



# AIR QUALITY MANAGEMENT PLAN

# 2019

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# CONTENTS

FOREWORD FOR THE THIRD GENERATION AIR QUALITY MANAGEMENT PLAN.....	2
ABBREVIATIONS AND DEFINITIONS .....	4
EXECUTIVE SUMMARY .....	5
1 INTRODUCTION .....	9
2 AIR QUALITY IN GRDM .....	16
3 AREAS OF CONCERN .....	19
4 AQMP GOALS AND OBJECTIVES.....	27
GOAL 1: Ensure effective and consistent air quality management.....	28
GOAL 2: Ensure effective and consistent compliance monitoring and enforcement .....	35
GOAL 3: Continually engage with stakeholders to raise awareness with respect to Air Quality Management (AQM) and Climate Change Response (CCR).....	36
GOAL 4: Support AQM and CCR programmes, including promoting and facilitating the reduction of greenhouse gas emissions .....	36
5 SPECIFIC REQUIREMENTS APPLICABLE TO THE GRDM .....	42
CLOSING STATEMENT.....	45
REFERENCES .....	46
ANNEXURE 1   LEGISLATION .....	47
PHOTO CREDITS .....	48



# FOREWORD FOR THE THIRD GENERATION AIR QUALITY MANAGEMENT PLAN



It is with great excitement that I present the Third Generation Garden Route District Municipality (GRDM) Air Quality Management Plan (AQMP). A comprehensive AQMP through which the District plans to continue to protect the air that we breathe. We are undoubtedly one of the front-running municipalities with regards to Air Quality Management in South Africa. This is achieved because of our commitment to legislative prescripts, continuous improvement on an already high standard of work ethic. Apart from this, our Air Quality vision confirms our commitment “To have air quality worthy of the name ‘Garden Route’.”

This plan followed the required public participation processes and considered inputs from all relevant role-players. The goals of the plan will require passion, commitment and hard work from both the District’s Air Quality Unit, as well as a co-

operative industrial sector, business and civil society. My promise is to ensure that we provide the necessary political muscle to strengthen the hands of officials.

We are aware of the increased risk that air quality pose to vulnerable community members. It is for this reason that the AQMP will prioritise to protect them against exploitation.

Moreover, the AQMP focuses on ongoing GRDM Clean Fires campaigns. Primary Schools will benefit greatly from the informative and educational material presented to them. We will aim to build on the current coordination efforts, air quality activities and support provided to local municipalities within our jurisdiction.

The success of any plan is, however, the buy-in from all sectors and the continued cooperation between GRDM and partners, such as the local municipalities, provincial - and national Government and the private sector.

This Third Generation GRDM Air Quality Management Plan is also rooted in the Second Generation Provincial AQMP, as required by the National Framework for Air Quality Management in South Africa. It provides the best practice upon which GRDM and municipalities will continue to effectively and efficiently implement air quality management in the Garden Route over the next 5 to 6 years, by continually protecting our communities against harmful air quality practices.

COUNCILLOR MEMORY BOOYSEN

EXECUTIVE MAYOR: GARDEN ROUTE DISTRICT MUNICIPALITY







# ABBREVIATIONS AND DEFINITIONS

AEL .....	Atmospheric Emissions License
AQM .....	Air Quality Monitoring
AQMP.....	Air Quality Management Plan
AQO .....	Air Quality Officer
ARC.....	Agriculture Research Council
CCR.....	Climate Change Response
DEA & DP .....	Department of Environmental Affairs and Development Planning
DEFF.....	Department of Environment, Forestry and Fisheries
EIS .....	Electronic Information System
GHG .....	Greenhouse Gas
GRDM .....	Garden Route District Municipality
H <sub>2</sub> S.....	Hydrogen Sulphide
IDP .....	Integrated Development Plan
mg/ton .....	Milligrams per ton
NAEIS.....	National Atmospheric Emission Inventory System
NEM:AQA .....	National Environmental Management: Air Quality Act, Act 39 of 2004 as amended
NO .....	Nitrogen Monoxide
NO <sub>2</sub> .....	Nitrogen Dioxide
NOx.....	Nitrogen Oxides
PM10 .....	Particulate Matter with aerodynamic diameter smaller than 10 micron
SAAQIS .....	South African Air Quality Information System
SAWS .....	South African Weather Service
SO <sub>2</sub> .....	Sulphur Dioxide
SO <sub>3</sub> .....	Sulphur Trioxide
THC.....	Total Hydrocarbon Content
tpa .....	Tons per Annum
TPM .....	Total Particulate Matter
WCG.....	Western Cape Government



# EXECUTIVE SUMMARY

An Air Quality Management Plan (AQMP) was compiled for the Garden Route District Municipality (GRDM), formerly known as the Eden District Municipality, in 2006 as required by the National Environmental Management: Air Quality Act, 2004 as amended (NEM:AQA). As required by this Act, the AQMP must be reviewed and revised every 5 to 6 years and this was done during 2012/13. That version was reviewed recently and revised to suit the changing environment within the GRDM region.

In this process an in-depth background study was carried out to assess the following:

- The degree to which GRDM complied with the objectives of the 2012/2013 version of the AQMP.
- The status quo with respect to air quality management capabilities in GRDM and the seven local municipalities that make up the Garden Route district.
- Compilation of an extensive emissions inventory, including the emissions of greenhouse gases.
- A detailed dispersion modelling study aimed at understanding the air quality within the GRDM region.
- Air quality monitoring and modelling capabilities within the Garden Route region.

The findings of these assessments are discussed in various progress reports which are available to the public on GRDM's website. The individual reports are listed on the Reference page.

The vision and mission of the AQMP remain unchanged.

## VISION

*To have air quality worthy of the name “The Garden Route”*

## MISSION STATEMENT

*To minimise the impact of air pollutant emissions on the population and the natural environment of the Garden Route Municipal District*







A key requirement in the revision process was to align the GRDM's AQMP with the Western Cape Government Air Quality Management Plan (WCG AQMP).




The WCG AQMP was revised in 2016 and forms the backbone of the newly published GRDM AQMP and its goals will be used to strengthen GRDM's air quality management performance over the next five year period.

Within the Western Cape Provincial context, GRDM issued 21% of the total number of Atmospheric Emissions Licenses (AELs) and 18% of industry registered on the National Atmospheric Emissions Inventory System (NAEIS) within the Western Cape Government, second only to the City of Cape Town (CCT). As such, the GRDM region is recognised as the second most industrialised area within the Western Cape Government.

Industry in GRDM includes, but is not limited to:

- Combustion Installations
- Petroleum Industry
- Carbonisation and Coal Gasification
- Metallurgical Industry
- Mineral Processing, Storage and Handling
- Disposal of Hazardous and General Waste
- Animal Matter Processing
- Temporary Asphalts
- Solid Biomass Fuel-Fired Small Boilers
- Small-scale Char and Charcoal Manufacturers
- Tourism

Based on the four goals established in the WCG AQMP, GRDM's performance over the past six years is reflected in the scorecard on the following page. Please note that this is an average across municipal and district air quality management performance.

PERFORMANCE INDICATORS		
		
Good	Average	Poor

Key for Table 1























GOAL	STATUS	
	District	Local Municipalities
<b>GOAL 1: Ensure effective and consistent air quality management</b>		
Strengthen and build capacity in AQM, compliance and enforcement		
Promote cooperation amongst all spheres of government, business, industry and civil society		
Develop institutional mechanisms to improve air quality and climate change response		
Develop, implement and maintain air quality management systems		
Ensure adequate funding for the implementation of AQM by municipalities		
<b>GOAL 2: Continually engage with stakeholders to raise awareness with respect to Air Quality Management (AQM) and Climate Change Response (CCR)</b>		
Develop comprehensive education and communication mechanisms, strategies and programmes with respect to AQM and CCR		
<b>GOAL 3: Ensure effective and consistent compliance monitoring and enforcement</b>		
Improve air quality compliance monitoring and enforcement		
Promote continuous improvement in respect of industry air quality compliance		
Develop and implement air quality regulatory processes		
<b>GOAL 4: Support air quality and CCR programmes, including promoting and facilitating the reduction of greenhouse gas emissions</b>		
Reduce ozone depleting substances and greenhouse gas emissions, in line with National and International requirements		

Table 1: Compliance with 2012/13 AQMP



This third edition of GRDM's AQMP provides insight into the state of air quality within the seven municipalities which form the district. The seven municipalities are: Bitou, Knysna, George, Mossel Bay, Hessequa, Kannaland and Oudtshoorn.

The AQMP review process included a comprehensive dispersion modelling study, the results of which indicated a number of potential air quality concerns. The areas where these concerns arose and the respective pollutants involved, are:

- Bitou: Particulate matter
- Knysna: Nitrogen dioxide
- George: Particulate matter
- Mossel Bay: Nitrogen dioxide and odours
- Oudtshoorn: Particulate matter, sulphur dioxide and nitrogen dioxide

The Draft AQMP and all supporting documentation were made available to the public in general with an open invitation to submit comments on all aspects covered. A comprehensive report dealing with the public participation process is also available on GRDM's website.





# INTRODUCTION

The World Health Organisation (WHO) estimated that 9 out of every 10 people globally do not have access to clean air. Furthermore, based on 2016 data, 4.2 million deaths annually were due to poor ambient air quality, and 3.8 million due to poor indoor air quality.

To improve air quality and reduce greenhouse gas emissions, the Department of Environment, Forestry and Fisheries published a number of regulations (listed in Annexure 1). The National Climate Change Response White Paper (DEFF, 2011), provides that South Africa will integrate climate change considerations into health sector plans to “reduce the incidence of respiratory diseases and improve air quality through reducing ambient particulate matter, ozone and sulphur dioxide concentrations by legislative and other measures to ensure full compliance with the National Ambient Air Quality Standards by 2020. In this regard, the use of legislative and other

measures that also have the co-benefit of reducing greenhouse gas emissions will be prioritised”.

In accordance with regulations, GRDM published the first AQMP in 2006 and it was reviewed in 2012/13. This is the third edition of the AQMP and allows the District Municipality to:

- Compare performance to the previous and Provincial Air Quality Management Plan
- Confirm the current state of air quality in the district
- Identify areas of concern
- Develop objectives to achieve over a five year period

The vision and mission of the AQMP remain unchanged.





## VISION

*To have air quality worthy of the name  
“The Garden Route”*

## MISSION STATEMENT

*To minimise the impact of air  
pollutant emissions on the population  
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Garden Route Municipal District*

GRDM is one of the most picturesque areas in the world and receives international acclaim. High tourist occupancy is experienced throughout the year. GRDM encompasses a very large area across seven municipalities and a variety of climatic conditions.

Population in the district is of low density. As at the end of 2014, GRDM accounted for 9.8% of the Western Cape Government’s population, second only to the City of Cape Town, with George, Mossel Bay and Oudtshoorn comprising 66% of the total population within the area. Population growth is estimated at 3.5% per annum, but since the last census was conducted in 2011, no current information is available.

Major industries are centred within town boundaries, with the highest concentration found in George, followed by Mossel Bay and Oudtshoorn.

Primary economic activities are listed below:

- Agriculture
- Brick manufacturing
- Fisheries, rendering and related industry
- Forestry and related industry
- Petrochemical industry
- Tourism

A summary of GRDM activities, relating to the WCG AQMP goals, are summarised in the following table.



