AIR QUALITY MANAGEMENT PLAN FOR THE STELLENBOSCH MUNICIPALITY

Prepared by

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EXECUTIVE SUMMARY

Stellenbosch Municipality is one of five local municipalities that comprise the Cape Winelands District Municipality (CWDM) in the Western Cape Province. Covering an area of approximately 900 km^2, Stellenbosch Municipality accommodates approximately 270 000 people. The major economic activities in the municipality are linked to agriculture. Stellenbosch is the main commercial centre. Other towns include Franschhoek, Groot Drakenstein, Jamestown, Pniel and Klapmuts.

The CWDM developed an air quality management plan (AQMP) in 2008, where the town of Stellenbosch was identified as a potential air pollution 'hot spot' for particulate matter. The development of the AQMP for Stellenbosch Municipality follows the requirements of the National Environmental Management: Air Quality Act to include an AQMP in municipalities' IDP.

AQMP development is a dynamic process, which is enhanced by active engagement with a wide range of stakeholders. It firstly describes the current state of air quality in the Municipality, identifying gaps and issues. This is followed by the development of a strategic plan with a vision and mission, supported by short and long-term goals and objectives for the implementation of defined management measures.

Sources of air pollution in the Stellenbosch Municipality include motor vehicle emissions, industrial and manufacturing emissions, agricultural emissions, residential fuel burning emissions and biomass burning emissions and emissions from landfill and wastewater treatment plants. The brown haze which forms over Cape Town during the winter months, largely attributed to motor vehicle emissions, extends northwards on occasion and affects air quality over the southern parts of the Stellenbosch Municipality. These sources are relatively small and air quality in Stellenbosch is generally good with respect to the typical pollutants. However, agricultural activities, including seasonal burning and the use of pesticides present challenges for air quality management.

The NEM: AQA requires local municipalities to designate an AQO, to include an AQMP in their IDP, and to report on progress with the implementation of the AQMP on an annual basis. With respect to the three mandated requirements; an AQO has not yet been designated in Stellenbosch, the AQMP has been drafted, but is not yet included in the IDP therefore reporting on air quality is not done. Within the Stellenbosch Municipality, there is currently no capacity or competence for AQM. Further gaps include the inter-governmental relationships between the Stellenbosch Municipality and the CWDM, that are not well defined. While the CWDM AQMP addresses

emission reduction at a high level, there are currently no initiatives in Stellenbosch Municipality to manage or reduce the negative effects of air pollution, including waste and agricultural burning and the application of pesticides.

An understanding of the state of air quality and the ability able to report with confidence requires access to reliable and accurate emissions and ambient air quality data. An objective of the CWDM AQMP is to establish and maintain a comprehensive emission inventory. Ambient air quality monitoring is currently conducted in Stellenbosch by the D: EA&DP, who also undertake campaign measurements. It is necessary that Stellenbosch Municipality participate in these monitoring activities and have access to the information, as well as expand the scope of monitoring. This will provide an understanding of sources, pollutants and ambient air quality in the municipality and facilitate accurate reporting.

Transparent and inclusive communication, which is important to the successful implementation of the AQMP, is limited in the Stellenbosch Municipality. It is necessary that a multi-stakeholder forum be established, at which progress with the implementation of the AQMP can be reported. In addition, it is necessary to include air quality in planning decisions.

Aligned with the CWDM vision for air quality management, the vision for the Stellenbosch Municipality AQMP is:

Air quality in the Stellenbosch Municipality is clean and healthy.

The mission statement to achieve the vision is:

Air quality in the Stellenbosch Municipality is co-operatively managed for the benefit of present and future generations according to the principles of sustainable development to safeguard health and quality of life, promoting economic and social development.

The three goals for the Stellenbosch Municipality to achieve the mission of the AQMP are:

Goal 1: Air quality governance meets requirements to effectively implement the AQMP

This goal addresses the regulatory framework and the institutional capacity required in the Stellenbosch Municipality to carry out the air quality function. This links directly to the goal of the AQMP for the Western Cape to 'Ensure effective and consistent air quality management' and the goal in the CWDM AQMP of 'Effective air quality management'.

Goal 2: Reduce atmospheric emissions of harmful pollutants

This goal aims to manage activities that impact on air quality to reduce the emissions of harmful pollutants and associated impacts on human health and well-being. This links directly to the Provincial AQMP goal to 'Ensure effective and consistent compliance monitoring and enforcement' and 'To ensure that health-based air quality standards are attained and continually met'. It also links to the CWDM AQMP goal of 'Effective air quality management' through an 'Emission reduction strategy'.

Goal 3: Systems and tools are established to effectively implement the AQMP

This goal refers to the systems and tools required for effective AQMP implementation, the cornerstone of which is an Air Quality Management System. The development of an AQMS links directly to the Provincial AQMP goal 'To ensure effective and consistent air quality management' through the development of AQM systems. It also links to the CWDM AQMP goal to develop an AQMS. An AQMS is the fundamental unit towards the management of air quality in an area, incorporating the necessary technical elements that provide information on the status of air quality (D: EA&DP, 2010).

The timeframes defined for the implementation of the AQMP are:

- Immediate First 3 months of AQMP adoption
- Short term First 12 months of AQMP adoption
- Medium Term 2 to 3 years
- Long term Year 4 and 5

The goals are divided into achievable objectives in the AQMP's implementation plan. Each objective is assigned to the appropriate implementing officer and timeframes for the implementation are given with defined measurable outcomes.

The AQMP will be included in the next drafting of the Stellenbosch Municipality Integrated Development Plan. Progress with implementation of the AQMP will be on-going and the AQMP's effectiveness will be reviewed annually.

ACKNOWLEDGMENTS

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- Marius Engelbrecht of the Cape Winelands District Municipality;
- Heinrich Wingrove, Kama Chetty and Jeff Jefferson of the Western Cape Department of Environmental Affairs and Development Planning;
- Dr Angela Andrews of the Legal Resources Institute;
- Riaan van der Dool of CSIR's Meraka Institute.

GLOSSARY OF ACRONYMS, TERMS AND UNITS

AEL	Atmospheric Emission License
AFIS	Advanced Fire Information System
APPA	The Atmospheric Pollution Prevention Act
AQMP	Air Quality Management Plan
Criteria pollutant	Common air pollutants for which national ambient air quality standards or guidelines have been set
CH_4	Methane
CO	Carbon monoxide
CWDM	Cape Winelands District Municipality
DEA	National Department of Environmental Affairs
D:EA&DP	Western Cape Department of Environmental Affairs and Development Planning
EIP	Environmental Implementation Plan
Emission	The direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in an installation into the air, water or land.
EMP	Environmental Management Plan
GHG	Greenhouse gas
HC	Hydrocarbons
HRA	Health Risk Assessment
IDP	Integrated Development Plan
IPCC	International Panel for Climate Change
mg/m^3	Milligrams per cubic meter
NEM: AQA	National Environmental Management Air Quality Act No.39 of 2004
NO	Nitrogen oxide
N_2O	Nitrous oxide
NO_2	Nitrogen dioxide
NMVOC	Non-methane volatile organic compounds
NO_x	Oxides of nitrogen ($NO_X = NO + NO_2$)
PM	Particulate matter of all sizes in the atmosphere
PM_{10}	Particulate matter with a diameter less than 10 microns
$PM_{2.5}$	Particulate matter with a diameter less than 2.5 microns
POPs	Persistent organic pollutants, organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes
SO_2	Sulphur dioxide
$\mu g/m^3$	Micrograms per cubic meter
Toxic air pollutants	Also known as hazardous air pollutants, these are pollutants known to or suspected of causing cancer or other serious health problems
TSP	Total suspended particulates, all sizes of particles suspended within the air smaller than 100 µm
US-EPA	United States Environmental Protection Agency
VOC	Volatile organic compounds
WHO	World Health Organisation

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1. Introduction

Stellenbosch Municipality is one of five local municipalities that make up the Cape Winelands District Municipality (CWDM) in the Western Cape Province (Figure 1-1). Covering an area of approximately 900 km^2, Stellenbosch Municipality accommodates approximately 270 000 people. The main economic activities in the municipality are linked to agriculture. The town of Stellenbosch is the main commercial centre. Other towns include Franschhoek, Groot Drakenstein, Jamestown, Pniel and Klapmuts (Figure 1-2).

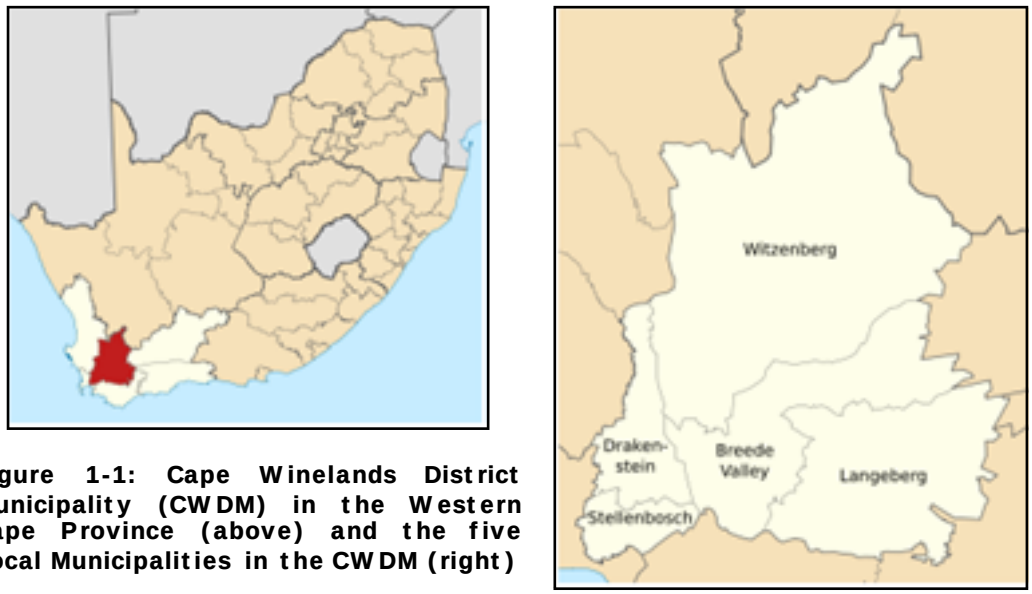

Figure 1-1: Cape Winelands District Municipality (CWDM) in the Western Cape Province (above) and the five Local Municipalities in the CWDM (right)

