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# **AMAJUBA DISTRICT MUNICIPALITY AIR QUALITY MANAGEMENT PLAN**

## **DRAFT GAP ANALYSIS AND INTERVENTION STRATEGY**

2018

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## 1. INTRODUCTION

The Amajuba District Municipality (Amajuba DM) is located within the north-western region of KwaZulu-Natal. Amajuba DM comprises three local municipalities (LM): Dannhauser LM; eMadlangeni LM; and Newcastle LM. Manufacturing, community services, financial and business services and trade are the main economic sectors in the Amajuba DM (Municipalities SA, 2017).

Air quality in South Africa is governed under the National Environmental Management Air Quality Act, (NEM: AQA) (Act No. 39, 2005) and related legislation such as the National Ambient Air Quality Standards (NAAQS) (Government Notice No. 1210, 2009). The NEM: AQA (Section 15(2)) requires Municipalities to introduce Air Quality Management Plans (AQMPs) that seek to improve air quality, identify and address emissions that have a negative effect on human health. Municipalities, in this case the Amajuba District Municipality, are required to include an AQMP as part of their Integrated Development Plans (IDP). The main objective of this project is to develop an AQMP for the Amajuba DM, as per the requirements of the NEM: AQA 2004.

This report entails the gap analysis stage of the AQMP process, which will assess the gaps within Amajuba DM with respect to past, present and current air monitoring activities, the emissions inventory, modelling and available information. The gaps found within the District will be outlined.



## **2. AIR QUALITY PRACTICES AND INITIATIVES: PROVINCIAL AND LOCAL GOVERNMENT**

This section will address the practices and initiatives in the Amajuba DM regarding air quality management. The discussion will cover the development of the vision, mission and objectives for air quality management within the Amajuba DM as well as assess the governmental structure and gaps in the human resources capacity. A review of AQM tools available within the Amajuba DM will follow and conclude the section.

### **2.1. Vision, mission and goals**

The vision, mission, goals and objectives developed for the Amajuba DM reflect the vision, mission and general approach for air quality management at the National, Provincial and Local levels. The National Framework for Air Quality Management (Government Notice No. 919, 2013) was referenced during this process to ensure the District is in-line with National requirements.

#### **2.1.1. Vision**

To attain and maintain of good air quality for the benefit of all inhabitants and natural ecosystems within the Amajuba DM.

#### **2.1.2. Mission**

- To ensure the maintenance of good air quality, through proactive and effective management principles that take into account the need for future sustainable development.
- To work in partnership with communities and stakeholders to ensure that air is healthy to breathe and is not detrimental to the well-being of the residents of Amajuba DM.
- To ensure that future developments (transportation, housing etc.) incorporate air quality impacts.
- To reduce the potential for damage to sensitive natural environmental systems from air pollution both in the short and long-term.
- To facilitate intergovernmental communication at the Local, Provincial and National levels to ensure effective air quality management and control in the Amajuba DM.

#### **2.1.3. Goals**

- Implementing the Air Quality Management Plan within the Amajuba DM.



- Assigning clear responsibilities and functions for air quality management.
- Air quality training of current and future air quality personnel at the local levels.
- Obtaining the necessary resources and funding for air quality management.
- Compliance monitoring and enforcement air quality legislation, policies and regulations.
- Assessing the contribution of various activities/ sources to ambient air quality and establishing measures to control emissions from these sources.

## 2.2. Government Structure and Functions

The capacity to conduct air quality management and control activities within the Amajuba DM is assessed within the various spheres of Government. The current capacity at Provincial, District and Local levels is evaluated in terms of available personnel, functions and resources. According to the NEM: AQA (Section 14(2) (3)) air quality officers at the provincial and local government are to be instated in order to co-ordinate matters pertaining to air quality management within their areas of jurisdiction.

### 2.2.1. Provincial Level

Within the KwaZulu Natal Province, the Department of Economic Development, Environment and Tourism (DEDET) is responsible for air quality related functions. Air Quality and Climate Change Management falls under the Environmental Quality Management Programme within the Environmental Management Directorate. The organisational structure of the Environmental Management Directorate is given in Figure 1.