WCG AQMP GOAL	GRDM ACTION AND FEEDBACK
Goal 1: Ensure effective and consistent air quality management	
Strengthen and build capacity in AQM, compliance and enforcement	<ul style="list-style-type: none"> <li>• GRDM has a team of two well-trained and experienced officers, assisted by one administrative official. Both officers are designated as Environmental Management Inspectors (Green Scorpions)</li> <li>• All seven municipalities have designated Air Quality Officers (AQO's)</li> <li>• The majority of compliance and enforcement of licensed industry is managed by GRDM</li> <li>• The majority of related concerns are directed to GRDM</li> <li>• Some of the Local Municipal AQO's only spend 5 to 10% of their time on air quality. The balance is allocated to other duties.</li> <li>• All licensed industries have designated Emission Control Officers (ECO)</li> <li>• GRDM established an Air Quality Officers' forum which serves as a platform for information-sharing and discussing air quality related issues within the district</li> </ul>
Promote cooperation amongst all spheres of government, business, industry and civil society	<ul style="list-style-type: none"> <li>• Quarterly Industry Working Group Forums are hosted by GRDM.</li> <li>• GRDM and the Provincial Department host Air Quality Officer Forums (AQOF).</li> <li>• There are currently few dedicated Environmental Management Inspectors (EMI). The two GRDM officials are designated inspectors. The Municipal AQO's all received the required training, barring those in Kannaland.</li> <li>• GRDM forms part of a forum hosted by The Provincial Directorate: Environmental Law Enforcement, which include all EMI's in the district</li> </ul>





WCG AQMP GOAL	GRDM ACTION AND FEEDBACK
<p>Develop institutional mechanisms to improve air quality and climate change response</p>	<ul style="list-style-type: none"> <li>• All current and future listed activity industry are subjected to stringent environmental approval and atmospheric emissions licensing criteria</li> <li>• Incidents and transgressions are investigated, using approved methodology, and are thoroughly documented</li> <li>• Industries which are non-compliant, are dealt with within the approved framework</li> <li>• One of the municipalities within GRDM has a service-level agreement with GRDM. As per legislation this is a temporary measure</li> <li>• An emissions inventory exists and is updated annually by GRDM</li> <li>• Development of an AQMP and working towards reaching goals</li> <li>• Continuous discussion between Provincial, District and Municipal managers to ensure that air quality management is provided for as a dedicated component within the municipal structures</li> </ul>
<p>Develop, implement and maintain air quality management systems</p>	<ul style="list-style-type: none"> <li>• Three Provincial ambient air quality monitoring stations provide information on the air quality within GRDM. The information of the George station may be viewed by the public using the South African Air Quality Information Systems (SAAQIS) App, available on all electronic stores</li> <li>• The National Atmospheric Emission Reporting Regulations enforces annual reporting of emissions and Controlled Emitters, including greenhouse gas emissions from all licensed industries. Municipalities may request small boiler operators to submit on the same portal</li> <li>• Short term air quality screening programmes are executed by the District</li> <li>• Atmospheric Emission Licence (AEL) applications are managed through the SA Atmospheric Emission Licencing &amp; Emissions Inventory Portal (SAAELIP) which ensures that the AEL application process is managed in a time-conscious manner</li> <li>• GRDM is in the process of the development of a reporting system for all industries that forms part of the emission inventory and are excluded from the Section 21 and 23 activities.</li> <li>• In 2018, GRDM introduced a self-auditing system for the licenced activities in the region. Each industry is required to submit a compliance report to GRDM on a quarterly basis.</li> </ul>



WCG AQMP GOAL	GRDM ACTION AND FEEDBACK
<p>Ensure adequate funding for the implementation of AQM by municipalities</p>	<ul style="list-style-type: none"> <li>• Five of the seven municipalities adopted the 2012 AQMP into their municipal IDP's</li> <li>• Very low funding has been allocated to air quality management to date</li> <li>• Insufficient budget is made available to maintain air quality and take required steps to manage air quality</li> </ul>
<p><b>Goal 2: Continually engage with stakeholders to raise awareness with respect to Air Quality Management (AQM) and Climate Change Response (CCR)</b></p>	
<p>Develop comprehensive education and communication mechanisms, strategies and programmes with respect to AQM and CCR</p>	<ul style="list-style-type: none"> <li>• Regular Provincial and District training programmes are hosted aimed at industry and the public</li> <li>• WCG launched the SMART-air Programme</li> <li>• South African Air Quality Information Systems (SAAQIS) launched an app which the public could use to gauge air quality in a specific area.</li> <li>• GRDM undertakes Vehicle Emission testing in collaboration with the AQO's of the local authorities in the region with the aim to educate drivers on vehicle emissions.</li> <li>• Since 2011, the Garden Route District Municipality's District Air Quality Unit has embarked on an air quality awareness raising project, called the Garden Route Clean Fire Campaign. The project was identified due to poor air quality especially in informal settlements, caused by fires used for household purposes, such as cooking and heating. Awareness sessions entailed the training of peers as educators to teach the communities on proper fire making methods and the dangers of air pollution. Recently, the awareness sessions further extended to a level whereby the Department of Education allowed the Air Quality Project to be incorporated into the curriculum of Grade 3 learners in the Garden Route. This approach ensures that the project reach all grade three learners, making a major impact in raising awareness about air quality.</li> </ul>





WCG AQMP GOAL	GRDM ACTION AND FEEDBACK
<b>Goal 3: Ensure effective and consistent compliance monitoring and enforcement</b>	
Improve air quality compliance monitoring and enforcement	<ul style="list-style-type: none"> <li>Industry submits quarterly air quality reports to GRDM as part of open communication channels and jointly taking responsibility for air quality management</li> <li>WCG is developing a Western Cape compliance and enforcement programme. Once established, GRDM will include the measures in its air quality management and enforcement strategy</li> <li>GRDM undertakes compliance and enforcement activities at licenced activities and also in collaboration with DEA&amp;DP Air Quality Management Department</li> </ul>
Promote continuous improvement in respect of industry air quality compliance	<ul style="list-style-type: none"> <li>During quarterly Industry Working Group meetings, industry receives information from a variety of consultants to improve air quality compliance</li> </ul>
Develop and implement air quality regulatory processes	<ul style="list-style-type: none"> <li>Three of the seven municipalities adopted air quality by-laws. All by-laws are generically in line with the National directive in terms of allowable operating conditions and limits</li> </ul>
<b>Goal 4: Support AQM and CCR programmes, including promoting and facilitating the reduction of greenhouse gas emissions</b>	
Reduce ozone depleting substances and greenhouse gas emissions, in line with National and International requirements	<ul style="list-style-type: none"> <li>Educational programmes which promote alternative fuel sources</li> <li>Incorporation of reporting greenhouse gas (GHG) emissions as an AEL condition</li> </ul>

Table 2: Compliance with WCG AQMP



The Garden Route District Municipality appointed Lethabo Air Quality Specialists (Pty) Ltd (LAQS) to review its Air Quality Management Plan (AQMP) and to revise it if necessary. LAQS carried out an extensive study in the GRDM region to assess various aspects associated with air quality management and the findings were contained in various reports, which are available on GRDM's website.



Those reports and LAQS's summarised findings, are:

## Progress Report 1

### Compliance with the Existing Air Quality Management Plan

Virtually all of the goals set in the 2012/13 AQMP were met. Those not met were instances where specific actions were not yet required, e.g. health risk assessments, etc.

## Progress Report 2

### Status Quo Assessment and Municipal Capacity

All municipalities within GRDM have designated air quality officers (AQO's), but not all the Air Quality Management Plans defined in 2012 /13 were adopted and included in the Integrated Development Plans. AQO's spend much more time on other duties, while air quality management activities receive low priority, except at District level. Limited or non-existent budgets severely hamper the efficiency of air quality management throughout the District.

## Progress Report 3

### Emissions Inventory

The emissions of various pollutants that occurred within the Garden Route district during 2018 are given below. For the sake of comparison, emissions from two significant wildfire incidents were also estimated.

## Progress Report 4

### Assessment of Air Quality in the Garden Route Region

Comprehensive dispersion modelling was done to assess the general air quality within the region. Some potential problem areas were identified and these are discussed in detail below.

## Progress Report 5

### Monitoring and Modelling Requirements

The long term monitoring of air pollutants in general is sufficient for the region, but short term monitoring projects in potential problem areas are highly recommended. No dispersion modelling capabilities exist and it is recommended that such a facility be established as a matter of priority to aid in air quality management in the region.





# 2

## AIR QUALITY IN GRDM

LAQS compiled a detailed inventory of emissions that occurred during 2018 and the outcome is summarised in the table below. The following sources were assessed and included in the inventory:

Industrial sources, including both licensed and unlicensed sources

- Residential emissions (use of fuel sources such as paraffin, coal and wood)
- Mobile emissions (vehicles, harbour and airport)
- Municipal solid waste disposal
- Municipal waste water treatment plants
- Farm animals

The impact of the 2017 Knysna and 2018 Outeniqua fires was investigated. Based on available information and making use of general international emission factors, the estimated emissions during these two incidents are summarised below for comparison against the emissions inventory.



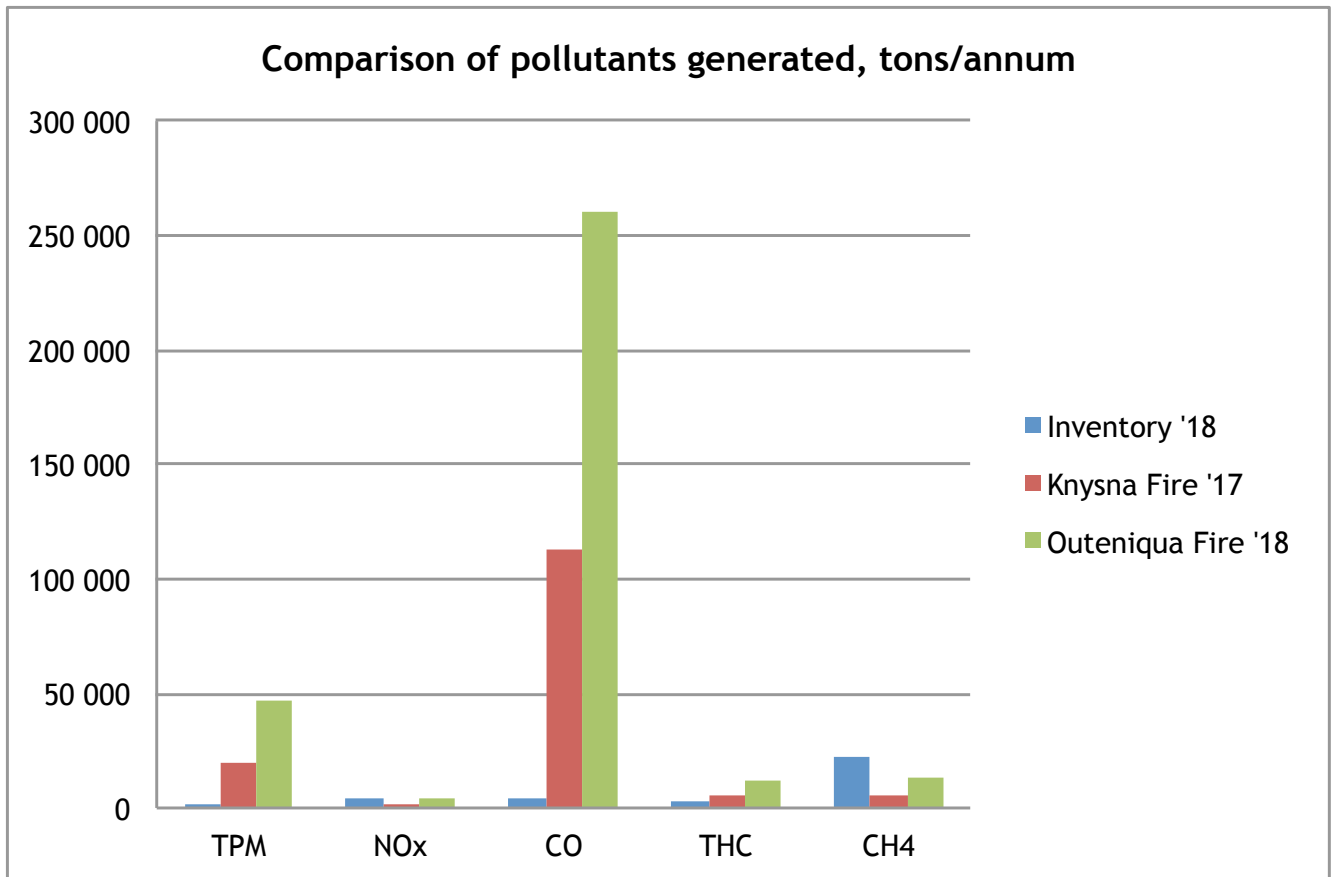
POLLUTANT	GRDM Inventory	GRDM Fire Incidents	
		Knysna 2017	Outeniqua 2018
Total particulate matter	1 083	19 889	46 968
Sulphur dioxide (SO <sub>2</sub> )	982	No reliable emission factors	
Nitrogen oxides (NO <sub>x</sub> )	4 464	1 913	4 463
Carbon monoxide (CO)	3 797	112 659	260 552
Carbon dioxide (CO <sub>2</sub> )	1 598 444	No reliable emission factors	
Total hydrocarbons (THC)	3 410	4 983	11 840
Methane (CH <sub>4</sub> )	16 566	5 631	13 175
Odorous compounds	55	No reliable emission factors	

**Table 3: Summarised Emissions Inventory for GRDM**

As can be seen from the comparative figures above, the emissions from the Outeniqua fire in 2018 exceeded the total emissions from all sources included in the emissions inventory. The difference lies in the duration of emissions. The forest fire emissions occurred over a relatively short period of time, numbered in days, whereas the emissions included in the emissions inventory occurred continuously throughout the year.