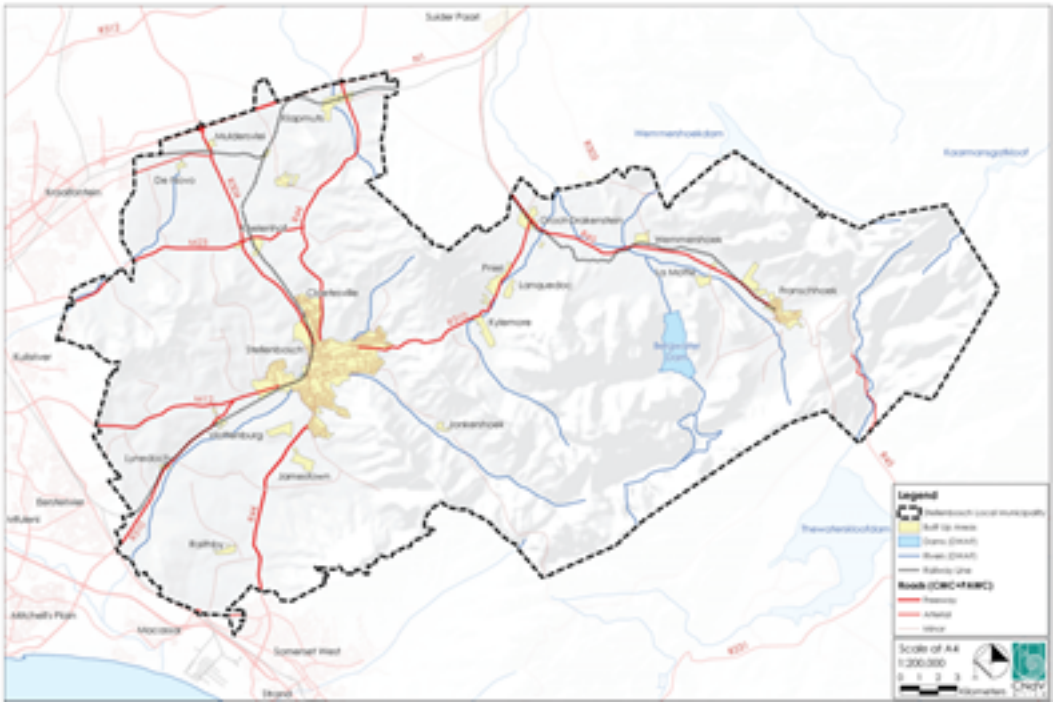

Figure 1-2: Stellenbosch Municipality showing the main towns (Stellenbosch Municipality, 2010)

The CWDM developed an AQMP in 2008 (CWDM, 2009) and air quality gaps and issues in the CWDM are well documented in the 2012/13 to 2017/17 IDP (CWDM, 2012). In the Stellenbosch Municipality the town of Stellenbosch was identified as a potential air pollution 'hot spot' for particulate matter. The brown haze which forms over Cape Town during the winter months, largely attributed to motor vehicle emissions, extends northwards on occasions and affects air quality over the southern parts of the Stellenbosch Municipality (2012). Gaps in air quality management identified in the CWDM AQMP, relevant to local municipalities are:

- The division of air quality management roles and responsibilities between local and district municipalities are not clearly understood or have not been recognised by certain local municipalities. This hampers cooperative governance and implementation of the function.
- Air Quality Officers have not been appointed for all local municipalities and this hampers communication and accountability.
- Air quality management requires cooperation from various disciplines within local government, including traffic, town planning, environmental services, cleansing services, housing, building control, municipal health services, law enforcement, social and developmental services and political buy in.
- The successful implementation of an AQMP is thus strongly dependent upon cooperation and communication amongst local governments within the district.
- Inadequate financial provision specifically earmarked for AQM, by all local authorities within the district.
- The availability of suitably skilled human resources also remains a challenge.

The AQMP for the Province and the associated goals provide a clear framework for air quality management in the Western Cape. The Department of Environmental Affairs and Development Planning (D: EA&DP) AQMP for the Province strongly supports air quality management by municipalities, with the vision to manage air quality to ensure *"Clean and healthy air for all in the Western Cape"* (D: EA&DP, 2010).

Ensuring a 'Treasured and protected environment is one of the strategic goals of the Stellenbosch Municipality IDP (Stellenbosch Municipality, 2012). Air quality is an integral part of the environment and the NEM: AQA Section 15 requires all municipalities to develop AQMPs. uMoya-NILU Consulting (Pty) Ltd was appointed by Stellenbosch Municipality to develop their AQMP. The main objectives of the AQMP development project are to:

- Set ***goals*** that are consistent with applicable legislation and based on consensus between all role-players who are involved in the development of the AQMP.

- Assess and evaluate the ***current air quality status***, including the climate and meteorology, population data, air quality data, source information and pollutants that have a negative effect on the environment, health and well-being, priority air quality management issues, evaluation of resources for air quality management and a gap analysis
- ***Develop an AQMP*** with appropriate stakeholder participation that identifies suitable interventions to address the air quality issues and gaps, strategies to ensure that the interventions are implemented in agreed time frames, and evaluation criteria to monitor the effectiveness of the the AQMP as a whole.

The AQMP development project is conducted in three related components. The first of which is a comprehensive assessment of the air quality status, followed by stakeholder participation to identify air quality management gaps and issues, to define goals and identify interventions necessary to meet the goals. The third component is drafting the AQMP for review and finalisation for input to Stellenbosch Municipality IDP. This document is therefore structured to provide necessary context regarding air quality legislation.

Introductory information on AQMPs and the regulatory context is discussed in **Chapter 2**. **Chapter 3** provides an overview of common air pollutants and associated ambient air quality standards, and their potential effects on human health and the environment. The climatology, meteorology and nature of the receiving environment in the Stellenbosch Municipality are presented in **Chapter 4**. The current state of air quality is presented in **Chapter 5**, including sources of air pollution and ambient concentrations. **Chapter** 6 highlights the gaps and issues and **Chapter 7** contains the AQMP for the Stellenbosch Municipality including the goals, intervention strategy, and to conclude, the evaluation strategy.

2. About Air Quality Management Plans

The National Environmental Management: Air Quality Act (NEM: AQA) (Act 39 of 2004) with the National Framework for Air Quality Management (2007) is regarded as the plan for air quality management in South Africa. Section 15 of the NEM: AQA requires Province's responsible for preparing EIPs or EMPs in terms of NEMA, to develop an AQMP. In the Western Cape the AQMP that was developed in 2010 serves as the vision and overarching framework for air quality management in the province(D:EA&DP, 2010). Section 15 of the NEM: AQA also requires that all municipalities develop an AQMP as part of their Integrated Development Plans (IDP). The AQMP for the Cape Winelands District Municipality developed in 2008 (CWDM, 2009) provides the vision and goals for air quality management in the district municipality. These AQMPs provide the context for the Stellenbosch Municipality AQMP.

AQMP development in South Africa is guided by the Manual for Air Quality Management Planning (DEA, 2008, and revised in 2012). An AQMP is a strategic document that assists the implementing organisation (national, provincial and municipal authorities) to achieve air quality management objectives in a structured and measured manner. Air quality management is a systems-based philosophy that is illustrated in Figure 2-1 and may be applied at a range of spatial scales. Driven by definitive air quality objectives or goals, it implies the management of activities that impact on air quality and monitoring of progress towards reaching objectives.

An AQMP must seek to give effect to Chapter 3 of the NEM: AQA. In other words, an AQMP must:

- improve (or maintain) air quality;
- identify and reduce the negative impact of air pollution on human health and the environment;
- address the effects of emissions from fossil fuel use in residential areas;
- address the effects of emissions from industrial sources;
- address the effects of emissions from other sources;
- implement obligations in respect of international agreements;
- give effect to best practice in air quality management; and
- describe how implementation will be effected and measured

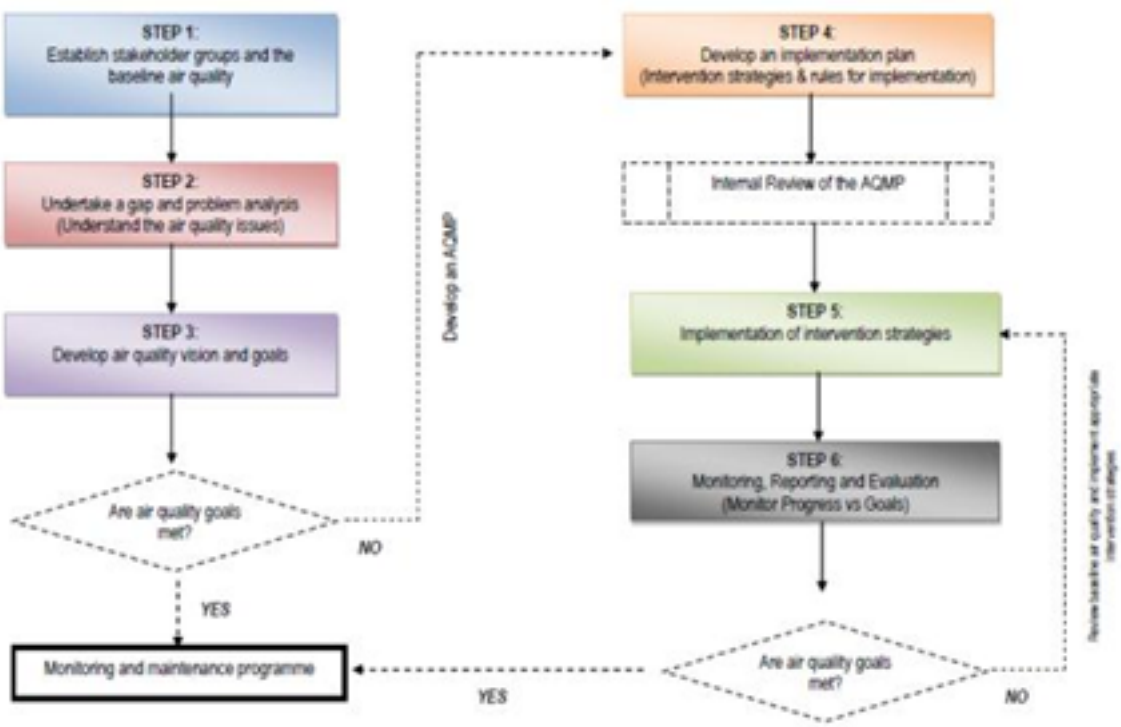

Figure 2-1: AQMP development process (DEA, 2012)

3. Criteria air pollutants and ambient standards

3.1 Ambient air quality standards

Health-based ambient air quality standards have been established for criteria (or common) pollutants and one toxic air pollutant in South Africa (DEA, 2009 and 2012). The national ambient air quality standard consists of a limit value and a permitted frequency of exceedance. The limit value is a fixed concentration level aimed at reducing the harmful effects of a pollutant. The permitted frequency of exceedance represents the tolerated exceedance of the limit value and accounts for high concentrations as a result of process upsets and meteorological variation. Compliance with the ambient standard therefore implies that ambient concentrations are below the limit value and the frequency of exceedance does not exceed the permitted tolerance. Being health-based, these standards imply that the ambient concentrations less than the standard do not pose a health risk, while concentrations above the standard may pose a health risk.

The criteria pollutants for which ambient standards have been set are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), lead (Pb), and inhalable particulate matter (PM_{10} and $PM_{2.5}$). Benzene (C_6H_6) is a toxic pollutant for which ambient standards have been set. The ambient standards are listed in Table 3.1.

Table 3-1: National Ambient air quality standards (DEA, 2009 and 2012)

Pollutants	Averaging period	Limit value µg/m³	Frequency of exceedance	Compliance date
SO_2	10 min	500	526	-
	1-hour	350	88	-
	24-hour	125	4	-
	Annual	50	0	-
NO_2	1-hour	200	88	-
	Annual	40	0	-
CO	1-hour	30 000	88	-
	8-hour mean	10 000	11	-
Pb	Annual	0.5	0	
PM_{10}	24-hour	120	4	-
	24-hour	75	4	1 Jan 2015
	Annual	50	0	-
	Annual	40	0	1 Jan 2015
$PM_{2.5}$	24-hour	65	0	-
		40	0	1 Jan 2016–31 Dec 2029
		25	0	1 Jan 2030
	Annual	25	0	-
		20	0	1 Jan 2016–31 Dec 2029
		15	0	1 Jan 2030
Benzene	Annual	10	0	-
		5	0	1 Jan 2015

3.2 Air pollutants and their effects

3.2.1 Sulphur dioxide

The major source of SO_2 is the combustion of fossil fuels such coal, oil and diesel which contain sulphur. On inhalation, most SO_2 only penetrates as far as the nose and throat as it is readily soluble in the moist lining of the upper respiratory system, with minimal amounts reaching the lungs, unless the person is breathing heavily, breathing only through the mouth, or if the concentration of SO_2 is high. The acute response to SO_2 is rapid, within 10 minutes in people suffering from asthma (WHO, 2005). SO_2 reacts with cell moisture in the respiratory system to form sulphuric acid. This can lead to impaired cell function and effects such as coughing, broncho-constriction, exacerbation of asthma and reduced lung function. Effects such as a reduction in lung function, an increase in airway resistance, wheezing and shortness of breath, are enhanced by exercise that increases the volume of air inspired, as it allows SO_2 to penetrate further into the respiratory tract (WHO, 1999). SO_2 has the potential to form sulphurous acid or slowly form sulphuric acid in the atmosphere via oxidation by the hydroxyl radical. The sulphuric acid may then dissolve in water droplets and fall as precipitation.