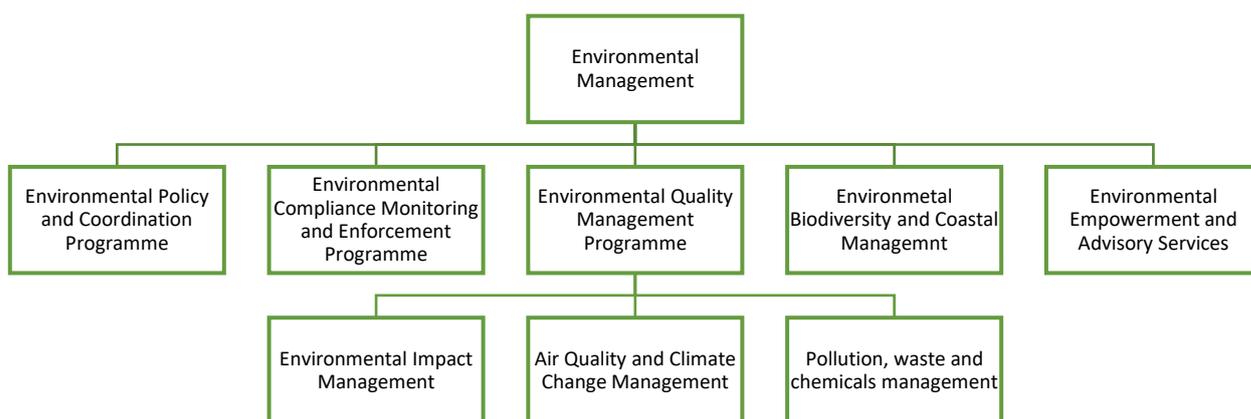


Figure 1: KwaZulu Natal Provincial organogram showing the position of Air Quality Management

### 2.2.2. District Level

Environmental and air quality related functions within the Amajuba DM are housed within the Planning and Development Directorate. The current staff compliment of this Directorate includes the Deputy Director: Environmental Management, Assistant Director: Air Quality and an Environmental Officer as shown in Figure 2. The responsibilities for this directorate include, *inter alia*;

- Development of the district Air Quality Management Plan, implementation and control in terms of the NEM:AQA;
- Assessment and processing of Atmospheric Emission licences;
- Compliance monitoring and enforcement of regulations;
- Co-ordination and facilitation of air quality management, clean and green (including climate change) activities;
- Complaints investigation and feedback to complainants;
- Guidance of other spheres of government with regards to air quality issues (Amajuba DM, 2018)



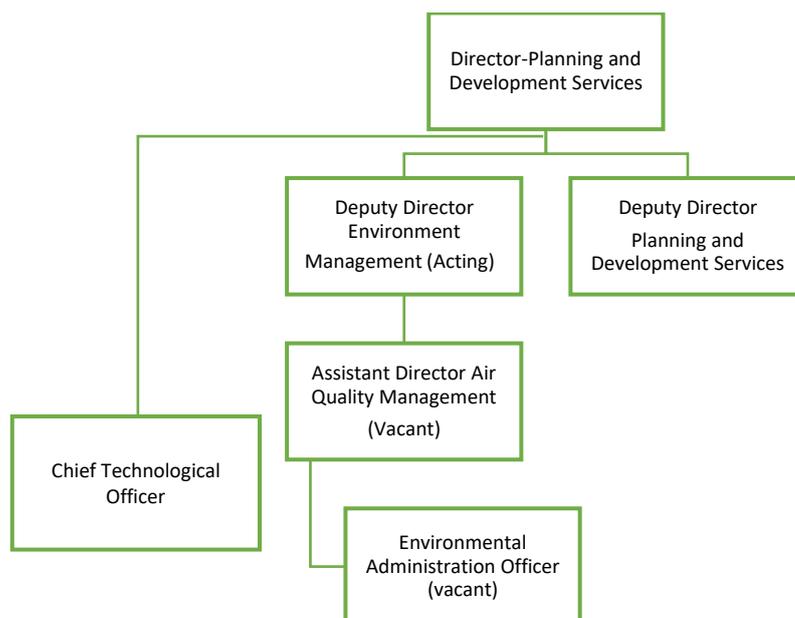


Figure 2: Amajuba DM Organisational Structure

### 2.3. Human Resources

As per Schedule 4, Part B, Section 156 of the Constitution, air pollution is an exclusive function of the Local Municipalities (NEM:AQA, 2012). Air quality functions are therefore, primarily the responsibility of the Local Government, with support to be provided from Provincial and National Government.