**Figure 1: Graphic Comparison of GRDM and Forest Fire Emissions**

Health risk is based on dosage and time of exposure, i.e. a high dosage over a short period of time is as dangerous as a low dosage over an extended period of time. Community involvement and education is, therefore, of extreme importance. Developing strategies to avoid fires in general and wildfires in particular, is imperative to ensure good air quality and promote health. These include preventative fire-breaks, prohibiting the burning of garden refuse, etc., but does not negate the need for industries and consumers to curb air pollution.





3

# AREAS OF CONCERN

To date, GRDM reacted to complaints by the general public and thus identified areas of concern. Invariably this led to some form of air quality monitoring, typically using screening methods already in GRDM's possession.

A comprehensive dispersion modelling study was conducted after compilation of the emissions inventory. The aim of the study was to determine if any other areas of concern existed outside the knowledge of both the GRDM and municipal personnel. The dispersion model indicated potential problem areas in five of the seven municipalities within the GRDM region.

The areas where these concerns arose and the respective pollutants involved, are:

- Bitou: PM10 Particulate matter
- Knysna: Nitrogen dioxide
- George: PM10 Particulate matter
- Mossel Bay Nitrogen dioxide and odours
- Oudtshoorn: PM10 Particulate matter, sulphur dioxide and nitrogen dioxide



The problem areas are shown graphically in the following pages and form the basis of LAQS's recommendations for project-based air quality monitoring actions. The pollutants involved all pose health risk problems, the exception being odours. At the estimated concentrations the odorous compounds do not pose a health risk, but are a nuisance and impacts quality of life and tourism. The health risks of PM10 particulates, SO<sub>2</sub> and NO<sub>2</sub> have been researched extensively and are summarised as follows:

## PM10 particulates

The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can penetrate deep into the lungs, and some may even reach the bloodstream.

Exposure to such particles can affect both the lungs and heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- premature death in people with heart or lung disease
- non-fatal heart attacks
- irregular heartbeat
- aggravated asthma
- decreased lung function
- increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

People with heart or lung diseases, children, and older adults are most likely to be affected by particle pollution exposure.

## Sulphur dioxide

Short-term exposures to SO<sub>2</sub> can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO<sub>2</sub>.

SO<sub>2</sub> emissions that lead to high concentrations of SO<sub>2</sub> in the air generally also lead to the formation of other sulphur oxides (SO<sub>x</sub>). SO<sub>x</sub> can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution. Small particles may penetrate deeply into the lungs and, in sufficient quantity, can contribute to health problems.

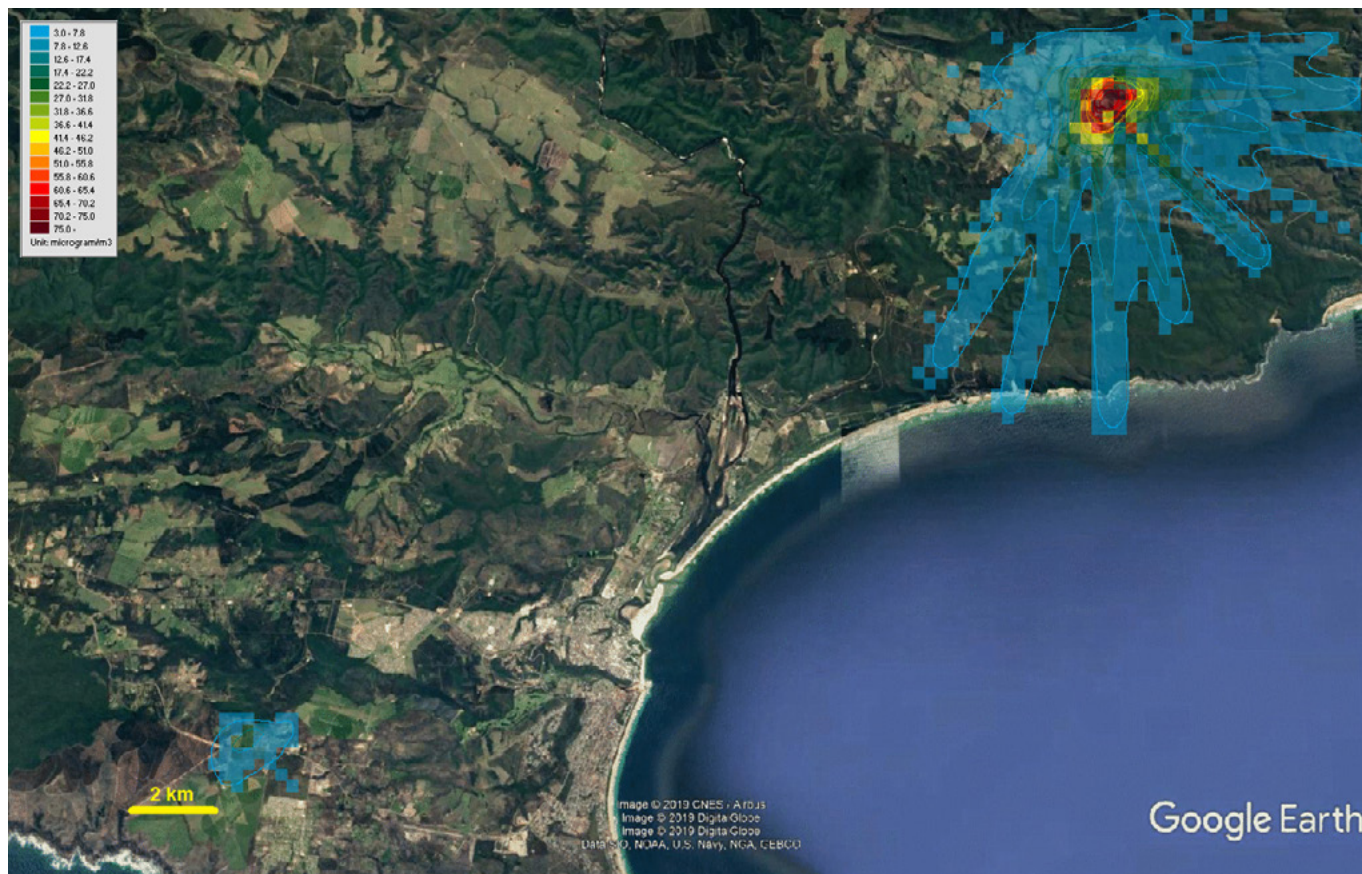
## Nitrogen dioxide

Breathing air with a high concentration of NO<sub>2</sub> can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO<sub>2</sub> may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly, are generally at greater risk for the negative health effects of NO<sub>2</sub>.

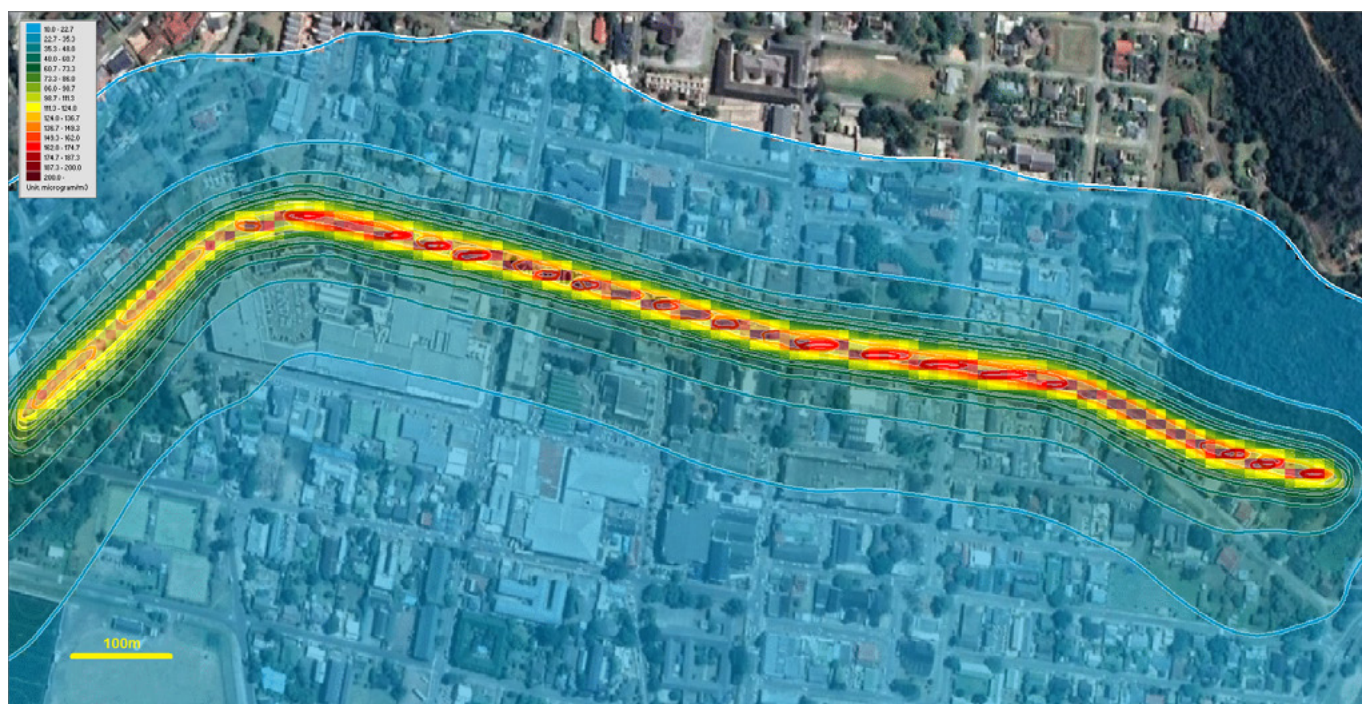
NO<sub>2</sub>, along with other NO<sub>x</sub>, reacts with other chemicals in the air to form both particulate matter and ozone. Both of these are also harmful when inhaled due to effects on the respiratory system.

From the figures on the following pages it can be seen that direct attention is required to prevent health impact in the Garden Route region.





**Figure 2: 99-percentile daily average PM10 concentrations in the vicinity of Kurland, Bitou.** Burgundy coloured regions show areas where the air quality standard of 75 µg/m<sup>3</sup> may be exceeded.



**Figure 3: 99-percentile NO<sub>2</sub> concentrations along Main Road, Knysna.** Burgundy coloured regions show areas where the air quality standard of 200 µg/m<sup>3</sup> may be exceeded.



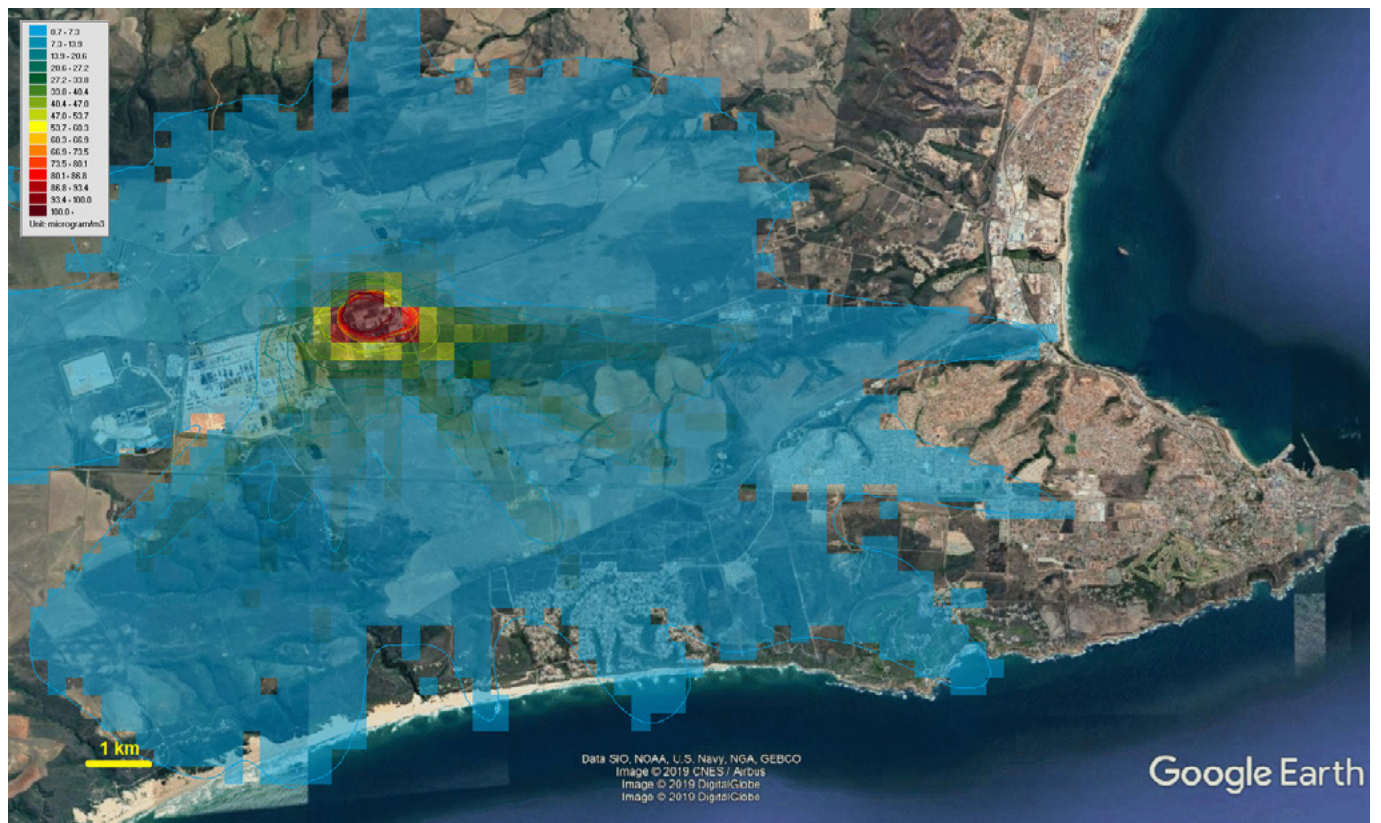


**Figure 4: 99-percentile daily average PM10 concentrations in the vicinity of the George industrial area. Burgundy coloured regions show areas where the air quality standard of 75  $\mu\text{g}/\text{m}^3$  may be exceeded.**