3.2.2 Nitrogen dioxide

Nitrogen dioxide (NO_2) is formed simultaneously in combustion processes and other high temperature operations such as metallurgical furnaces, blast furnaces, and internal combustion engines. The route of exposure to NO_2 is inhalation and the seriousness of the effects depends more on the concentration than the length of exposure. The site of deposition for NO_2 is the distal lung, as NO_2 does not readily dissolve in the moist upper respiratory system, it reacts with moisture in the fluids of the lower respiratory tract to form nitrous and nitric acids (WHO, 1997). About 80 to 90% of inhaled nitrogen dioxide is absorbed through the lungs (CCINFO, 1998). NO_2 present in the blood as the nitrite ion oxidises unsaturated membrane lipids and proteins, which results in the loss of cell permeability control. NO_2 causes decrements in lung function, particularly increased airway resistance. People with chronic respiratory problems and people who work or exercise outside will be more at risk to NO_2 exposure. In the atmosphere, NO_2 reacts with water vapour to produce nitric acid. This acidic pollution can be transported over long distances by wind and deposited as acid rain, causing the acidification of soils, lakes, and streams, accelerated corrosion of buildings and monuments and damages paintwork. NO_2 is also a major source of secondary fine particulate pollution which decreases visibility, and contributes to surface ozone formation through its reaction with VOCs in the presence of sunlight.

3.2.3 Carbon monoxide

Carbon monoxide (CO) is a product of the incomplete combustion of fossil fuels. It is predominantly formed in internal combustion engines of motor vehicles, but the combustion of any carbon-based material can release CO. Chemical reactions in the atmosphere may also lead to the formation of CO by the oxidation of other carbon-based gases such as methane. Decomposition of organic material within soils can also result in the release of CO. When inhaled, CO enters the blood stream by crossing the alveolar, capillary and placental membranes. In the bloodstream approximately 80-90% of absorbed CO binds with haemoglobin to form carboxyhaemoglobin. The haemoglobin affinity for CO is approximately 200-250 times higher than that of oxygen. Carboxyhaemoglobin reduces the oxygen carrying capacity of the blood and reduces the release of oxygen from haemoglobin, which leads to tissue hypoxia. This may lead to neurological effects and sometimes severe neurological effects that may include impaired coordination, vision problems, reduced vigilance and cognitive ability, reduced manual dexterity, and difficulty in performing complex tasks (WHO, 1999).

3.2.4 Ozone

A colourless gas which carries a harsh odour, ozone occurs naturally in the lower stratosphere as the ozone layer. This layer protects the earth from shortwave ultraviolet radiation. Near the earth's surface, ozone is a secondary pollutant and a major constituent of photochemical smog. The formation of ozone is dependent on the availability of NO_x, hydrocarbons and sunlight. Thus, ozone may not be related directly to any source. Rather it may be associated with the sources of its precursor gases (NO_x and hydrocarbons). Ozone may also reach the lower troposphere from the stratosphere, mostly associated with deep frontal systems or with deep convective storms. Ozone is a very reactive gas and a strong oxidant, associated with a number of health effects. These include respiratory system effects such as coughing, aggravation of asthma and reduced lung function

3.2.5 Lead

Lead (Pb) is a metal that occurs naturally in small amounts in the earth's crust. It is used in the production of some types of batteries, ammunition, metal products (such as solder and pipes) ceramic glazes and paint. Chemicals containing lead, such as tetraethyl lead and tetramethyl lead are used as gasoline additives. In the atmosphere, lead exists primarily in the particulate form and is removed from air by wet and dry deposition. Nearly all environmental exposure to lead is to inorganic compounds. Exposure to Pb may be through inhalation of contaminated air and ingestion of contaminated food, water and soil. Hand-mouth contact is the main route of exposure for children.

Lead can accumulate in plants and animals. The half-life of lead in human blood (it affects haemoglobin synthesis in the blood) is 28 to 36 days, but lead accumulates in the bones and teeth where it can stay for decades and be released again. Children absorb more and excrete less of the absorbed lead than adults.

3.2.6 Particulate matter

Particulate matter is a broad term used to describe the fine particles found in the atmosphere, including soil dust, dirt, soot, smoke, pollen, ash, aerosols and liquid droplets. The most distinguishing characteristic of PM is the particle size and the chemical composition. Particle size has the greatest influence on the behaviour of PM in the atmosphere with smaller particles tending to have longer residence times than larger ones. PM is categorised, according to particle size, into TSP, PM_{10} and $PM_{2.5}$.

Total suspended particulates (TSP) consist of all sizes of particles suspended within the air smaller than 100 micrometres (µm). TSP is useful for understanding nuisance effects of PM, e.g. settling on houses, deposition on and discolouration of buildings, and reduction in visibility.

PM_{10} describes all particulate matter in the atmosphere with a diameter equal to or less than 10 µm. Sometimes referred to simply as coarse particles, they are generally emitted from motor vehicles (primarily those using diesel engines), factory and utility smokestacks, construction sites, tilled fields, unpaved roads, stone crushing, and burning of wood. Natural sources include sea spray, windblown dust and volcanoes. Coarse particles tend to have relatively short residence times as they settle out rapidly and PM_{10} is generally found relatively close to the source except in strong winds.

$PM_{2.5}$ describes all particulate matter in the atmosphere with a diameter equal or less than 2.5 µm. They are often called fine particles, and are mostly related to combustion (motor vehicles, smelting, incinerators), rather than mechanical processes as is the case with PM_{10}. $PM_{2.5}$ may be suspended in the atmosphere for long periods and can be transported over large distances. Fine particles can form in the atmosphere during the gas phase, when gas molecules aggregate or cluster together without the aid of an existing surface to form a new particle, or from reactions of gases to form vapours that nucleate to form particles.

Particulate matter may contain both organic and inorganic pollutants. The extent to which particulates are considered harmful depends on their chemical composition and size, e.g. particulates emitted from diesel vehicle exhausts mainly contain unburned fuel oil and hydrocarbons that are known to be carcinogenic. Very fine particulates pose the greatest health risk as they can

penetrate deep into the lung, as opposed to larger particles that may be filtered out through the airways' natural mechanisms.

In normal nasal breathing, particles larger than 10 µm are typically removed from the air stream as it passes through the nose and upper respiratory airways, and particles between 3 µm and 10 µm are deposited on the mucociliary escalator in the upper airways. Only particles in the range of 1 µm to 2 µm penetrate deeper where deposition in the alveoli of the lung can occur (WHO, 2003). Coarse particles (PM_{10} to $PM_{2.5}$) can accumulate in the respiratory system and aggravate health problems such as asthma. $PM_{2.5}$, which can penetrate deeply into the lungs, are more likely to contribute to the health effects (e.g. premature mortality and hospital admissions) than coarse particles (WHO, 2003).

3.2.7 Benzene

Benzene is a natural component of crude oil, petrol, diesel and other liquid fuels and is emitted when these fuels are combusted. Diesel exhaust emissions therefore contain benzene. After exposure to benzene, several factors determine whether harmful health effects will occur, as well as the type and severity of such health effects. These factors include the amount of benzene to which an individual is exposed and the length of time of the exposure. For example, brief exposure (5–10 minutes) to very high levels of benzene (14000 – 28000 µg/m^3) can result in death (ATSDR, 2007). Lower levels (980 - 4200µg/m^3) can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. In most cases, people will stop feeling these effects when they are no longer exposed and begin to breathe fresh air. Inhalation of benzene for long periods may result in harmful effects in the tissues that form blood cells, especially the bone marrow. These effects can disrupt normal blood production and cause a decrease in important blood components. Excessive exposure to benzene can be harmful to the immune system, increasing the chance for infection. Both the International Agency for Cancer Research and the US-EPA have determined that benzene is carcinogenic to humans as long-term exposure to benzene can cause leukaemia, a cancer of the blood-forming organs.

3.2.8 Persistent Organic pollutants

Persistent organic pollutants (POPs) are organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes. Because of this, they are capable of long-range transport, bioaccumulation in human and animal tissue, bio-magnification in food chains, and to have potentially significant impacts on human health and the environment. Many POPs are used as pesticides. Pesticides are substances or mixture of substances intended for preventing, destroying, repelling or mitigating pests. The most common use of pesticides is the protection of crops,

or agricultural products from damaging influences such as weeds, diseases or insects. Target pests can include insects, plant pathogens, weeds and microbes. Although there are human benefits to the use of pesticides, some also have drawbacks, such as potential toxicity to humans and other animals. According to the Stockholm Convention on Persistent Organic Pollutants, 9 of the 12 most dangerous and persistent organic chemicals are pesticides.

4 Description of the environment

The baseline air quality assessment for the Stellenbosch Municipality is informed by the geography, topography, climate and meteorology of the area and the socio-economic context. It also describes the emission sources and current air quality conditions as well as the status of the institutional capacity to perform its air quality management function.

4.1 Topography and land use

The Stellenbosch Municipality is located in the south western corner of the CWDM. It is bordered by the CWDM's Breede Valley Municipality in the northeast, the Drakenstein Municipality, the Theewaterskloof Municipality in the Overberg District Municipality to the southeast and the City of Cape Town to the south and west.

The landscape is characterised by rolling hills, mountains and fertile valleys (Figure 4.1). Stellenbosch Town is surrounded by the Bottelaryberg in the northwestern corner, Stellenbosch Mountain to the south, the Jonkershoek Mountains and the Groot Drakenstein Mountains to the south-east and Simonsberg to the northwest. Franschhoek and Groendal are located in the valley between the Groot Drakenstein Mountains and the Wemmershoek Mountains. The Klein Drakenstein Mountains form the north-western to south-eastern boundary of the Stellenbosch Municipality in the Franschhoek area. The Dwars River Valley, which includes settlements such as Johannesdal, Kylemore and Pniel, are located between the Simonsberg, the Groot Drakenstein Mountains and the Jonkershoek Mountains. The north-eastern area of the Municipality includes the plains. The Helderberg forms the southern boundary of the Stellenbosch Municipality with the City of Cape Town.

The permanently irrigated agricultural activities are generally located in the western areas of the Municipality as well as the Dwars River Valley (Kylemore and Pniel) and Franschhoek areas (Figure 4.2). Wine grapes and peaches are the biggest contributors to agricultural land use. Natural veld is generally located along the mountain ranges of the Stellenbosch, Jonkershoek, Simonsberg and Groot and Klein Drakenstein mountains.