The Amajuba DM is currently not adequately capacitated in terms of human resources and the available personnel is unable to fulfil all the functions required to ensure efficient air quality management and control in the district. For the Amajuba AQMP to be implemented effectively, the capacity to enforce compliance with legislation is required. In order to increase the capacity in local government, authorities need to invest both time and capital. In addition to filling the vacant posts (Figure 2), it is recommended that the Amajuba DM increase the staff compliment of the Environmental Management Directorate to include two (2) Air Quality Officers, for the dedicated functions of licensing and compliance monitoring.

Municipalities are also required to undertake monitoring, data analysis and reporting on ambient air quality as per their mandate as air quality authorities. Training on calibration and maintenance of analysers for current and future ambient monitoring stations will be required, as well as training on data acquisition and analysis. For this task, technical personnel will need to be appointed.



### 2.3.1. Local Municipalities

According to legislation, municipalities are required to appoint an Air Quality Officer. Currently, no dedicated Air Quality Officers have been appointed at the Local Municipalities, with air quality functions forming part of other departments' responsibilities. In the Newcastle LM air quality related issues fall under Environmental Health in the Community Services Department. In the eMadlangeni LM air quality issues are addressed as part of the Civil Services Unit in the Planning and Infrastructure Services Department, while in Dannhauser LM air quality responsibilities fall under the Community Services Department.

Within the Local Municipalities, it is recommended that an air quality officer be appointed within each of the Local Municipalities. Support should also continue to be provided by Province, with various capacity building strategies initiated to ensure capacitation of staff within the Amajuba DM and each Local Municipality. The Amajuba DM should collaborate with other levels of Government and Industry which have been actively involved in air quality management and control for longer periods. Inter-governmental co-operation and co-ordination will support information sharing and dissemination.

### 2.3.2. Summary

A summary of the air quality responsibilities of the Amajuba DM and its local municipalities as per the National Framework for Air Quality Management (Government Notice No. 919, 2013) (Table 1).



Table 1: Air Quality Management Functions for Local Government

<b>Principal Responsibility</b>	<b>Action</b>	<b>Current Status</b>
Appointment of an AQO	Appointment of Air Quality Officer	Amajuba DM AQO currently appointed.
Monitor ambient air quality and point, non-point and mobile source emissions	Comply to South African emissions and ambient. Air Quality Standards through monitoring and reporting.	One monitoring station currently installed in the Newcastle LM
Development of air quality management plans as a component of IDPs as required by the Municipal Systems Act	Prepare AQM plan and implement the plan	In progress
The setting of municipal standards for emissions from point, non-point or mobile sources in the municipality in respect of identified substances or mixtures of substances in ambient air which, through ambient concentrations, bioaccumulation, deposition or in any other way, present a threat to health, well-being or the environment in the municipality.	Establish local emission standards	Ongoing
Implement the AQA atmospheric emission licensing system referred and for this purpose perform the functions of licensing authority as set out in this Chapter 5 and other provisions of the AQA.	Perform the prescribed duties of a licensing authority. Monitor emissions of listed activities against set standards	Ongoing
Monitoring potential illegal listed activities	Monitor and take action against offenders	
Monitoring compliance with emission standards in respect of the manufacture, sale or use any appliance or conducting of an activity declared as a controlled emitter	Monitoring compliance of controlled emitters against set standards	
Monitoring compliance in respect to reasonable steps to prevent the emission of any offensive odour caused by any activity.		
Monitoring compliance with directives to submit an atmospheric impact report.		



Principal Responsibility	Action	Current Status
Monitoring compliance with conditions or requirements of an atmospheric emission licence	Compliance monitoring of AEL holders	Ongoing
Monitoring any application for an atmospheric emission licence, or for the transfer, variation or renewal of such a licence to ensure that it does not contain false or misleading information		
Monitoring any information provided to an air quality officer to ensure that it does not contain false or misleading information		
Appointment of an Emission Control Officer in a given company as per section 48 of the NEM:AQA	Instruct the holder of an AEL as deemed necessary to appoint an Emissions Control Officer	ADM is the current licencing authority, ADM is investigating the possibility to hand down the responsibility to local municipal level and remain in an overseeing role.