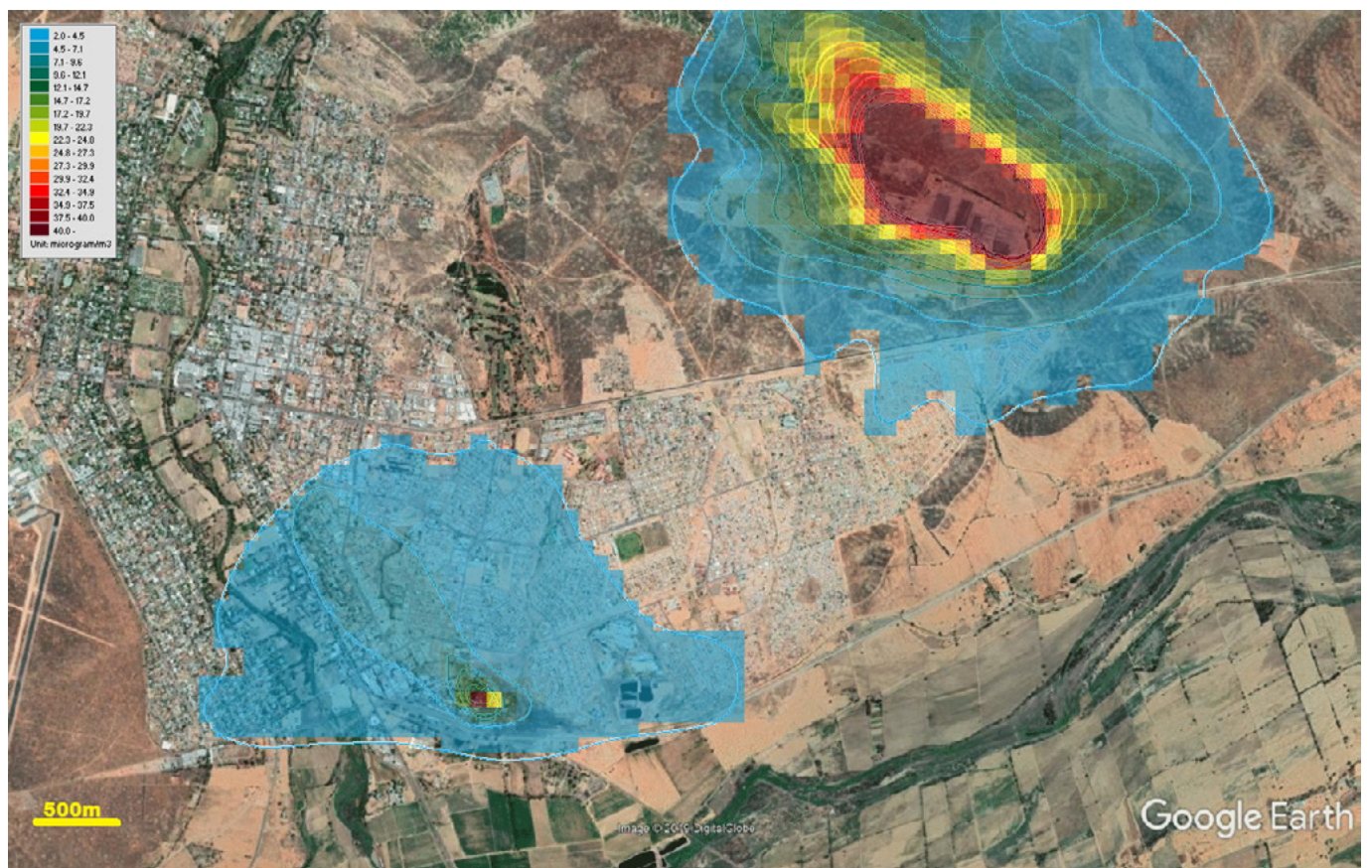


**Figure 5: 99-percentile NO<sub>2</sub> air quality standard in danger of being breached along R102 in Heiderand. Orange / red coloured regions show areas where the estimated concentration is approximately 80% of the air quality standard of 200  $\mu\text{g}/\text{m}^3$ .**



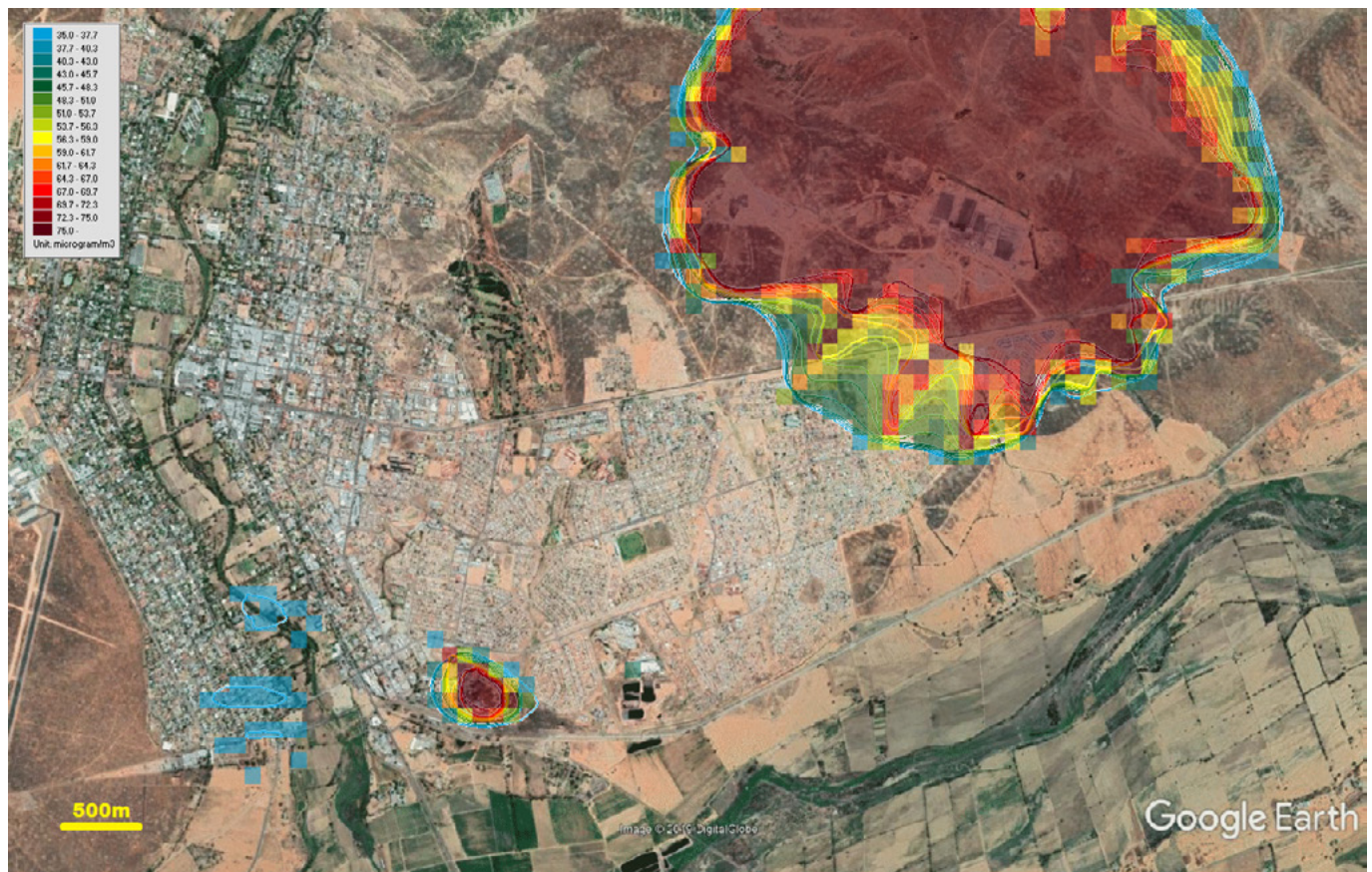


**Figure 6: Areas over which odours may be detected in the Mossel Bay area for 1% of the time (88 hours per year).**



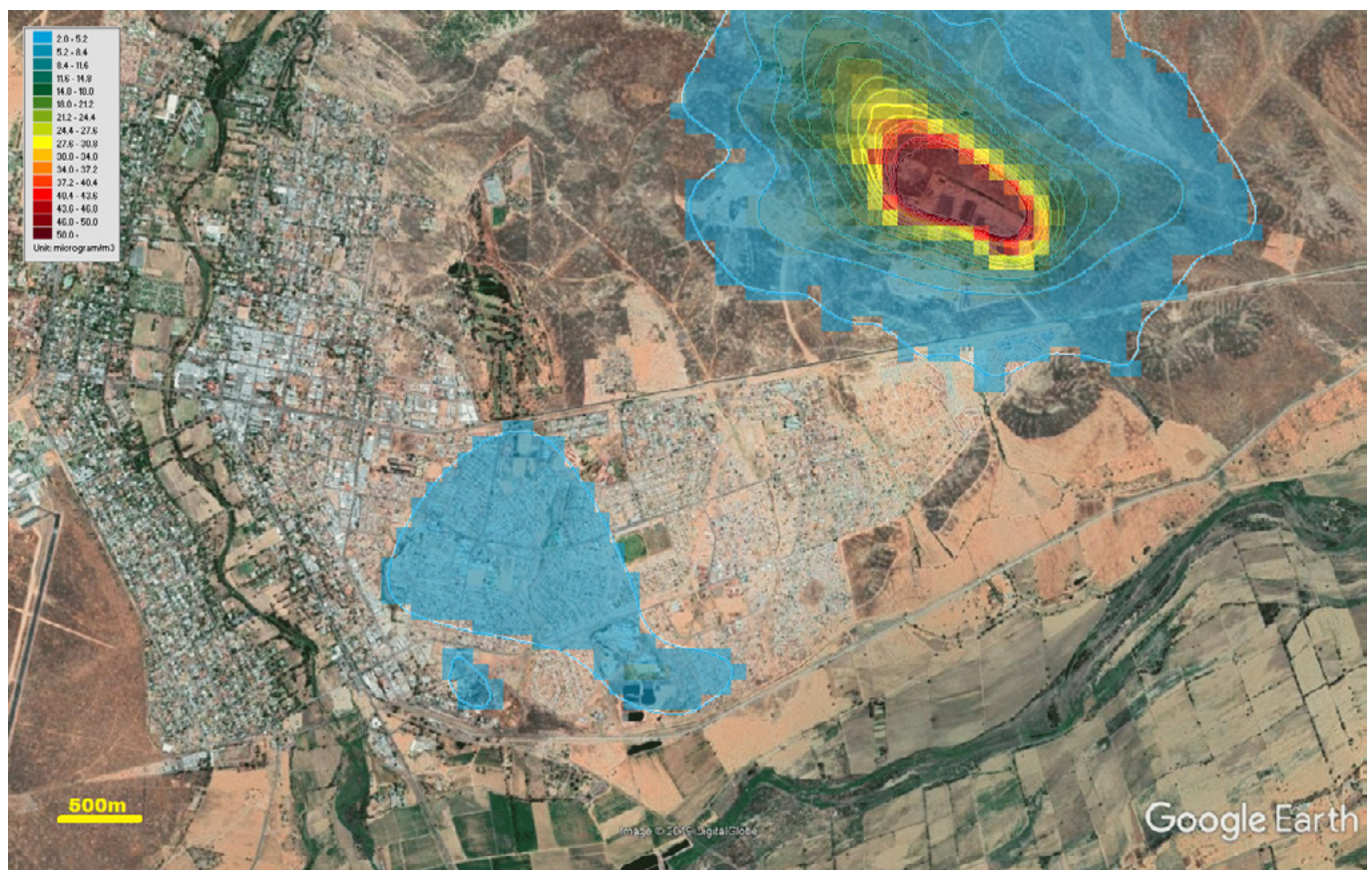
**Figure 7: Annual average PM10 concentrations in the vicinity of a brick manufacturer, Oudtshoorn. Burgundy coloured regions show areas where the air quality standard of  $75 \mu\text{g}/\text{m}^3$  may be exceeded.**