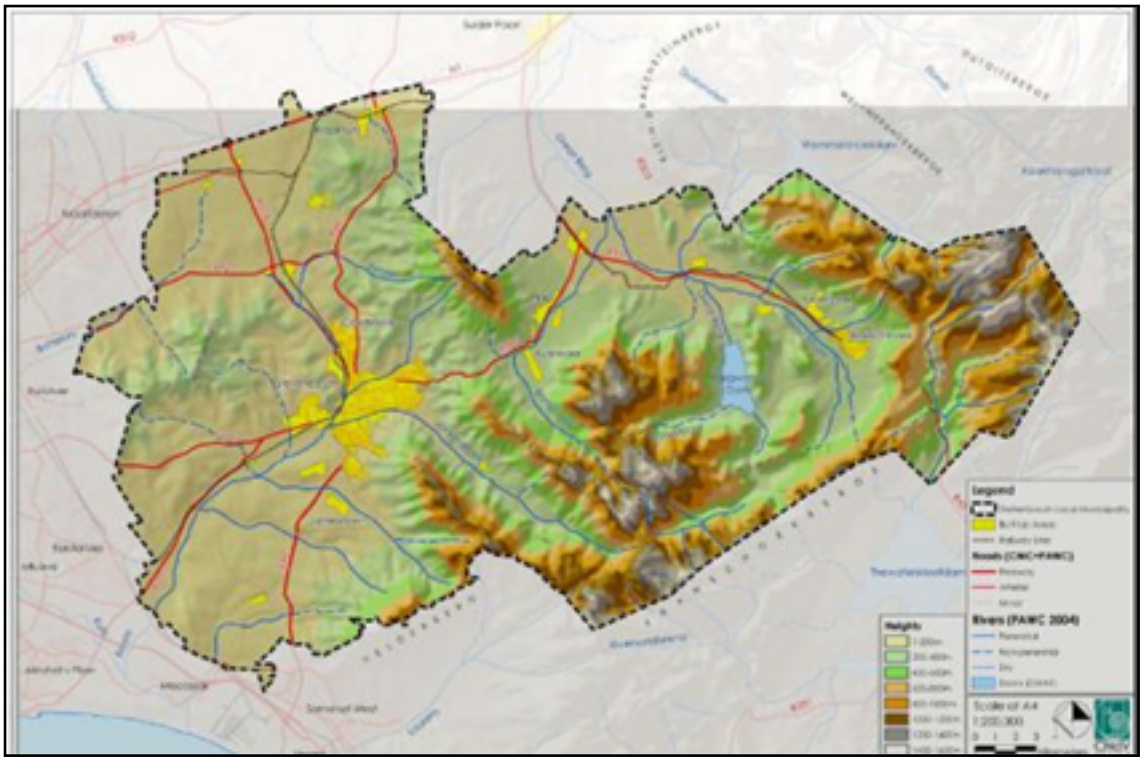

Figure 4-1: Topography of the Stellenbosch Municipality (Stellenbosch Municipality, 2010)

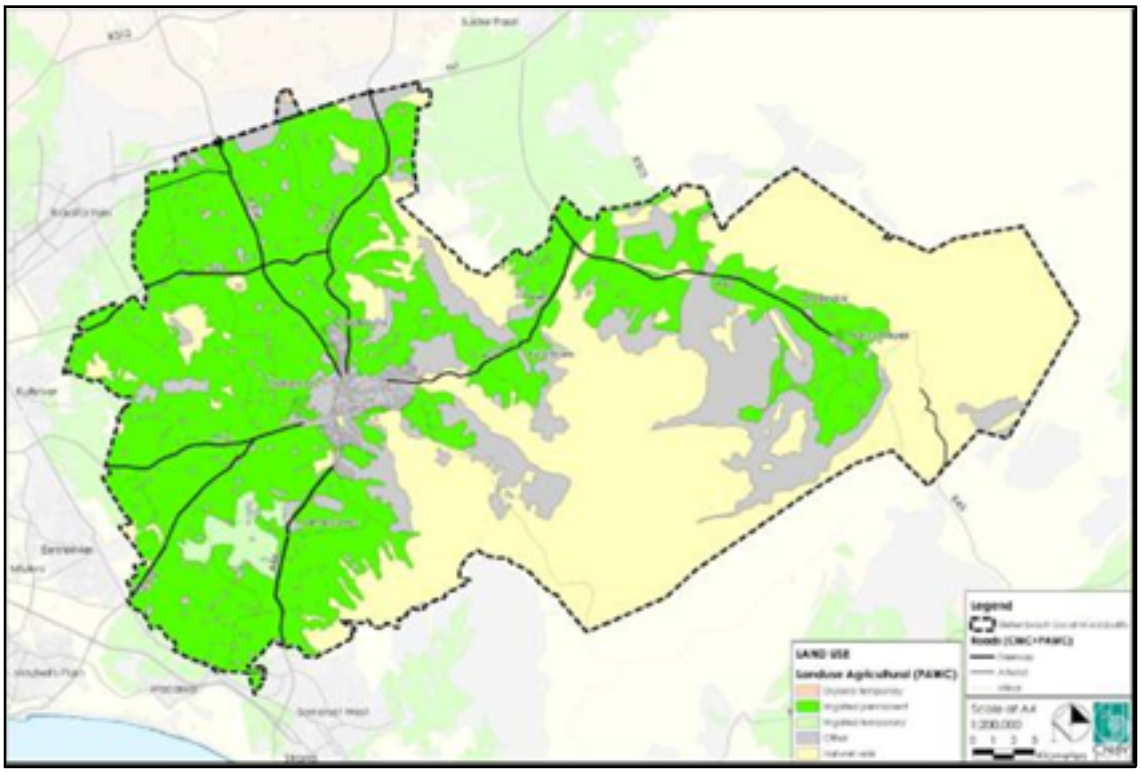

Figure 4-2: Land use in the Stellenbosch Municipality (Stellenbosch Municipality, 2010)

4.2 Climate and meteorology

The Stellenbosch Municipality experiences a Mediterranean climate typical of the southern parts and south-western of the Western Cape. In summer the weather is mostly influenced by the location of the semi-permanent Atlantic Ocean high pressure system over the south-western Cape, resulting in dry and warm conditions. In winter mid-latitude systems migrate further northwards and influence the region through cold fronts between May and August. The cold fronts are accompanied by rainfall, mild daytime temperatures and cold nights. This is well illustrated by the climate data measured at the South African Weather Service monitoring station at Jonkershoek (SAWS, 1998) (Figure 4.3). The annual average rainfall at Jonkershoek is 1 096 mm with the highest rainfall occurring between May and August when an average of 629 mm occurs. By comparison an average of 192 mm occurs between November and March. Average summer temperatures reach 20 °C while average winter temperatures are between 12 and 13 °C.

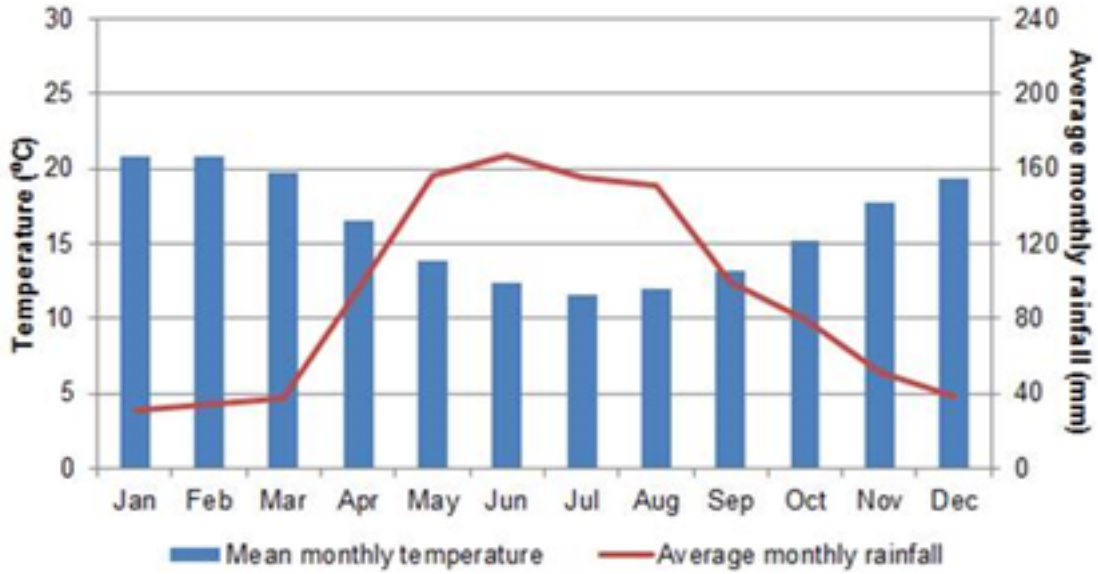

Figure 4-3: Average monthly temperature (˚C) and rainfall (mm) at Jonkershoek for the period 1925 to 1984 (SAWS, 1998)

The spatial distribution of rainfall in the Stellenbosch Municipality closely mimics the topography, with higher rainfall generally corresponding with higher elevation (Figure 4-4). The highest rainfall occurs in the in the south-eastern corner of the Municipality corresponding generally with the Jonkershoek Mountains and an average annual rainfall of more than 3 000 mm. The Franschhoek Valley area, the eastern most part of the Municipality, has an average annual rainfall of between 1000 mm and 2000 mm. The south-western part of the Municipality experiences the lowest annual rainfall of less than 500 mm.

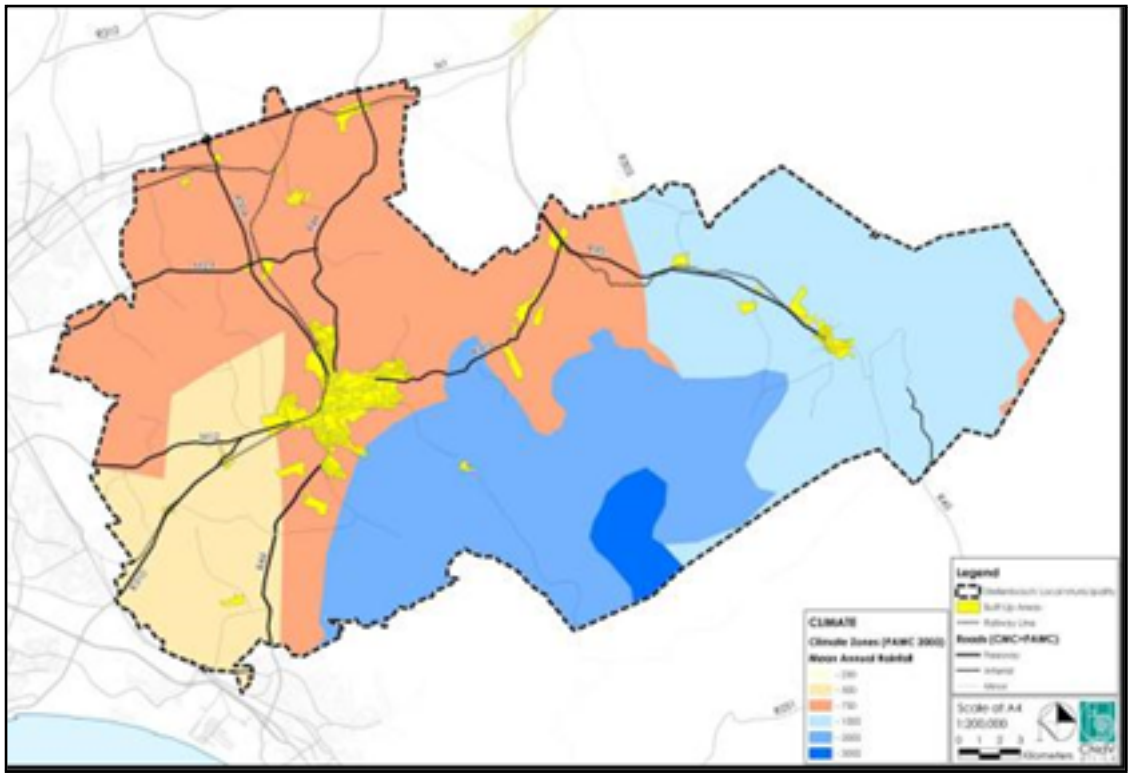

Figure 4-4: Spatial distribution of rainfall in the Stellenbosch Municipality (Stellenbosch Municipality, 2010)

Wind speed and direction in the Stellenbosch Municipality may be inferred from measurements in Cape Town and Paarl. The wind measured in Cape Town is more representative of the western parts of the Municipality than elsewhere and wind measured at Paarl will apply mostly to the eastern parts of the Municipality including the Franschhoek Valley. Figure 4.5 shows wind roses for Paarl and Cape Town for the period 1998 to 2008. Each wind rose depicts the frequency (as a percentage) of occurrence of hourly wind speed in six wind speed classes in the 16 cardinal wind directions. Wind direction being from where the wind blows, e.g. south-easterly winds blow from the southeast to the northwest. The frequency of very light and calm winds (< 0.5 m/s) is shown in the centre of the windrose with the wind speed classes colour coded in Figure 4.5. Each arch represents a 5% frequency of occurrence.