Governance functions as relating to information management, problem identification and prioritisation, strategy development and standard setting, policy and regulation development, authorisations and compliance monitoring are outlined in the National Framework for Air Quality Management (Government Notice No. 919, 2013) in the environmental governance cycle.

## 2.4. Air Quality Management Tools

### 2.4.1. Complaints Response Database

Air pollution complaints received from the public need to be recorded in a database, investigated and addressed within each level of Government. Pollution complaints need to be logged into a centralised electronic pollution complaints database at provincial level to ensure the effective co-ordination and management of complaints received. Prior to such a system being implemented, it is recommended that the Amajuba DM maintain a complete complaints system, keeping records of responses, letters, notices and feedback to the complainant. Complaints should be broken down into complaint type such as smoke, odours, dust etc. and be dealt with accordingly. In terms of compliance and enforcement, verbal warnings can generally be issued and, in more serious offences, written notices are served.



There is currently no official system for capturing and addressing complaints in the Amajuba DM. However, when complaints are received, a site visit is conducted and a site visit report is compiled after which, recommended actions to address the complaint are communicated via written letter or email. Follow-ups are conducted and administrative action is carried out where necessary. These reports are then filed but not captured into a systematic complaint register. Classifying and electronically capturing the air related complaints in the Amajuba DM would help to monitor trends and areas of concern relating to air quality within the Amajuba DM's airshed.

#### 2.4.2. Emissions Inventory Database

As part of the South African Air Quality Information System Phase two, all source and emissions data recorded within each Municipality and Province should be incorporated into the National Atmospheric Emissions Inventory System (NAEIS), allowing for easy access and manipulation of data from any sphere of Government. Since NAEIS has been established, AEL holders have to submit annual emissions inventory reports for the compilation of a National emission inventory profile (NEM:AQA, 2013).

For effective air quality management and control, an accurate, electronic emissions inventory of point, non-point and mobile sources must be established. The emissions inventory includes information on source parameters (source location, stack height, stack diameter, exit gas velocity, exit temperature) and associated pollutant emission rates. An emissions inventory serves the following functions;

- Providing spatially resolved source strength data on each pollutant for dispersion modelling,
- Predicting environmental impacts,
- Helping in urban and regional planning,
- Supporting the design of regional monitoring networks,
- Contributing a basis for evaluating trends,
- Assisting in the formulation of air quality management policies.

It is not necessary for the Amajuba DM to purchase emissions inventory software; use can be made of available software such as Microsoft Excel to capture the emissions inventory information supplied by industries. The Amajuba DM will need to ensure that their current emissions inventory database is regularly updated and that it is incorporated into the South



African Air Quality Information System. Further to the the baseline emissions inventory developed for this AQMP, regular monitoring and updating of the emissions inventory will be required. The Amajuba DM will therefore have to put measures in place to monitor the burning of fuels in households, as well as agricultural, mining and industrial emissions in the region.

*(a) Development of the Emissions Inventory gaps and limitations*

In developing the dedeveloping the Emissions Inventory for the Amajuba as part of this AQMP, there were some limitations in terms of data availability and subsequently its usability.

#### Vehicle emissions

While the use of Fuel Sales Volume as a method of quantifying vehicle emissions is generally acceptable, having more detailed information on the local fleet and traffic volumes will make quantifying the emissions more accurate, however this level of information was not available at the time of this AQMP.

#### Domestic fuel burning

Data used in quantifying emissions from domestic fuel burning was obtained from the Stats SA 2016 Community Survey. Such data may not be fully representative of the actual habits of the community regarding use of domestic fuels and may result in the overestimation of emissions due to the manner in which questions are designed. Regular data collection by the Amajuba DM with specially designed questionnaires will ensure that more accurate data is obtained.