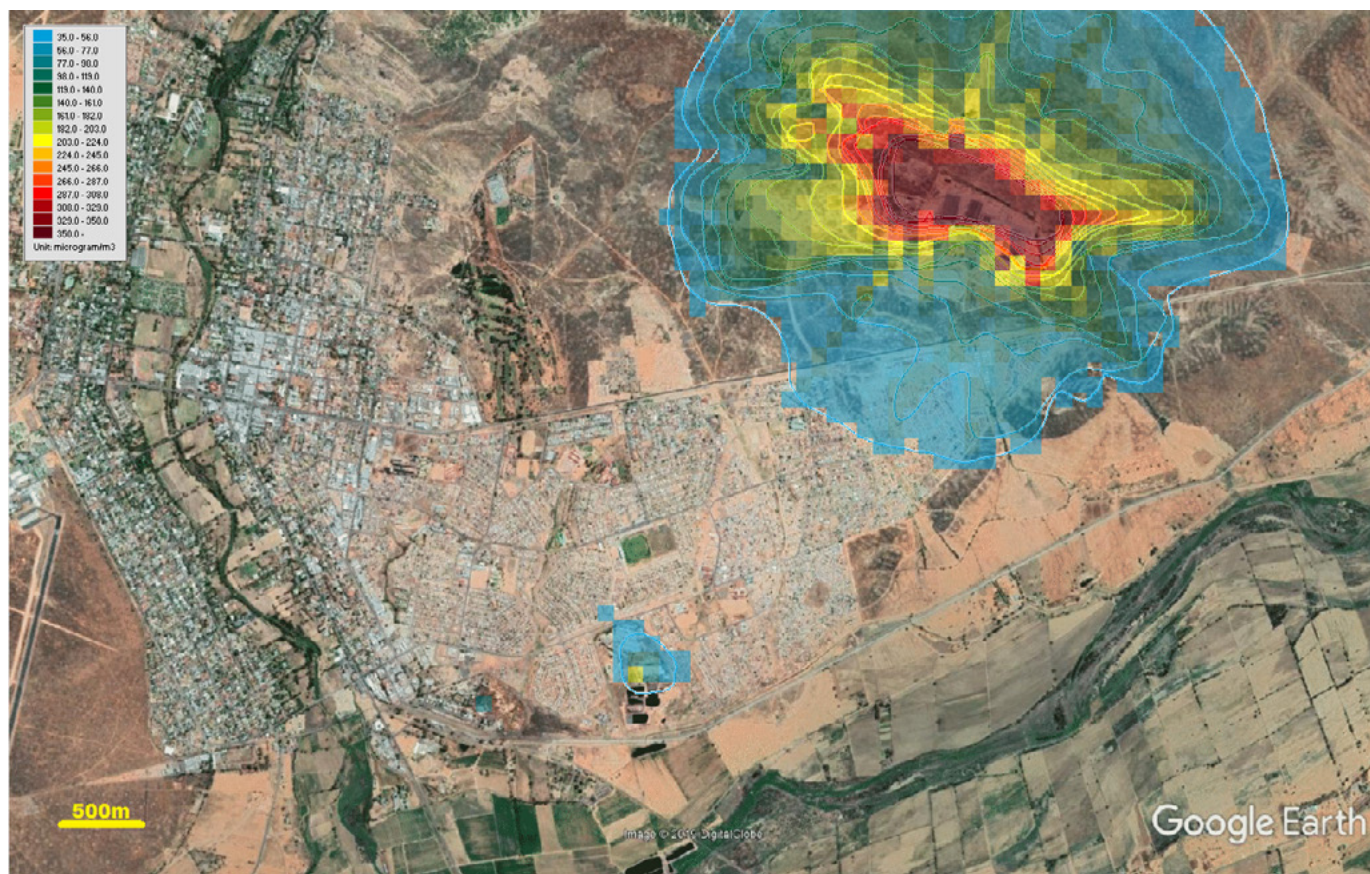
**Figure 8:** 99-percentile daily average PM10 concentrations in the vicinities of a timber yard and a brick manufacturer, Oudtshoorn.

*Burgundy coloured regions show areas where the air quality standard of  $75 \mu\text{g}/\text{m}^3$  may be exceeded.*

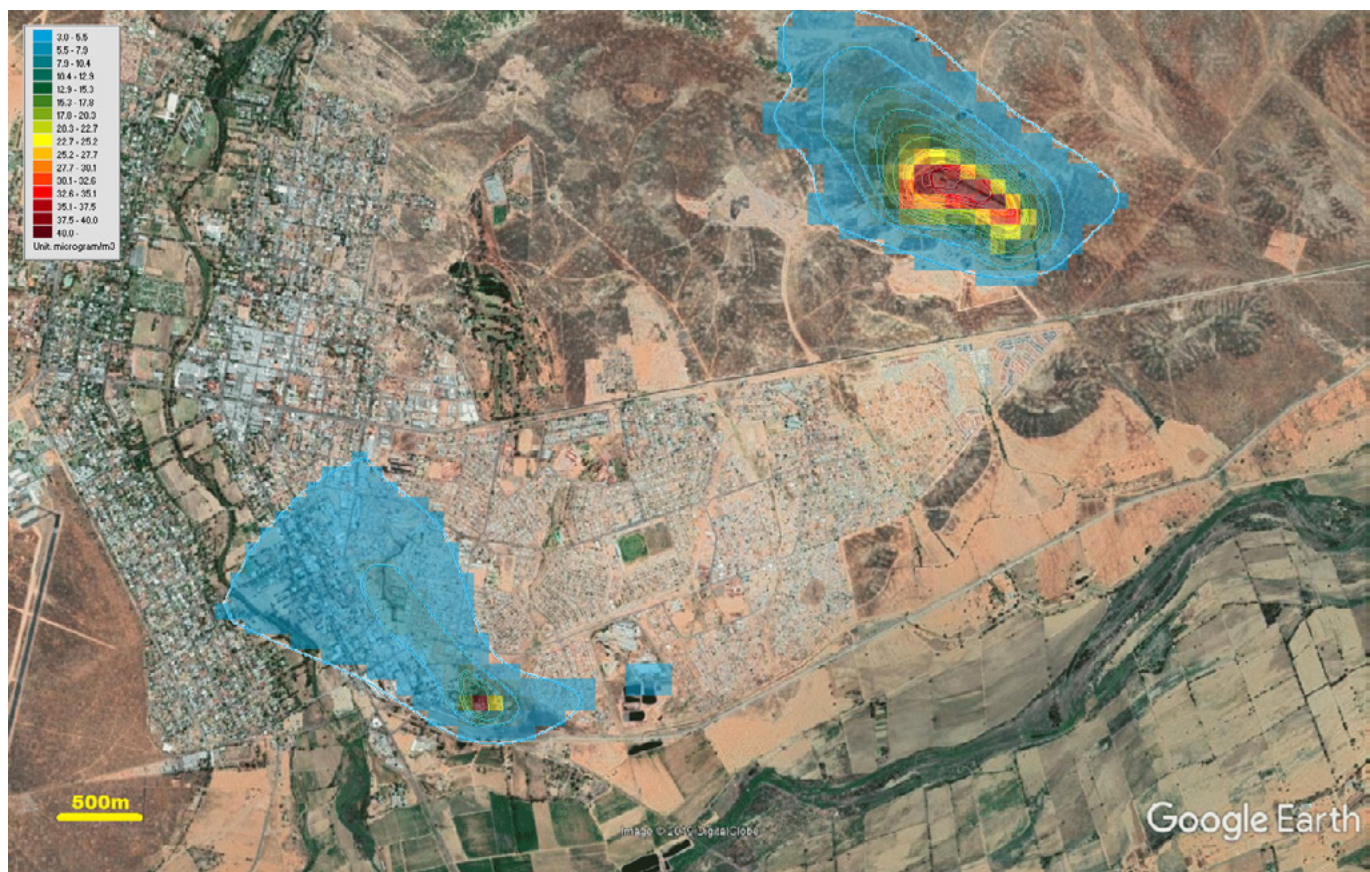


**Figure 9:** Annual average  $\text{SO}_2$  concentrations in the vicinity of a brick manufacturer, Oudtshoorn. *Burgundy coloured regions show areas where the air quality standard of  $350 \mu\text{g}/\text{m}^3$  may be exceeded.*



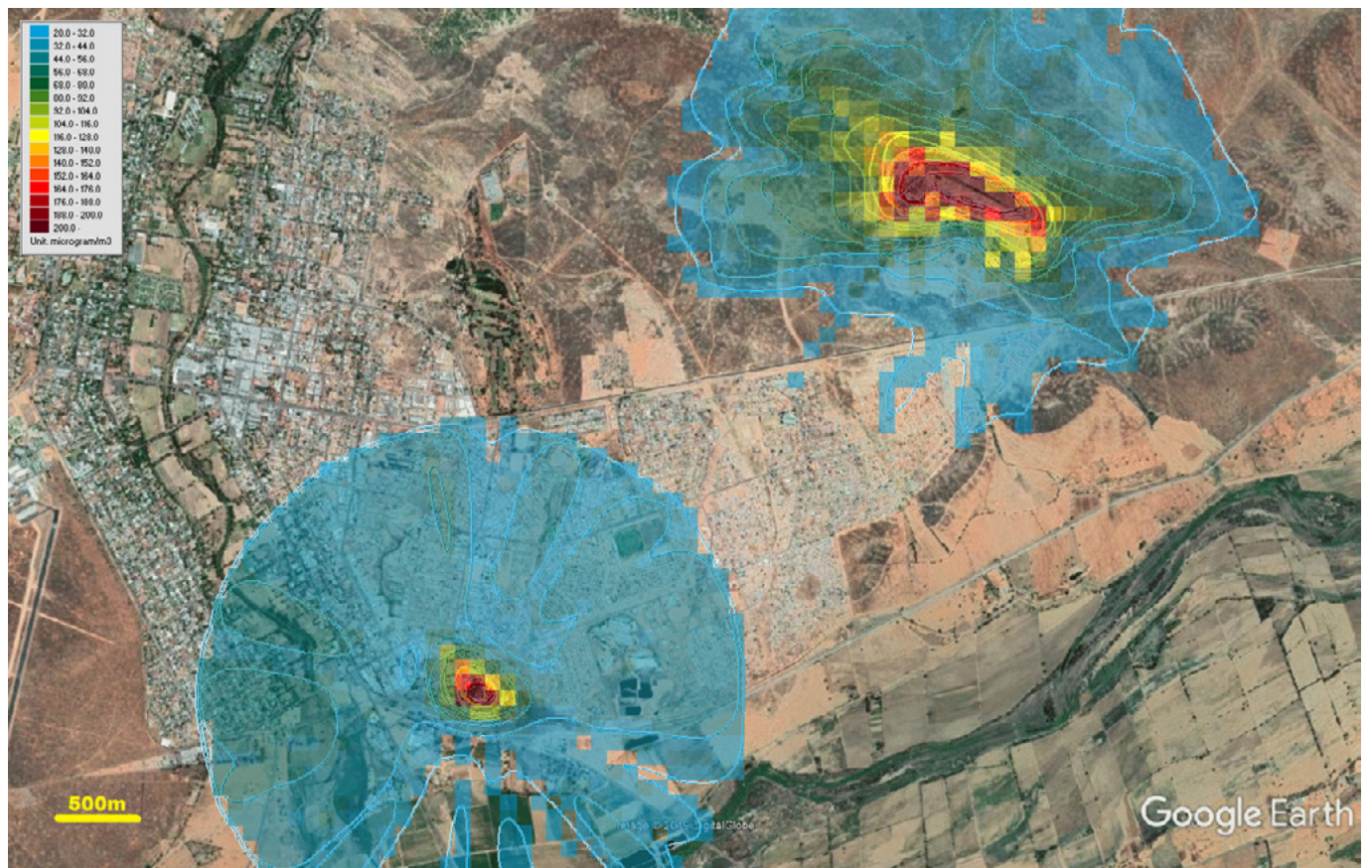


**Figure 10: 99-percentile SO<sub>2</sub> concentrations in the vicinity of a brick manufacturer, Oudtshoorn.** Burgundy coloured regions show areas where the air quality standard of 350 µg/m<sup>3</sup> may be exceeded.