The wind in Cape Town and over the western parts of the Stellenbosch Municipality is generally stronger than at Paarl and the eastern parts of the Municipality where the mountainous topography offers protection from the strong coastal winds. At Paarl more than 38% of winds are very light or calm (< 0.5 m/s) and more than 50% of winds are between 0.5 and 3.5 m/s. These winds will mostly be topographical induced, given the mountainous nature of the area. Winds prevail mostly from two sectors; from the south to west-southwest, and northwest to north. On rare occasions the wind reaches 8 m/s, possibly when strong synoptic-scale conditions affect the south-western Cape Province.

Light winds (<0.5 m/s) are very rare in Cape Town, occurring only 3.8% of the time. The prevailing winds occur in the sector south-southeast to south-southwest and reach speeds in excess of 10.8 m/s. These mostly occur in summer when the Atlantic Ocean high pressure system is located across the southern parts of the country. In winter the northwesterly winds prevail as a result of frontal systems and also reach more than 10.8 m/s at times.

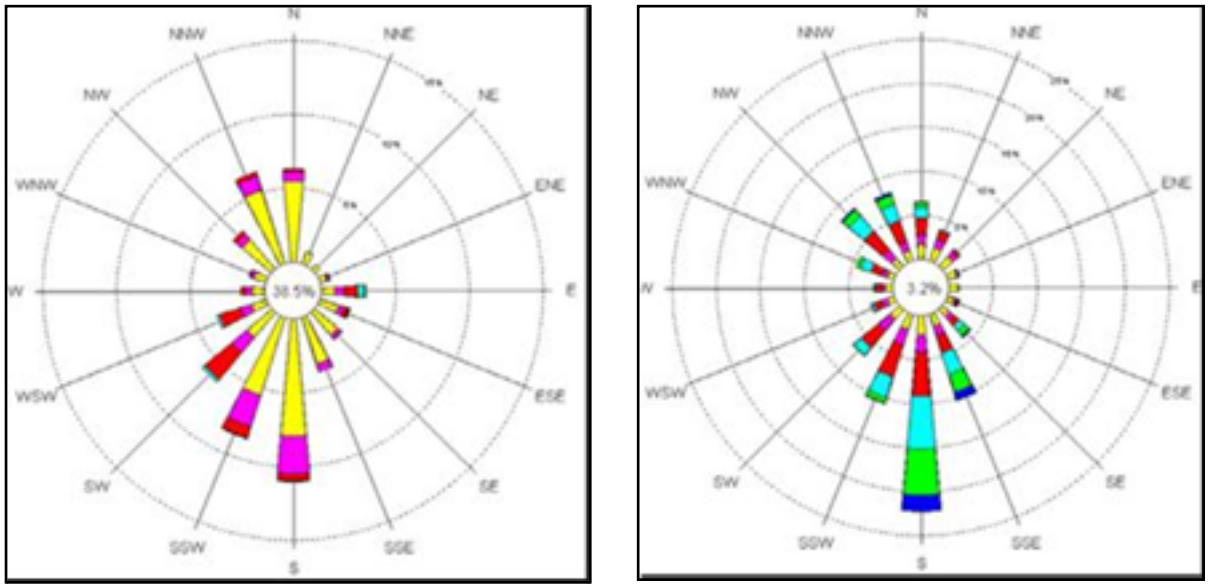

Figure 4-5: Annual wind roses for Paarl (left) and Cape Town (right) for the period 1998 to 2008 (Stellenbosch Municipality, 2010). The wind speed classes in m/s are shown below

0.5-2.5 **2.6-3.5** **3.6-5.5** **5.6-8.0** **8.1-10.8** **>10.8**

The air pollution dispersion potential of an area refers to the ability of atmospheric processes, or meteorological mechanisms, to disperse and remove pollutants from the atmosphere. Dispersion comprises both vertical and horizontal components of motion. The vertical component is defined by the stability of the atmosphere and the depth of the surface mixing layer. The horizontal dispersion of pollution in the boundary layer is primarily a function of the wind field and atmospheric stability. The wind speed determines the rate of downwind transport and wind direction and the variability in wind direction determines the general path of pollutant. Atmospheric stability, or instability, determines the ability of the atmosphere to mix and dilute pollutants. Stability is a function of solar radiation (thermal turbulence) and wind speed and surface roughness which induce mechanical turbulence. The dispersion potential of an area, therefore experiences diurnal and seasonal changes.

By day with stronger insulation (in coming solar radiation) and stronger winds the dispersion potential is generally more efficient through vertical dilution and horizontal dispersion. The dispersion potential is generally better on summer

days than winter days. At night as the surface temperature inversion develops the lowest layer of the atmosphere becomes more and more stable, reaching a maximum at sunrise. As a result, the dispersion potential typically becomes less efficient during the night and the poorest conditions generally occur at sunrise. Thermal turbulence disappears when the sun sets, and mechanical turbulence decreases as the wind speeds drops at night. Pollutants tend to accumulate near the point of release under these conditions, particularly if these are released close to ground level. The dispersion potential is generally poorer on winter nights than summer nights.

In the Stellenbosch Municipality the dispersion potential is expected to be reactively good during the day in both summer and winter as a result of warm daytime temperatures and a relatively high frequency of meditate winds, particularly over the western and south western parts. Dispersion will however be better on summer days than winter days because the thermal mixing is stronger and the night-time temperature inversions are weaker and shorter lived in summer. At night the dispersion potential is poorer and there is a tendency for pollutants to accumulate in the lowest layer of the atmosphere. This effect is more pronounced in the winter when the surface temperature inversions are stronger and exist for longer than in summer. Dispersion is also expected to be more efficient over the flatter western parts of the municipality where winds are stronger than the east where mountains and valleys moderate the thermal and mechanical mixing.

4.3 Socio-economic context

The socio economic context of the Stellenbosch municipality was derived largely from the 3rd generational Integrated Development Plan (IDP) for 2012/13 to 2017/17 (Stellenbosch Municipality, 2012). Additional information was gathered from the Spatial Development Framework component of the Stellenbosch Municipality IDP (Stellenbosch Municipality, 2010). The Cape Winelands District Municipality IDP was used to account for regional trends (CWDM, 2012). The demographic profile is considered in terms of gender ratios as well as age and race aspects of the population composition. In terms of the economic and development context, the main economic potential centres are listed and infrastructure development and service provision is briefly described. The energy use profile of the Stellenbosch municipality is also described, as some energy sources can contribute to air pollution.

The 2001 Census recorded a population of 117 705 for the Stellenbosch Municipality. The Census 2007 community survey estimated the population of Stellenbosch Municipality to be the second largest population in the CWDM. In terms of population composition, the economically active (15-64 years) make up the majority at 70.1%, with the elderly (65+ years) and children (0-14 years) making up the remainder of the population at 4.5% and 25.4% of the population

respectively (Stellenbosch Municipality, 2012). As such, the population of Stellenbosch is relatively youthful. In terms of gender ratios, in 2007, males accounted for 48.7% of the population and females 51.3 % respectively. The largest population group in Stellenbosch is the Coloured racial group, accounting for 54.4%, while the White and African population make up 26% each and Indians/Asians at 0.5%. In 2007 80.4% of the population was estimated to be literate.

The larger concentrations of people are located around the urban settlements of Stellenbosch, Franschhoek, Klapmuts and Kylemore (Figure 4-6) (Stellenbosch Municipality, 2010). The areas with higher elevation, the mountainous south eastern parts and the rural areas are sparsely populated in comparison. Migration from rural to urban areas and from rural areas in other provinces has influenced population composition and densification of populations in urban centres.

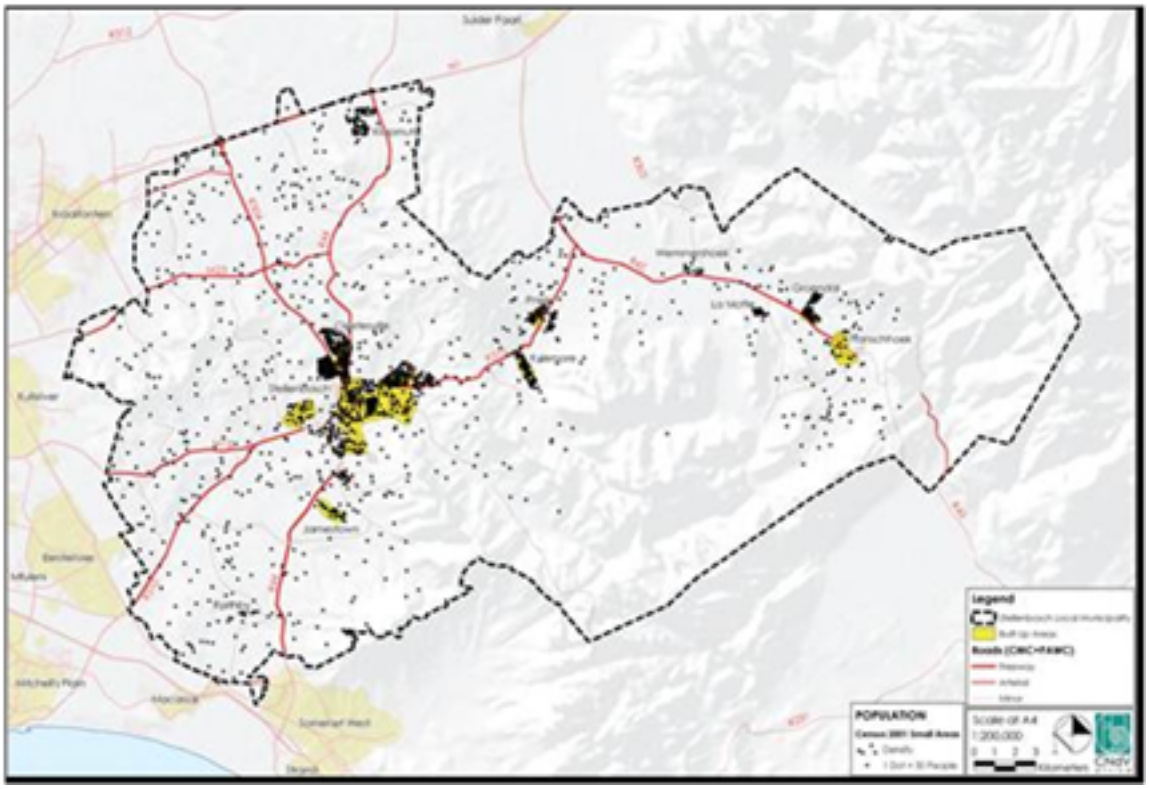

Figure 4-6: Population Density in 2001, Stellenbosch Municipality (2010)

The provincial treasury estimates that Stellenbosch Municipality has 28.3% people in rural areas and 71.7% of its population in the urban centres (Stellenbosch Municipality, 2010). This is a higher urbanization percentage than the Cape Winelands District that has 70.28% urban and 29.72% rural population. (Census, 2001). The majority of the of the Municipality's population is urbanised which means that a significant amount of livelihoods are derived from urban activities. Wages tend to be higher in urban settlements than rural areas. However; the population of Stellenbosch municipality is relatively poor

(Stellenbosch Municipality, 2010). The majority of households earn less than R 3 500 per month. Higher income households are found in and around the Stellenbosch Town and the eastern parts of Franschhoek. The northern and western parts contain a higher concentration of low income earners. There are also a lot of university students who fall under the no income category.