#### Crop and livestock emissions

Emissions from livestock were quantified using data from The Department of Agriculture Forestry and Fisheries. This data was only for commercial farming activities and did not take into account subsistence farming which is prevalent in some parts of Amajuba DM. For crop emissions, lack of recent data was a limitation as data from 2005 had to be used in the quantification. In addition, the absence of detailed data (area planted per crop type, crop types, fertiliser application etc.) impacts on the accuracy of the emissions quantification process as assumptions will have to be made.



#### 2.4.3. Dispersion modelling

Successful air quality management relies on data collection and monitoring. In this regard, the Amajuba DM does not have an Air Quality Information System in place, which can enable them to better monitor the air quality within the District and to respond appropriately. Dispersion modelling software is not available at either the Local, District or Provincial levels. The use of such modelling software is critical to the understanding of the temporal and spatial distribution of pollutants in the atmosphere. Data collection through monitoring of activities such as domestic fuel burning, biomass burning, industrial and agricultural emissions would facilitate the maintenance of an up to date emissions inventory.

#### 2.4.4. Ambient Air Quality Monitoring

An ambient air quality management system consists of various hardware, software, communication systems as well as activities related to the ongoing maintenance and calibration of the system. Continuous ambient air quality monitoring requires among other things; a set of trace gas analysers housed in a secure shelter, meteorological equipment, a data communication and acquisition system, as well as various other mechanical, civil and electrical structures such as an inlet manifold, fencing, concrete plinth, air conditioner, Uninterrupted Power Supply (UPS) and safety devices such as a lightning conductor. As part of a monitoring network design (macro and micro-siting) it is important to consider the following aspects:

- Proximity to residential areas,
- Location of industries, major roads, sources of domestic fuel burning emissions etc.,
- Dominant wind direction,
- Dispersion modelling results,
- Topography,
- Location of existing monitoring stations,
- Sensitive environments,
- Sensitive populations,
- Trans-boundary transport of air pollution from neighbouring sources.

#### *Continuous Ambient Air Quality Monitoring*

Continuous ambient air quality monitoring ensures that the environment is being properly protected and helps Local Government manage the impact of atmospheric emissions on the environment. This type of monitoring provides continuous, accurate data on pollution



concentrations at a specific location. However, limitations of this type of monitoring are associated with spatial coverage, technical skills required for maintenance and calibration as well as the ongoing financial implications. An example of such a monitoring station is shown in Figure 3. There is one ambient air monitoring station in Amajuba DM, located in Newcastle LM at Amcor Dam. This station monitors the ambient air quality for Newcastle and is located to better monitor the impacts of industry on air quality (KZN DARD, 2012). The Newcastle LM IDP 2018/2019 highlighted the need to maintain the equipment for air quality monitoring in their jurisdiction (Newcastle LM, 2018).



Figure 3: Examples of continuous ambient air quality monitoring stations

Concerns for the quality of air have been raised for the industrialised Newcastle LM during the development of the Newcastle LM Environmental Management Framework. Residents noted with concern the industrial emissions which impact on the Madadeni and Osisweni settlements in the local municipality (Thornhill & Richardson, 2014).

#### *Passive Diffusive Monitoring*

Passive monitoring is an inexpensive method of monitoring over a large area and requires little human intervention. Passive diffuse samplers can measure a range of pollutants including SO<sub>2</sub>, NO<sub>2</sub>, O<sub>3</sub>, hydrogen sulphide (H<sub>2</sub>S), hydrochloric acid, VOCs, and various aldehydes among others. Passive diffusive sampling calculates an average reading over a time period as opposed to real-time data acquisition that continuous monitoring can provide. Passive diffuse samplers (Figure 4) have to be sent away to an accredited laboratory for analysis, further extending the lag time in getting results (approximately 4 weeks). Passive sampling conforms to international methodologies and standards and can be used to validate dispersion modelling results or as an indicative measure for continuous monitoring.



However, there are limitations associated with passive monitoring. These include questionable concentrations given that passive monitoring is based on diffusion of pollutants while comparison with ambient air quality guidelines/standards is difficult. Extreme meteorological conditions such as high humidity and temperatures influence diffusion rates, and hence, affect concentrations.



Figure 4: Passive sampling equipment

## 2.5. Concluding remarks

This report served to highlight the gaps identified within Amajuba DM with regards to fulfilling the legislative requirements of air quality management. Recommendations and interventions will be discussed in the final AQMP report.



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