**Figure 11: Annual average NO<sub>2</sub> concentrations in the vicinity of a brick manufacturer, Oudtshoorn.** Burgundy coloured regions show areas where the air quality standard of 200 µg/m<sup>3</sup> may be exceeded.





**Figure 12: 99-percentile NO<sub>2</sub> concentrations in the vicinities of a timber yard and a brick manufacturer, Oudtshoorn.**

*Burgundy coloured regions show areas where the air quality standard of 200 µg/m<sup>3</sup> may be exceeded.*





# AQMP GOALS AND OBJECTIVES

The following goals are recommended to GRDM to further improve the effectiveness of air quality management.

## **GOAL 1**

Ensure effective and consistent air quality management

## **GOAL 2**

Ensure effective and consistent compliance monitoring and enforcement

## **GOAL 3**

Continually engage with stakeholders to raise awareness with respect to Air Quality Management (AQM) and Climate Change Response (CCR)

## **GOAL 4**

Support AQM and CCR programmes, including promoting and facilitating the reduction of greenhouse gas emissions





The following goals and objectives are recommended to GRDM to further improve the effectiveness of air quality management.

## GOAL 1

### Ensure effective and consistent air quality management

#### Objective 1.1

#### Create awareness of the AQMP implications

Due to the diligence of GRDM's AQO and supporting personnel, air quality management in general in the District receives a fair amount of attention at District level, but only receive cursory attention at most of the local municipalities. A concerted effort will be needed to create an awareness of air pollution and its risks at local municipal level.

The following tasks are envisaged under this Objective:

- Present the AQMP to the GRDM council for acceptance, approval and inclusion in IDP.
- Workshop the action plan with GRDM and distribute to local municipal stakeholders, e.g. planning, traffic control, engineering, etc., to gain insight and buy-in for all departments to be aware of the need for proper air quality management input on all levels of development.
- GRDM must assist each local municipality and liaise with the Provincial Department to ensure that they adopt their individual AQMP's and include them in their IDP's. This is best achieved at a municipal management level so that the importance of air quality management is brought to the attention of those at the highest level of municipal management.

#### Objective 1.2

#### Promote cooperation amongst all spheres of municipal government

The National Framework for Air Quality Management in the Republic of South Africa (the National Framework), as published under Government Notice No. 1144 of 26 October 2018, underpins NEM:AQA by providing national norms and standards for air quality management to ensure compliance with legislation. The National Framework serves as the country's AQMP.

Paragraph 4.2 of the National Framework describes the duties and responsibilities on all levels of government involved with air quality management. Those activities that are regarded as the primary responsibilities of individual municipalities are listed in Table 4 on the following page.





SECTION NUMBER	TITLE	RESPONSIBILITIES
4.2.1	Information management	Monitor ambient air quality and point, non-point and mobile source emissions.
4.2.3	Strategy development	The development of Air Quality Management Plans as a component of integrated development plans as required by the Municipal Systems Act.
4.2.4	Standards setting	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, bio-accumulation, deposition or in any other way, present a threat to health, well-being or the environment in the municipality.
4.2.8	Compliance monitoring	<ul style="list-style-type: none"> <li>• Monitoring compliance with respect to reasonable steps to prevent the emission of any offensive odour caused by an activity, in terms of nuisance or disturbance matters.</li> <li>• Monitoring compliance in respect of noise caused by an activity, in terms of nuisance or disturbance matters.</li> <li>• Monitoring compliance with directives to submit an atmospheric impact report.</li> <li>• Monitoring compliance with the requirements of the National Dust Control Regulations.</li> <li>• Monitoring compliance with the emission standards set out for activities declared as controlled emitters in terms of Section 23 of the AQA.</li> <li>• Monitoring compliance with the requirements of the National Dust Control Regulations for an activity, in terms of nuisance or disturbance matters.</li> </ul>

**Table 4: Primary Responsibilities of Local Municipalities**

Most of the functions listed in Table 4 form part of the primary responsibilities of District Municipalities. In addition, District Municipalities also have the items in Table 5, on the following page, added to their list of primary responsibilities.



SECTION NUMBER	TITLE	RESPONSIBILITIES
4.2.1	Information management	Review emissions reports provided by industry in the NAEIS in line with AEL.
4.2.7	Authorisations	<ul style="list-style-type: none"> <li>• Issuing of an Atmospheric Emission Licences.</li> <li>• Transferring of Provisional Atmospheric Emission Licence and Atmospheric Emission Licence if ownership of an activity for which a provisional atmospheric emission licence was issued is transferred.</li> <li>• Review of Provisional Atmospheric Emission Licence and Atmospheric Emission Licence at intervals specified in the licence, or when circumstances demand that a review is necessary.</li> <li>• Variation of Provisional Atmospheric Emission Licence and Atmospheric Emission Licence.</li> <li>• Renewal of Provisional Atmospheric Emission Licence and Atmospheric Emission Licence on application by the holder of the licence.</li> </ul>





SECTION NUMBER	TITLE	RESPONSIBILITIES
4.2.8	Compliance monitoring	<ul style="list-style-type: none"> <li>• Monitoring potential illegal listed activities.</li> <li>• Monitoring compliance with emission standards in respect of the manufacture, sale or use of any appliance or conducting of an activity declared as a controlled emitter.</li> <li>• Monitoring compliance with respect to reasonable steps to prevent the emission of any offensive odour caused by a listed activity.</li> <li>• Monitoring compliance in respect of noise caused by a listed activity.</li> <li>• Monitoring compliance with conditions or requirements of atmospheric emission licence and/or registration certificates.</li> <li>• 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.</li> <li>• Monitoring any information provided to an air quality officer to ensure that it does not contain false or misleading information.</li> <li>• Monitoring compliance with the requirements of the National Dust Control Regulations for listed activities.</li> <li>• Monitoring compliance with the emission standards set out for activities declared as controlled emitters in terms of Section 23 of the AQA, for facilities that have been issued with an AEL.</li> </ul>

**Table 5: Additional Primary Responsibilities of District Municipalities**

As can be seen from these tables, some activities are common on both levels of municipal activities and require cooperation to give justice to the activities. However, currently GRDM fulfils 90% of air quality management duties in the Garden Route region. A service-level agreement with one municipality, i.e. Hessequa, has been entered into. However, although allowed under the relevant legislation, it must only serve as a temporary measure to enable the municipality to build its own infrastructure to deal with air quality issues.

The current situation is not sustainable since two officials at district municipal level cannot sufficiently perform all of the functions listed above. The aim of this objective is, therefore, to develop the capacity to comply with all of the primary responsibilities, as shown above, in each of the seven municipalities within the GRDM region.



To ensure adequate cooperation between GRDM and local municipal AQO's, the following need to be put in place:

- WCG, GRDM together with all seven local municipalities should initiate discussions with each other about sharing the responsibilities associated with air quality management. This is best achieved at a municipal management level where the importance of air quality management and the costs implications can be brought to the attention at the highest level of municipal management.
- Share annual industry emission reports with relevant municipal AQO's. This will allow municipal AQO's to better gain an understanding of the air quality, make more informed recommendations on municipal council level and manage complaints relating to listed activities or controlled emitters more effectively, if and when required.
- Continue to include municipal AQO's in discussions and planning where problems exist.
- Cooperation between GRDM and municipalities in all aspects relating to identification and compliance monitoring of listed activities will ensure that illegal operations are identified sooner and any concerns relating to licensed industry identified faster.
- Compile a detailed list of air quality monitoring equipment at each municipality and GRDM. Information on the status of the equipment, i.e. maintenance, calibration and spares, is essential. Once a comprehensive list is available, it would be evident where additional resources are required. Sharing of equipment between municipalities would be a cost-effective solution to effective air quality monitoring.

### Objective 1.3 Strengthen and build capacity in air quality management, compliance and enforcement

Although each municipality designated an air quality officer, this role is generally not their primary responsibility in any of the municipalities.

Based on feedback from AQO's, a maximum of 10% of their time is spent on air quality. The emphasis must change. Air quality management must be the prime duties of an AQO. Only if there are no such issues, can an AQO pay attention to other duties. However, should an air quality issue arise, the AQO must be relieved from other duties to pay attention to the air quality issue at hand.

As stated before, GRDM has two technical officials dedicated to air quality management and they attend to 90% of the air quality issues in the district. As the area is vast, there are numerous industries and a variety of complaints, it is not possible for GRDM to effectively enforce air quality management actions.

This objective promotes the scenario of a combined team effort, with the seven municipal AQO's participating fully when necessary, thus creating a team of nine officials to manage and enforce air quality management practices.

The following tasks are envisaged under this Objective:

- Training must be provided to AQO's on the interpretation of annual industrial emission reports if the information contained in these reports are to be of any use.
- The municipal AQO's must be trained in air quality management practices to be able to act as effective compliance inspectors.
- The municipal AQO's must be trained in the use of air quality monitoring equipment. This will enable the AQO's to conduct short term air quality assessments and report back on findings, detect and/or monitor air quality in problem areas.
- Dispersion modelling is an essential tool in air quality management and town planning. Once established, the facility will serve as the primary air quality assessment tool and provide input into all spheres of spatial planning activities in the Garden Route region. GRDM must establish such a system and officials must be trained in the effective use of the system. This system must be accessible to all municipal AQO's as and when needed.



- Such a system needs extensive weather data, especially in the industrial areas, and a plan to provide the necessary data for dispersion modelling purposes must be developed. The recommendations of the relevant Progress Report must be taken into account.
- In 2020, new plant standards will need to be met by all industry. It is recommended that GRDM develops a database of the best available air quality control practices for the types of industries within their area. This will allow GRDM, as licensing authority, to provide effective advice to industries in the region in order to minimise air pollutant emissions.

### Objective 1.4 Develop institutional mechanisms to improve air quality and climate change response

The largest and continuous task within air quality management is the collection of data. Ensuring that the data received is accurate, forms an essential part of planning air quality in any region. The NAEIS platform is an essential tool for collating annual emissions from licensed industry. To support this, and expand on available information, GRDM is developing a platform (Electronic Information System - EIS) to enable business and civil society's involvement in the process of gathering information.

The following tasks are envisaged under this Objective:

- GRDM is in the process of developing the EIS software platform in which, inter alia, air pollution emission data from unlicensed industries will be stored. This platform will enable both municipalities and industry to upload information such as fuel usage, production rate, emissions, etc., and related data on a regular basis.
- Once activated, workshops, discussion groups and training of the target market would be essential to create buy-in and maximise the opportunity this platform will provide.
- The dispersion modelling software mentioned in Objective 1.3.4 will equip GRDM and local authorities to manage air space more effectively and provide air quality information essential to all town planning activities. Relevant training will be essential.
- The dispersion model, the database of best available technologies and the EIS database would enable GRDM and municipalities to advise industry and business on any emission related concerns.

### Objective 1.5 Develop, implement and maintain air quality management systems

Managing air quality and human health is not an isolated task left to the AQO's. Knowledge gained through an air quality study is an essential tool for planning and development. This includes industrial, commercial and residential development. To ensure that a development is viable, one of the first considerations should be the quality of the existing air space and then the impact such development would have on the air space. Building a residential development close to an existing emitter will create complaints in the future and, in serious situations, can lead to air pollution related illness. This AQMP promotes open communication channels between the various municipal stakeholders and industry to address existing concerns and avoid future development which would negatively impact human health.