The Stellenbosch Municipality is the second largest economy in the Cape Winelands District. The region's economic potential centres largely on agricultural activities, heritage and tourism ventures. These are sectors that rely heavily on environmental services. There are strong linkages from Stellenbosch Municipality's agricultural sector to its manufacturing, wholesale, trade and accommodation, and financial services sectors, particularly with agri-tourism. The wine industry, followed by vegetable products, both strongly linked to the agricultural sector, are the district municipality's largest export products. According to Provincial Treasury (2006) the Stellenbosch Municipality finance and business services sector, mining, government, community, social and personal services, manufacturing and construction make the largest contributions to the CWDM economy.

The historical context of municipal service delivery and the emerging South African context influence the manner in which municipal services are distributed. Approximately 90.4% of the dwellings were categorised as formal by 2007, with the remainder of the dwellings being informal or traditional. However, there is still a considerable need for housing in the municipality. While access to sanitation has improved there are still some households that did not have access to sanitation as of 2007, the majority of households had access to refuse removal services and communal dumps. Most of the settlements have access to healthcare facilities. The literacy rates in Stellenbosch are lower than in the rest of the district. Stellenbosch University, located in Stellenbosch, is a major driver in this town.

In 2001, electricity was the main source of energy for lighting purposes (used by 91.8% of households), followed by candles and paraffin (used by 4.2% and 3.4% of households respectively). In 2007, electricity remained the leading source of energy for lighting purposes (used by 97.9% of households). The percentage of households that used candles and paraffin lowered to 0.9% and 0.4% of households respectively in 2007.

4.4 Atmospheric emissions

The main categories of atmospheric emissions that occur in the Stellenbosch Municipality are from industrial and manufacturing processes, motor vehicles, agricultural activities, residential fuel burning, biomass and refuse burning, and waste management. Emissions from these sectors are discussed in the following sections.

4.4.1 Industrial and manufacturing emissions

Atmospheric emissions from industrial and manufacturing processes are typically associated with the combustion of fuel for heat or steam generation. These fuels may be coal, wood, heavy fuel oil (HFO), diesel or gas. In Stellenbosch Municipality there are seven industries with fuel burning devices. These are listed in Table 4-1 and their relative locations are shown in Figure 4-7. Six facilities operate boilers using either coal, diesel, HFO or wood waste. The incinerator at the Provincial Veterinary Clinic is diesel fired. Of the seven facilities, four require an Atmospheric Emission License (AEL) in terms of the NEM: AQA. The AEL authority is a District Municipal function and is the responsibility of the CWDM. The boilers at the remaining facilities will be regulated by the Stellenbosch Municipality as Controlled Emitters if they have a design capacity of between 10 MW and 50 MW heat input (DEA, 2012).

Table 4-1: Facilities operating fuel burning devices in Stellenbosch Municipality

Company name	Nature of process	Device type	AEL required
Cape Sawmills	Sawmills	Boilers: Wood waste and coal	Yes
Distell	Winery	Boiler: Coal and HFO	No
ICA Development Pty Ltd	Chemical Manufacture	Air heater: Diesel	No
Killarney brickfields Pty Ltd	Brick Manufacturer	Boiler: Coal	Yes
Parmalat Pty Ltd	Cheese manufacture	Boiler: HFO	No
Provincial Veterinary Laboratory	Veterinary Incinerator	Incinerator: Diesel	Yes
Wemmershoek Sawmills	Sawmills	Boilers: Wood waste and coal	Yes

Figure 4-7: Relative location of the facilities that operate fuel burning devices in Stellenbosch Municipality

The pollutants that are emitted from fuel burning devices depend primarily on the fuel and could include SO_2, NO_X, CO, particulates and VOCs. The quantity of pollutants emitted depends on the fuel consumption, the combustion device and the efficiency of installed air pollution abatement equipment. Emissions have been estimated using data collected for the AQMP scoping (GES, 2008) and emission factors for the different fuel types (Table 4-7), using the methodology described in the EMEP/EEA emission inventory guidebook (2004). The total estimated annual emission of SO_2 emission is 455 tons per annum, with 188 tons of NO_X and 175 tons of PM_{10}.

Table 4-2: Estimated emissions of pollutants in tons per annum from facilities operating fuel burning devices in Stellenbosch Municipality

Facility	Pollutant		
	SO_2	NOx	Particulates
Cape Sawmills	0.2	16.4	11.2
Distell	4.1	1.0	0.2
ICA Development Pty Ltd	0.0	0.3	0.0
Killarney Brickfields Pty Ltd	408.0	142.8	81.6
Parmalat Pty Ltd	43.2	3.6	0.7
Provincial Veterinary Laboratory	0.0	0.0	0.0
Wemmershoek Sawmills	0.0	0.02	0.04
Total	**455.5**	**164.1**	**93.8**

4.4.2 Motor vehicles

Air pollution from motor vehicles arise from the by-products of the combustion process (emitted via the exhaust system) and from evaporation of the fuel itself from the fuel tank. Particulate matter (PM) is also emitted from brake, tyre and road wear. The following key pollutants are emitted from motor vehicles: Nitrogen oxides (NO_X), carbon monoxide (CO), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), hydrocarbons (HC) (represented by NMVOC) and lead (Pb). Emissions of carbon dioxide (CO_2), a greenhouse gas (GHG), also occurs.

Emissions are estimate for motor vehicles in all municipalities in South Africa in the *Integrated Strategy for the Control of Motor Vehicle Emissions: Motor Vehicle Emission Inventory* (DEA, 2012). The following vehicle categories were adopted for the study: Passenger cars, light-duty vehicles (LDVs) (< 3.5 ton), heavy-duty vehicles (HDVs) (> 3.5 ton) and buses, and motorcycles. Emissions were estimated using emission factors for diesel (500 and 50 ppm) and gasoline for the different vehicle classes and 2009 fuel sales data from the Department of Energy (DoE), i.e. 9 866 kl of gasoline, 9 997 kl of diesel 500 and 3 114 kl of diesel 50.

The total estimated emissions from motor vehicles for the Western Cape (Table 4.3) are 12.8% of the total mass of pollutant emitted from motor vehicles in South Africa. The total mass of motor vehicle emissions in Stellenbosch Municipality of 153 220 tons per annum is 2.1% of the total emissions in the Western Cape which is 7 153 457 tons per annum.

Stellenbosch Municipality completed a five-year Comprehensive Integrated Traffic Plan in 2010. As the municipality has grown so too has the pressure on the capacity of the road and transport infrastructure. Large numbers of commuters cross the municipal boundaries of Stellenbosch Municipality every day to access their places of work. These local transport patterns and systems are linked to the adjacent Cape Town Metropolitan Area. The use of non-motorised transport options such as cycling and walking and the use of public transport by some members of the population contribute to lowering motor vehicle emissions and should be encouraged further (Stellenbosch Municipality, 2012).

Table 4.3: Emissions of pollutants from motor vehicles in the Western Cape and Stellenbosch Municipality (DEA, 2012c)

Area	Emission Rate (ton/year)						
	NO_X	SO_2	CO	PM_{10}	NMVOC	Benzene	Lead
Western Cape	31 776	996	169 104	2 419	25 136	35.6	0.0546
Stellenbosch	686	8.4	5 220	35.1	759	1.11	0.00101

4.4.3 Residential fuel burning

The majority of households in Stellenbosch Municipality use electricity for cooking, heating and lighting purposes with some use of gas, parrafin, wood and other energy sources (Figure 4-7). As such, energy use in the Stellenbosch Municipality is not strongly associated with air pollution as electricity, gas and paraffin are clean sources of energy. However, there are some households, particularly in the informal settlements that do not have access to electricity. Here wood, paraffin and alternative fuels are used. Wood burning is associated with several consequences for indoor and ambient air quality and for human health. Smoke resulting from incomplete combustion of wood contains many chemical substances that are harmful such as hazardous air pollutants (HAPs), fine particle pollution (ash), and volatile organic compounds (VOC).

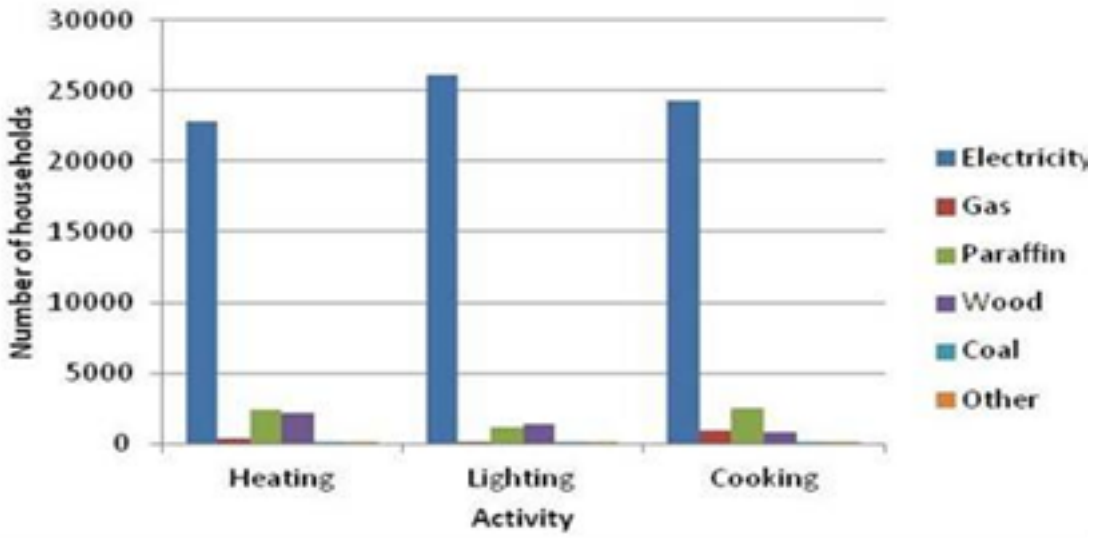

Figure 4-8: Energy sources for lighting, cooking and heating per a household (Stats SA, 2007)

The estimation of emissions from domestic burning is based on data from Stats SA's Household Services Community Survey (2007) that delineates the number of households utilising fuels for domestic purposes (cooking, lighting, space heating) shown in Figure 4.7. Emission factors for the different fuels were sourced from the US-EPA 42 (2011), the IPCC (1996) and the so-called FRIDGE study (2004). As might be expected the highest emissions of particulates and CO result from wood burning (Table 4.4).

Table 4.4: Estimated emissions of pollutants from domestic fuel burning in Stellenbosch Municipality in tons per annum

Fuel	SO_2	NO_X	PM_{10}	CO
LPG	0.00	0.07	0.00	0.01
Paraffin	4.03	1.02	0.06	0.28
Wood	0.13	0.91	9.97	75.17
Coal	0.04	0.01	0.01	0.37
Total	**4.20**	**2.02**	**10.04**	**75.84**

4.4.4 Agricultural emissions

Emissions from agricultural activities are most often associated with GHG emissions such as nitrous oxide (N_2O) from soil management and N_2O and methane (CH_4) from livestock and livestock management. Vegetation and crop residue burning results in the emission of CO, NO_X and particulates. Pesticide usage is very often necessary to maintain both agricultural productivity as well as human health. The drift of spray and dust from pesticide applications can expose people, wildlife, and the environment to pesticide residues that can cause health and environmental effects and property damage.

The predominant agricultural activity in the Stellenbosch Municipality is the cultivation of grapes and deciduous fruit, with relatively little livestock farming. Emissions from this sector are expected to be relatively small and are not considered further in this air quality baseline assessment. Emissions from vegetation burning for agricultural purposes are addressed as biomass burning.

4.4.4.1 Biomass burning

Biomass burning is an important source of atmospheric emissions. Uncontrolled and controlled burning of natural vegetation, agricultural residue and waste are the main types of biomass burning that occur in the Stellenbosch Municipality. Agricultural burning in Stellenbosch is a seasonal practice and is done under specific guidelines and only when a permit from the local Fire department is issued. However this not done with any consideration for potential air quality impacts.

Fires can emit large volumes of particulate matter, ranging from coarse smuts that deposit on surfaces and are a nuisance, to fine inhalable particulate matter (PM_{10}). Gases emitted include CO, NO_X and VOCs. Biomass burning emissions can be estimated using fire data or burnt area estimates and emission factors for the vegetation type. Active fires are detected using data from the moderate resolution image spectro-radiometer (MODIS) sensor on NASA's Aqua and Terra satellites received by South African National Space Agency (SANSA, Hartebeeshoek) and CSIR Meraka Institute (Pretoria). The Advanced Fire

information System (AFIS) determines the size and location of active fires, which may be used as a proxy for area burnt. In turn, the area burnt and the location may be used to estimate the type and amount of vegetation burnt. Emissions of particulates and gases are estimated using emission factors. Emissions from biomass burning in Stellenbosch were not estimated due to uncertainties in the AFIS algorithms (pers. Comm., Riaan van den Dool, CSIR Meraka Institute, Pretoria).

4.4.4.2 Pesticide use

Pesticide usage in South Africa has increased and the country is one of the largest markets for pesticides in Sub-Saharan Africa. Each crop type is susceptible to a unique host of pests that in-turn require a unique mixture of pesticides. Wine and fruit dominate as major agricultural export products for South Africa (Quinn et al, 2011). The Western Cape, including Stellenbosch Municipality, is one of the major growing regions for these products and as such pesticide usage occurs. With the need to use pesticides in grape and deciduous fruit farming the focus of agricultural emissions in Stellenbosch Municipality is therefore on pesticides.

Pesticides are categorised into four main substituent chemicals: herbicides; fungicides; insecticides and bactericides. Data on South African pesticide production is scarce. The last published data indicates that in 2002 around 10 000 kℓ of liquid insecticides were produced for crop protection, of which 43% comprised organophosphates (Quinn et al, 2011). South Africa has more than 500 registered pesticides; the vast majority of these pesticides are carbamates, organophosphates and pyrethroid (Pesticide Action Network (PAN), 2010). There are also a number of alternative remedies registered for use in South African agricultural activities such as microbial, botanical and pheromone agents.

There are three main forms of pesticides:

- Liquids - usually mixed with water and then sprayed
- Solids - usually in the form of pastes, pellets, dust and powder and may be applied directly as solids. They may also be turned into other forms
- Gases - usually in the form of tiny particles.

Pesticide drift refers to the unintentional diffusion of pesticides and associated potential negative effects of pesticide application. These effects include off-target contamination due to spray drift as well as runoff from plants and soil. It occurs when pesticides suspended in the air as particles are carried by wind to other areas, potentially contaminating them. Pesticides are one of the causes of water pollution and contribute to soil contamination. Over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species, including non-target species, air, water and soil (Miller, 2004).

Pesticides enter human bodies through four pathways. Exposure can occur through the skin, through oral ingestion, through the eyes or through inhalation (Quinn et al, 2011). Pesticide exposure can cause a variety of adverse health effects, ranging from simple irritation of the skin and eyes to more severe conditions such as those affecting the nervous system, mimicking hormones causing reproductive problems, and also causing cancer (US-EPA, 2012). Strong evidence also exists for other negative outcomes from pesticide exposure including neurological, birth defects, foetal death (Sanborn, 2007) and neurodevelopmental disorder (Jurewicz, 2008).

Pesticides feature significantly in many international environmental policy documents. This is largely due to the use of pesticides that have been banned in the developed world, in developing countries. This is attributed to their low costs, and the lack of awareness and institutional capacity around their use. The European Union Framework Directive (EU, 2009) for the protection of human health and sensitive environmental areas proposes mitigation measures that include the creation of buffer zones and the establishment of no or significantly-reduced pesticide application zones. With limited exceptions, the Framework Directive prohibits aerial spraying; when strict conditions for aerial use have been met, preference is given to application devices with low-spray volume

The airborne nature of spray drift from the application of pesticides implies an air quality issue. However, spray drift is not addressed the NEM: AQA. Pesticide use is regulated under the Fertilizer Farm Feeds Agriculture and Remedy's Act (36 of 1947), regulated and administrated by Department Agriculture, Forestry and Fisheries (DAFF). The statutory obligation in terms of the National Environmental Management Act (Act No. 107 of 1998) and the registration and prescription for the application of agrichemicals is legislated and administrated by DAFF. DAFF register all fertilisers, farm feeds, and agricultural remedies, stock remedies, sterilising plants and pest control operators, regulate or prohibit the importation, sale, acquisition, disposal or use of all fertilizers, farm feeds, agricultural remedies and stock remedies. The objectives of the Pesticide Management Policy for South Africa (DAFF, 2010) are, amongst others, to improve the legislative framework to improve protection against health and environmental risks posed, and to encourage the development and use of alternative products and techniques and to reduce the dependence of chemical protection of plants. To facilitate improvements that are aimed at ensuring that pesticides are produced, used and disposed of throughout their full life-cycle in ways those pose no significant adverse effects on health and the environment.

Pesticide labels state how pesticides should be used. These directions include what protective clothing workers should wear and when they should refrain from spraying on neighbouring properties. Labels for pesticides approved for aerial

application generally state that chemical drift should not be allowed to contaminate water or adjacent areas.

Labels are usually stuck directly on to containers and have some of the following information:

i. Product information: trade/brand name; manufacturer/supplier's name; addresses; type of formulation; emergency phone numbers.
ii. Hazardous ingredients: active ingredients; other chemical formulation; all identified by a chemical name(s).
iii. Toxicological properties: health effects; environmental effects; hazard warning symbols.
iv. User information: direction for use; dose rates; mixing instructions; application rates; approved tank mixes.
v. Environmental/crop/pest information: range of crops; types of livestock; pest range; tolerant or resistance species; warning on possible crop damage; harvest intervals.
vi. Precaution/preventive measures: technical/ engineering control; other safety information; medical advice or warning; washing and disposal of containers.
vii. Operator protective measures.
viii. First aid measures.

The use of pesticides, spray drift and the effects on workers and surrounding communities has been well documented as an issue in the CWDM, including Stellenbosch Municipality (London et al, 1994; London et al, 1997; Green Times, 2011). Estimating emissions from spray drift is however challenging due to the varied nature of this activity. Emissions have not been estimated in this air quality baseline assessment.

4.4.4.3 Chicken broilers and piggeries

There are some chicken broilers and piggeries within the municipality. A typical air quality issue associated with these facilities is odour. In addition the use of fuels such as diesel, HFO and coal for heating results in the emission of pollutants of combustion such as SO_2, NOx and particulate matter.

4.4.5 Waste management

4.4.5.1 Landfill

The management of general waste in Stellenbosch Municipality involves the collection and disposal at a landfill site. The waste collection service reaches most domestic homes and businesses (Stellenbosch Municipality, 2012). Approximately 96 ton/day, 980 ton/week, 4 243 ton/month and 50 960

ton/annum of general waste is being managed by the Municipality (Stellenbosch Municipality, 2012). This amounts to 31.2% of the total waste for the Cape Winelands district Municipality. Waste removal services have improved since 1991; more than 90% of the Municipal residents have their waste currently removed by the Municipality (IDP, 2009). The current solid waste disposal site is over capacity.

While a landfill has the potential to impact on many aspects of the environment, the main risks to human health are likely to be a consequence of airborne emissions (Richardson et al, 2010). Gaseous emissions from landfill sites are both a public nuisance as well as a potential health hazard. The presence of a landfill impacts on air quality through three major pathways: odours, dust and gaseous pollutants. Emissions from general waste landfill sites occur as landfill gas, which consists mostly of methane and CO_2 and particulates from waste handling and vehicle movement on the landfill site and wind entrained dust.

The nature of airborne emissions from a landfill site is dependent on site specific factors such as the type and quantity of waste and the age of the landfill waste (Richardson et al, 2010). The impact on air quality that ensues is dependent on the emissions, local meteorological conditions and proximity to the site (Richardson et al, 2010). Wind speed and direction is of particular importance as it affects the odour and pollutant dispersion characteristics (Richardson et al, 2010). Emissions of pollutants emitted at the Stellenbosch Municipality have not been estimated for this air quality baseline assessment.

Incidental waste burning are localised sources of air pollution. The pollutants will depend on the type of waste being burnt and may include particulates, CO, NO_X, VOC and toxic pollutants if waste including plastics are burnt. The estimation of emissions from incidental waste burning is a challenging exercise due to the varied nature of the activity and has not been done for this air quality baseline assessment

1.1.1.1. Wastewater treatment

There are six wastewater treatment (WWT) plants in the Stellenbosch Municipality. The Franschhoek Valley WWT plant is currently over capacity and requires a new system (Stellenbosch Municipality, 2010). The La Motte WWTW was closed down, the Wemmershoek Works will be abandoned and Klapmuts requires a new system. Stellenbosch Town WWT requires repairs to achieve its original design capacity.

Air pollutants associated with wastewater treatment works include hydrogen sulphide (H_2S), mercaptans and ammonia. Volatile organic compounds (VOCs) form by the volatilization of organic compounds in the treatment process, often found in industrial waste. Wastewater treatment works are also sources of

greenhouse gases; CO_2, CH_4 and N_2O. CO_2 production is associated with the anaerobic treatment process through the breakdown of organic matter in the activated sludge. Wastewater as well as its sludge components can produce CH_4 if it degrades anaerobically. The extent of CH_4 production depends primarily on the quantity of degradable organic material in the wastewater, the temperature, and the type of treatment system. The rate of CH_4 production increases with increasing temperature. This is especially important in uncontrolled systems and in warm climates. N_2O is associated with the degradation of nitrogen components in the wastewater, e.g., urea, nitrate and protein.