The following tasks are envisaged under this Objective:

- Where problem areas have been identified, in the proximity of listed activities, through the AQMP's dispersion model, short term air quality monitoring programs must be designed and implemented.
- GRDM's role should be that of coordination, i.e. to initiate a project and define its scope and extent in conjunction with the relevant individual municipality. The municipal role is the execution of, and reporting back on air quality assessments. This implies that AQO's in the relevant municipalities must carry out the monitoring activities, where applicable, as part of the municipalities' primary responsibilities for air quality monitoring. Results obtained must be circulated to all relevant stakeholders.



- Since GRDM is the licensing authority, it remains GRDM's responsibility to ensure that licensed industry submits annual reports on NAEIS.
- It is expected that the development of pollution prevention plans will become necessary once the results of air quality monitoring projects are available. The various mitigation tools and mechanisms available to both municipal and district authorities should then be evaluated and ranked, depending on the requirements of each individual case. Cognisance must be taken at this stage that the eventual mitigation technique may be based on technological and/or political decisions.

### Objective 1.6 Ensure adequate funding for the implementation of AQM by municipalities

Although there has been a number of engagements between National, Provincial and Municipal management structures on the importance of air quality management to human health and the inclusion of air quality structures within municipal plans, very little has been done on municipal level in the Garden Route District to ensure that its mandate is met.

Only four of the seven municipalities adopted their previous AQMP's and included it in their IDP's. Of these, budget allocated ranges from none to R60 000 per annum. This budget is not sufficient to actively manage the largest threat to human health, i.e. air pollution.

To assess air quality, specialised equipment is required, which must be maintained and may require annual calibration. In addition, many devices require consumable items, e.g. filters, adsorbent cartridges, chemical analyses, etc., the costs of which must be budgeted for.

This AQMP proposes that GRDM assess the equipment needs across all municipalities, assess available equipment and identify what is required to effectively manage air quality within its boundaries. The AQMP proposes that equipment is shared between municipalities in a planned and coordinated manner.

A budget for annual consumables and calibration is to be divided between the municipalities along with the purchase of additional equipment. Based on feedback from AQO's, there appears to be some uncertainty on the budgeting process and requirements.

The following tasks are envisaged under this Objective:

- Assist municipal AQO's, where necessary, to plan air quality budget submissions and assist to coordinate resources between municipalities
- Plan with municipal AQO's for purchase of air quality monitoring equipment which could be shared between municipalities, i.e. particulate samplers within GRDM could be rotated between municipalities. The same applies to gas monitoring equipment, e.g. diesel exhaust monitors.
- Budget for a panel of specialists to review GRDM Industries and develop a best practices framework as reference tool
- Budget for a comprehensive dispersion modelling facility to be housed and operated by GRDM, but accessible to all municipalities. All of the peripheral requirements associated with dispersion modelling, as pointed out in the relevant Progress Report, e.g. access to suitable weather data, must be taken in account in the budgeting process.



## GOAL 2

### Ensure effective and consistent compliance monitoring and enforcement

The key word to this goal is consistency. It is important that all data is collected periodically as pre-determined and within set time limits. The data thus obtained must be used to update the emissions inventory and a comprehensive dispersion modelling facility, if available, can then reflect the air quality conditions when planning any further development. In addition, it will support the process of development of air pollution control plans.

#### Objective 2.1

##### Improve air quality compliance monitoring and enforcement

The following tasks are envisaged under this Objective:

- Develop customised air pollution control plans as and where required.
- Update and review emission inventory during NAEIS submission period and highlight concerns for further investigation.
- Implement AEL review processes in line with legislation.

#### Objective 2.2

##### Promote continuous improvement in respect of industry air quality compliance

The following tasks are envisaged under this Objective:

- Provide training to district officials on approved emission survey technology as well as the various conditions where methods may or may not be appropriate.
- Provide a reference framework to industry with approved emission survey methodology.

#### Objective 2.3

##### Develop and implement air quality regulatory processes

The following tasks are envisaged under this Objective:

- Based on short term air quality assessments, amendments to the emission limits may be required. Liaise and coordinate amendments to Section 21 through Provincial and National structures.
- Assist local authorities with the incorporation of emission limits for fuel-burning appliances in their by-laws.





### GOAL 3

Continually engage with stakeholders to raise awareness with respect to Air Quality Management (AQM) and Climate Change Response (CCR)

GRDM has a good relationship with the public and continues with its ongoing communication plan. The AQMP proposes two additions to its existing efforts. The first is to engage with DEFF volunteers and municipalities to confirm the type and quantity of fuel used in households. The information gained from such a study would improve the reliability of the emissions inventory and direct future public campaigns on alternative fuel sources. The second is to work with existing structures to educate the community on the health impact of burning municipal waste, garden rubble and wildfires.

#### Objective 3.1

Continue with current education and communication mechanisms develop additional strategies and programmes with respect to AQM and CCR

The following tasks are envisaged under this Objective:

- Coordinate and assist DEFF's Environment Awareness Coordinators (EACs) and municipal AQO's to develop and roll out a campaign to ascertain the types and quantity of fuel used in households. The information to be gathered is types of fuel used, quantities of fuel used per household, including seasonal variations, and population densities in residential areas.
- Continue the current Clean Fires campaign at schools, but develop a household fuel campaign, using the information obtained above to educate the community on the dangers of air pollution.
- Use the household fuel information to refine the emissions inventory and dispersion model.
- Coordinate with DEFF and Working on Fire to educate the community on the health risk associated with burning of garden and other waste as well as wildfires.

- Assist local authorities with the development of a communication channel between fire departments and air quality officers. The purpose is to ensure that the AQO provides comments and fire departments are aware of the dangers of air pollution when a member of the public applies for a burning permit.

### GOAL 4

Support AQM and CCR programmes, promoting and facilitating reduction of greenhouse gas emissions

The AQMP's emissions inventory identified the largest contributors to greenhouse gas emissions within GRDM. There are known users of fossil fuels, some of which also use cooling agents which include CFC's. This AQMP promotes direct discussion with these entities to reduce greenhouse gas emissions within GRDM. The community itself has a responsibility in the battle against greenhouse gas emissions. The community should receive information to make use of alternative fuel and heating sources.

#### Objective 4.1

Reduce ozone depleting substances and greenhouse gas emissions, in line with National and International requirements

The following tasks are envisaged under this Objective:

- Identify the largest contributors of greenhouse gas emissions within GRDM through the emission inventory and for Section 21 and 23 activities via NAEIS.
- Engage with the largest contributors to reduce greenhouse gas emissions and acknowledge those who take effective steps to do so.
- Assist municipalities to amend municipal by-laws to affect emission limits on unlicensed industries that emit greenhouse gases, e.g. small boilers.



GOAL	TASK	TIMEFRAME	OPERATIONAL BUDGET per Annum	CAPITAL BUDGET
Goal 1: Ensure effective and consistent air quality management				
Objective 1.1  Create awareness of AQMP implications	<ul style="list-style-type: none"> <li>Present the AQMP to GDRM Council for acceptance, approval and inclusion in IDP</li> </ul>	3 months	Operational (salaries/ transport)	
	<ul style="list-style-type: none"> <li>Workshop the action plan with GRDM and distribute to local municipal stakeholders, e.g. planning, traffic control, etc., to gain insight and buy-in</li> </ul>	6 months		
	<ul style="list-style-type: none"> <li>GRDM must assist each local municipality and liaise with Provincial Department to ensure AQMP's are adopted and included in IDP's. It is best achieved at municipal management level</li> </ul>	6 months		
Objective 1.2  Promote cooperation amongst all spheres of municipal government	<ul style="list-style-type: none"> <li>WCG, GRDM and local municipalities to initiate discussions with each other about sharing the responsibilities associated with air quality management</li> </ul>	Immediate	Operational (salaries/ transport)	
	<ul style="list-style-type: none"> <li>Share annual industry emission survey reports with relevant municipal AQO</li> </ul>	3 months		
	<ul style="list-style-type: none"> <li>Continue to include municipal AQO's in discussions and planning where problems exist</li> </ul>	Ongoing		
	<ul style="list-style-type: none"> <li>Forge closer cooperation between GRDM and municipalities in all aspects relating to the identification and compliance monitoring of listed activities</li> </ul>	1 year		
	<ul style="list-style-type: none"> <li>Compile a list of air quality monitoring equipment available at each municipality with the view of sharing equipment as and when necessary</li> </ul>	6 months		



GOAL	TASK	TIMEFRAME	OPERATIONAL BUDGET per Annum	CAPITAL BUDGET
<p>Objective 1.3</p> <p>Strengthen and build capacity in AQM, compliance and enforcement</p>	<ul style="list-style-type: none"> <li>• Provide training to municipal AQO's on interpretation of air quality reports</li> <li>• Train municipal AQO's in air quality management and utilise AQO's as inspectors</li> <li>• Schedule training sessions on air quality monitoring equipment with municipal AQO's</li> <li>• Establish a comprehensive dispersion modelling system and train officials in the effective use of the system</li> <li>• Develop a plan to acquire the necessary weather data for dispersion modelling</li> <li>• Develop a best practices guideline, for industry and municipal AQO's, as a frame of reference for new technology which could reduce emissions</li> </ul>	<p>1 year</p> <p>1 year</p> <p>1 year</p> <p>2 years</p> <p>6 months</p> <p>1 year</p>	<p>Operational R20 000 (Professional fees)</p>	
<p>Objective 1.4</p> <p>Develop institutional mechanisms to improve air quality and climate change response</p>	<ul style="list-style-type: none"> <li>• Finalise EIS and launch the platform</li> <li>• Provide training to industry, business and municipal AQO's to ensure the effective utilisation of EIS</li> <li>• Encourage the municipal AQO's buy-in and participation to ensure business owners and municipal stakeholders submit required information on EIS</li> <li>• Use dispersion modelling to manage available air space effectively</li> <li>• Use available tools, i.e. EIS, dispersion modelling and best practice guides to advise industry and business</li> </ul>	<p>1 year</p> <p>1½ - 2 years</p> <p>2 years</p> <p>2 years</p> <p>3 years</p>	<p>Professional fees R50 000</p> <p>System maintenance R24 000 per annum</p>	



GOAL	TASK	TIMEFRAME	OPERATIONAL BUDGET per Annum	CAPITAL BUDGET
<p>Objective 1.5</p> <p>Develop, implement and maintain air quality management systems</p>	<ul style="list-style-type: none"> <li>Initiate and coordinate short term air quality monitoring projects (where applicable) to verify the dispersion modelling results in potential problem areas</li> <li>Enforce licensed industry's submission on NAEIS and EIS</li> <li>Conceptually develop pollution prevention plans, based on the outcomes of dispersion modelling and air quality monitoring programs as and when necessary</li> </ul>	<p>1½-2 years</p> <p>1½-2 years</p> <p>Ongoing</p>	R60 000	
<p>Objective 1.6</p> <p>Ensure adequate funding for the implementation of AQM by municipalities</p>	<ul style="list-style-type: none"> <li>Assist municipal AQO's (where necessary) to plan air quality budget submissions and assist with the coordination of resources between municipalities</li> <li>Plan with municipal AQO's for the purchase of air quality monitoring equipment, which could be shared between municipalities (i.e. 4 mini-vol's in GRDM could be rotated amongst municipalities, the same with vehicle exhaust monitors)</li> <li>Budget for a panel of specialists to review GRDM industries and develop a best practices framework as reference tool</li> <li>Budget for a comprehensive dispersion modelling facility to be housed and operated by GRDM, but accessible to all municipalities</li> </ul>	<p>6 months</p> <p>1 year</p> <p>2 years</p> <p>2 years</p>	Operational (salaries/ transport)	<p>R2 million over 5 years</p> <p>R180 000 Dispersion model</p>







GOAL	TASK	TIMEFRAME	OPERATIONAL BUDGET per Annum	CAPITAL BUDGET
Goal 2: Ensure effective and consistent compliance monitoring and enforcement				
Objective 2.1 Improve air quality compliance monitoring and enforcement	<ul style="list-style-type: none"> <li>Develop customised air pollution control plans as and when required</li> <li>Update and review the emission inventory during the NAEIS submission period and highlight concerns for further investigation</li> <li>Implement AEL review processes in line with legislation</li> </ul>	4 years  Ongoing  Ongoing	Operational (salaries/ transport)	
Objective 2.2 Promote continuous improvement in respect of industry air quality compliance	<ul style="list-style-type: none"> <li>Provide training to district officials on approved emission survey technology</li> <li>Provide a reference framework to industry with approved emission survey methodology</li> </ul>	1 year  2 years	R 20 000	
Objective 2.3 Develop and implement air quality regulatory processes	<ul style="list-style-type: none"> <li>Based on short term air quality assessments, amendments to the emission limits may be required. Liaise and coordinate amendments to Section 21 through Provincial and National structures</li> <li>Assist local authorities with the incorporation of emission limits for fuel-burning appliances in their by-laws</li> </ul>	3-5 years  2 year	Operational (salaries/ transport)	



GOAL	TASK	TIMEFRAME	OPERATIONAL BUDGET per Annum	CAPITAL BUDGET
Goal 3: Continually engage with stakeholders to raise awareness with respect to AQM and CCR				
<p>Objective 3.1</p> <p>Develop comprehensive education and communication mechanisms, strategies and programmes with respect to AQM and CCR</p>	<ul style="list-style-type: none"> <li>Coordinate and assist DEFF's EACs and municipal AQO's to develop and roll out a campaign to ascertain the types and quantity of fuel used in households</li> <li>Use the household fuel information to refine the emissions inventory and dispersion model</li> <li>Coordinate with DEFF and Working on Fire to educate the community on the health risk associated with burning of garden and other waste as well as forests</li> <li>Assist B-authorities with the development of a communication channel between fire departments and air quality officers</li> </ul>	<p>1 year</p> <p>2 years</p> <p>1 year</p> <p>1 year</p>	R76 000 per annum	
Goal 4: Support AQM and CCR programmes, including promoting and facilitating the reduction of greenhouse gas emissions				
<p>Objective 4.1</p> <p>Reduce ozone depleting substances and greenhouse gas emissions, in line with National and International requirements</p>	<ul style="list-style-type: none"> <li>Identify the largest contributors of greenhouse gas emissions within GRDM through the emission inventory</li> <li>Engage with the largest contributors to reduce greenhouse gas emissions through best practice framework</li> <li>Assist B-authorities to amend municipal by-laws to effect emission limits on unlicensed industries that emit greenhouse gases, e.g. small boilers</li> <li>Initiate a project aimed at setting GHG emission limits on unlicensed fuel-burning appliances as a District program to reduce such emissions</li> </ul>	<p>6 months</p> <p>1 year, ongoing</p> <p>3-5 years</p> <p>3-5 years</p>	Operational (salaries/ transport)	

Table 6: Goals, Tasks and Time Frames of 2019 GRDM AQMP





# SPECIFIC REQUIREMENTS APPLICABLE TO THE GARDEN ROUTE DISTRICT MUNICIPALITY

From the preceding sections it can be seen that much emphasis is placed on the establishment of the dedicated and comprehensive dispersion modelling capacity for the Garden Route District Municipality. In LAQS's opinion such a system is the primary tool for investigating air quality issues in the whole region, be it for GRDM's purposes or for one of the seven municipalities within its boundaries.

A dispersion model is highly reliant on an accurate emissions inventory and prevailing weather conditions.

Emissions inventories will improve over time, as emission survey results from licensed industries are submitted annually. Industrial sources from unlicensed activities can be refined with the involvement of municipal AQO's. Traffic count data and vehicle fleet composition can be optimised. Annual updating of harbour and airport traffic emissions data will improve the reliability of the emissions inventory. Maintenance and improvement of the emissions inventory must, therefore, receive attention if any dispersion modelling output is to be reliable.



# WEATHER DATA

Reliable weather data, at least complying with the requirements of the “Regulations Regarding Air Dispersion Modelling” as published in Government Notice GN R.533 of 11 July 2014 (GN R.533), is more difficult to obtain. Of key importance in this regard is the age of the weather data.

Data used for the dispersion modelling study was largely obtained from the Agriculture Research Council (ARC) and data for George, Riversdale, Ladismith and Oudtshoorn were thus procured. Weather data for Mossel Bay was obtained from GRDM’s weather station located in Mossdustria. In all of these cases the data complied fully with the minimum requirements specified in GN R.533, although the number of parameters available from ARC was slightly limited.

While ARC also provided weather data for Bitou and Knysna, the data is old and not in compliance with the requirement of GN R.533. This data was, nevertheless, used since no other source of data existed for those two municipalities. It is fortuitous that the industrial activities in those areas are limited and that weather data is not required more frequently, but it is not impossible that a major industry may want to settle in one of the two areas. In this case the lack of proper weather data will play an important role in the environmental authorisation for such an industry. As it is, the dispersion model indicated potential air quality problems in both municipal areas and these may be influenced by a lack of more recent weather data.

The establishment of a sound weather database in each of the municipalities within the GRDM region was motivated in the original AQMP compiled in 2006, but limited funds result in only one such station being set up in Mossel Bay. To solve the lack of weather data, LAQS would like to make the following recommendations:

## Provincial Air Quality Monitoring Stations

Three continuous, automated air quality monitoring stations were deployed in the GRDM region by the Western Cape Government’s Department of Environmental Affairs and Development Planning (DEA & DP). These are located in George, Mossel Bay and Oudtshoorn, the three areas with the highest industrial activity in the region. Each of these stations is fitted with sufficient sensors to fulfil GRDM’s requirements, but an assessment of the data showed that the availability of the weather data was not as high as would be expected.

It is recommended that GRDM discuss this issue with DEA & DP so that more attention could be paid to weather data collection. In addition, the type of sensors used to monitor wind speed and direction, two key parameters in dispersion modelling, should be considered. LAQS suspects that the current sensors operate on mechanical principles, e.g. rotating propeller, and such sensors have a high threshold, low resolution and require annual calibration. It is recommended that these sensors are replaced by ultrasonic units, probably at GRDM’s cost, which are perfectly suited for dispersion modelling data.

Should this be done, it will provide additional weather data for Mossel Bay as well as provide good data for George and Oudtshoorn.

The budget cost for an ultrasonic wind speed and direction sensor is approximately R 25 000.

## ARC Data

The ideal solution would be to set up weather monitoring stations in each municipality, but until such time, it is recommended that GRDM discusses the availability of weather data with ARC. As a private company LAQS is required to purchase data from ARC, but that organisation may make the data available free of charge to a Government body such as GRDM.

This must be seen as an interim measure as there is little information available about the reliability and suitability of the data, e.g. the types of sensors used, maintenance and calibration frequency, etc.





## Set Up Discreet Weather Stations

This is seen as the ultimate goal as such stations can be designed and operated with the sole purpose of generating weather data for dispersion modelling purposes. Such a station should monitor wind speed, wind direction, temperature, relative humidity and solar radiation as a minimum requirement.

As is the case with GRDM's weather station in Mossdustria, such installation can operate on battery power, charged with a solar panel and data can be transmitted to some remote location using Global System for Mobile Communications technology.

The budget cost for a complete weather station is approximately R 160 000.

As preferably at least three years' hourly data is required for dispersion modelling activities, the establishment of a reliable weather database should be started sooner rather than later. Even if GRDM decides not to set up its own dispersion modelling facility, the collection of weather data is still recommended as AEL applications and air quality impact assessments are usually based on dispersion modelling studies. By providing data collected to consultants who do such studies, GRDM will have the assurance that all contractors use the same weather database and will be fully aware of its reliability.

## DISPERSION MODEL

LAQS is of the opinion that the Aermod dispersion model is suitable for GRDM's use. The model should allow the importing and modification of digital maps and should be GIS based.

The model should also include the ability to set up an emissions database that includes all of types of sources encountered in GRDM.

The cost of an extensive air pollution dispersion model can be expected to amount to approximately R 150 000 for a tool that is applicable across the whole of the GRDM region.



# CLOSING STATEMENT

GRDM has succeeded in substantially meeting the diverse tasks and duties associated with air quality management as defined in the AQMP compiled during 2012/13, primarily due to the diligence and dedication of the officials involved in the activity. As a result, the general quality of ambient air in the district is good.

However, the growth in population in the district resulted in concomitant expansion in pollution generating activities. The growth, together with advances in air pollution emission quantification methods and impact assessment technologies, has shown that some potential air quality problems may exist in the district. The nature of these potential problems is such that it warrants further investigation.

This Air Quality Management Plan addresses that issue and also identifies shortcomings in the capacity of GRDM that limit the Municipality's abilities to effectively address the many issues involved with air quality management.

A key point stressed by the plan is the importance of closer cooperation between GRDM and the individual local authorities within the district. Only through a concerted and combined effort will the Vision and Mission of this plan be met.

At the end of the day, this Air Quality Management Plan might by some be regarded only as a document required by law, to be included in GRDM's IDP and then ignored. However, this will do a serious injustice to the people in the region. One needs only to be reminded of the details given in the Introduction to this plan: The World Health Organisation (WHO) estimated that 9 out of every 10 people globally do not have access to clean air. Furthermore, based on 2016 data, 4.2 million deaths annually were due to poor ambient air quality, and 3.8 million due to poor indoor air quality.

The importance of air quality on the quality of life is often overlooked due to a lack of understanding of the impact that poor air quality has on the health and wellbeing of the community. Globally, air quality is starting to receive the recognition it deserves after extensive research identified it as the leading cause of most modern ailments, and the leading cause of premature deaths.

This Air Quality Management Plan promotes information-sharing between various municipal departments whose activities impact the community directly, so that cognisance is taken of the impact of development decisions on the quality of air, specifically in residential areas.





# REFERENCES

- 1 **Compliance with 2012 Air Quality Management Plan, Final Report**  
Progress Report No. GRDM-2019 PR.1, April 2019
- 2 **Status Quo Assessment and Municipal resources, Final Report**  
Progress Report No. GRDM-2019 PR.2, May 2019
- 3 **Emissions Inventory, Final Report**  
Progress Report No. GRDM-2019 PR.3, May 2019
- 4 **Dispersion Modelling Study, Final Report**  
Progress Report No. GRDM-2019 PR.4, May 2019
- 5 **Review of Monitoring and Modelling Requirement, Final Report**  
Progress Report No. GRDM-2019 PR.5, May 2019
- 6 **The 2017 National Framework for Air Quality Management in South Africa**  
Government Notice 1144 of 266 October 2018
- 7 **Second Generation Western Cape Air Quality Management Plan**  
2016



# ANNEXURE 1 | LEGISLATION

**National Environmental Management: Air Quality Act, 2004 as amended**

24 February 2005  
(GN 163 of GG No. 27318)

**National Ambient Air Quality Standards**

24 December 2009  
(GN 1210 of GG No. 32816)

**National Ambient Air Quality Standard for Particulate Matter with Aerodynamic Diameter less than 2.5 micron metres (PM2.5)**

29 June 2012  
(GN 486 of GG No. 35463)

**List of Activities which Result in Atmospheric Emissions which have or may have a Significant Detrimental Effect on the Environment, including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage**

22 November 2013  
(GN 893 of GG No. 33064)

**Amendments to the List of Activities which Result in Atmospheric Emissions which have or may have a Significant Detrimental Effect on the Environment, including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage**

12 June 2015  
(GN 551 of GG No. 38863)

**National Dust Control Regulations**

01 November 2013  
(GN 827 of GG No. 36974)

**Declaration of a small boiler as a controlled emitter and establishment of emission standards**

01 November 2013  
(GN 831 of GG No. 36973)

**Declaration of Small-scale Char And Small-scale Charcoal Plants as Controlled Emitters and Establishment of Emission Standards**

18 September 2015  
(GN 602 of GG No. 39220)

**Regulations Prescribing the Format of the Atmospheric Impact Report**

02 April 2015  
(GN 747, as amended by GN R284)

**National Atmospheric Emission Reporting Regulations**

02 April 2015  
(GN 283)

**Regulations Prescribing the Atmospheric Emission Licence Processing Fee**

11 March 2016  
(GN 250 of GG No. 39805)

**Regulations for the Procedure and Criteria to be followed in the Determination of an Administrative Fine in terms of Section 22a of the Act**

18 March 2016  
(GN 332 of GG No. 39833)

**Air Quality Offsets Guideline**

18 March 2016  
(GN 333 of GG No. 39833)

**National Environmental Management: Air Quality Act (39/2004): National Greenhouse Gas Emission Reporting Regulations**

3 April 2017  
(GN 275 of GG No. 40762)



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Thank you to the following contributors:

- Melanie Marè Photography for George Municipality
- Kelvin Saunders for Garden Route District Municipality
- Elle Photography for Garden Route District Municipality

Thank you to the following contributors at Pixabay.com:

- Gerhard Gellinger
- Jeanine Smal
- Skeeze
- Kees Kortmulder
- Hans Braxmeier
- Hermann Traub
- Forum Krakow
- Jean van der Meulen
- Brigitte Werner
- Delyth Williams
- Ria Algra
- Krissie Gwynne
- Mylene
- Free Photos