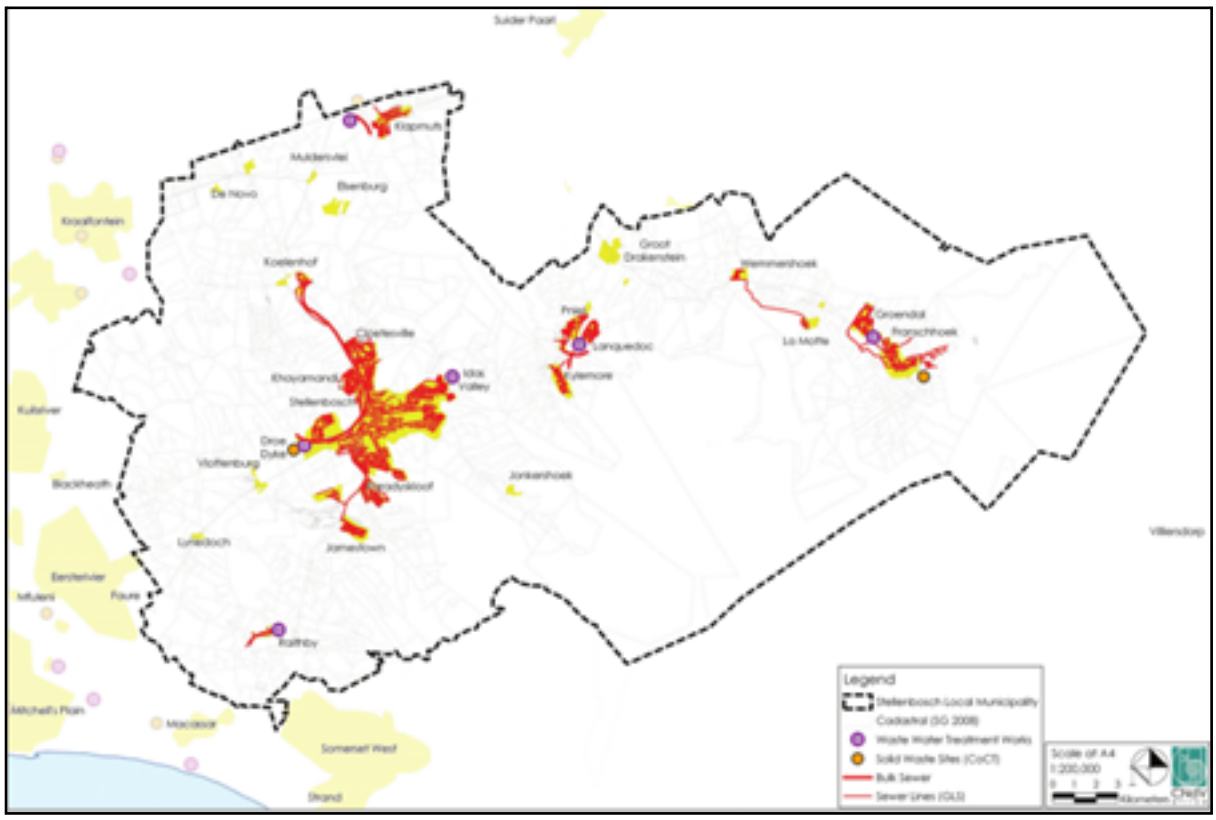

Figure 4-8: **Map of WWT and Solid Waste Disposal Sites (Stellenbosch Municipality, 2012)**

4.4.6 Wildfires

Wildfires occur seasonally in the Western Cape and in Stellenbosch. These uncontrolled fires occur in the forested and natural areas. They can emit large volumes of particulate matter, ranging from coarse smuts that deposit on surfaces and are a nuisance, to fine inhalable particulate matter (PM_{10}). Gases emitted include CO, NO_X and VOCs.

Emissions from uncontrolled fires can be estimated using fire data or burnt area and emission factors for the vegetation type. Active fires are detected using data from the moderate resolution image spectro-radiometer (MODIS) sensor on NASA's Aqua and Terra satellites received by South African National Space

Agency (SANSA, Hartebeeshoek) and CSIR Meraka Institute (Pretoria). The Advanced Fire information System (AFIS) determines the size and location of active fires size, which may be used as a proxy for area burnt. In turn, the area burnt and the location may be used to estimate the type and amount of vegetation burnt. Emissions of particulates and gases are estimated using emission factors. Emissions from uncontrolled fires in Stellenbosch were not estimated due to uncertainties in the AFIS algorithms (pers. Comm., Riaan van den Dool, CSIR Meraka Institute, Pretoria).

4.4.7 Transboundary pollution

Transboundary pollution is regarded as pollutants being released in an area and transported by wind across a political boundary into another area. An example of transboundary pollution affecting Stellenbosch is the brown haze which forms over Cape Town during the winter months, largely attributed to motor vehicle emissions extends northwards on occasions and affects air quality over the southern parts of the Stellenbosch Municipality (2012). In addition, emissions from the burning of crop residue in adjacent municipalities may affect air quality in the Stellenbosch Municipality.

4.4.8 Emissions Summary

Emissions of SO_2, NO_X and PM_{10} resulting from industrial fuel burning devices, motor vehicles, domestic fuel burning and biomass burning are compared Table 4.6. As might be expected, the emission of SO_2 is highest for the industrial sector.

Table 4.6: Estimated annual emissions from the contributing sectors in tons per annum

Sector	Pollutant			
	SO_2	NO_X	PM_{10}	CO
Industrial and manufacturing	456	188	175	NE
Motor vehicles	8.4	686	35.1	5 220
Residential fuel burning	4.2	2.0	10.0	76
Agricultural emissions	NE	NE	NE	NE
Biomass burning	NE	NE	NE	NE
Waste management	NE	NE	NE	NE

NE: Not estimated

4.5 Air quality status

4.5.1 Ambient air quality

The D:EA&DP conducted an ambient air quality screening study in the Western Cape in 2006 using passive samplers to measure and compare average concentrations SO_2, NO_2, O_3 and benzene (D:EA&DP, 2006). Four of the 20

monitoring sites in the CWDM were located in the Stellenbosch Municipality (Figure 4-8). The sampling in Stellenbosch was conducted from 26 June to 3 July 2006.

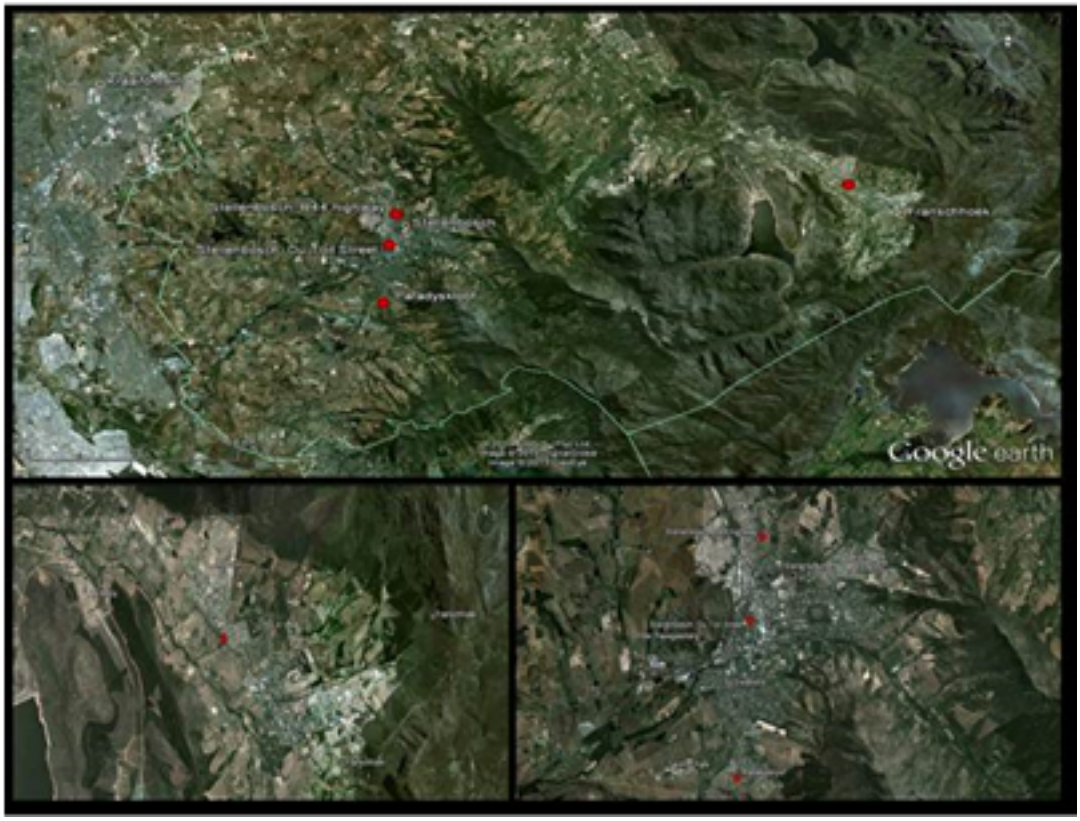

Figure 4-8: Location of the ambient monitoring sites in Stellenbosch Municipality (Google Earth, 2012)

This 2006 campaign was a short-term screening study that provided an indication of ambient concentrations of the four pollutants (D: ED&DP, 2006). The campaign provided average SO_2, NO_2, O_3 and benzene concentrations for the week of the measurements. The results are not readily comparable with the National Ambient Air Quality Standards (DEA, 2010) as the averaging periods do not agree with the averaging times of for the respective pollutants listed in the standards (Table 3-1). The results do however provide an indication of the ambient concentrations of SO_2, NO_2, O_3 and benzene in the two main commercial centres in the Stellenbosch Municipality.

Table 4.2: Average ambient concentrations of SO_2, NO_2, O_3 and benzene in $\mu g/m^3$ for the period 26 June to 3 July 2006

Pollutant	Franschhoek	Paradysburg	Stellenbosch - Du Toit Street	Stellenbosch – R44
SO_2	1	1	2	1
NO_2	16	16	33	18
O_3	23	34	28	37
Benzene	< 1	< 1	2.6	1.1

D: EA&DP installed an ambient air quality monitoring station at the CWDM office in Stellenbosch. Measurements of SO_2, NO_2, O_3, PM_{10} and $PM_{2.5}$ commenced in January 2012. The data are presented in Figure 4-9 and compared with the respective ambient air quality standards (Table 3-1)

Sulphur dioxide (SO_2)

SO_2 mostly results for the combustion of fuels containing sulphur, such as refineries, smelters or coal-fired power plants. There are no significant sources of SO_2 in the Stellenbosch Municipality and as might be expected, the ambient concentrations are very low (Table 4-2 and Figure 4-9) compared to the ambient air quality standards. The 2012 hourly data shows no seasonal trend for SO_2.

Nitrogen dioxide (NO_2)

The main source of NO_2 in urban areas is motor vehicle tailpipe emissions, as seen in the emission summary (Table 4-6). The highest average NO_2 concentration of 33 µg/m^3 was measured at the du Toit Street site in Stellenbosch (Table 4-2), which is attributed to the influence of traffic (D: EA&DP, 2006). Being 80% of the annual ambient NO_2 standard at this site during the monitoring campaign, suggests that traffic emissions may present a risk to air quality in Stellenbosch during peak times or during times of poor air dispersion. At the other the monitoring sites, the NO_2 concentrations are low (Table 4-2) compared to the ambient air quality standards.

The average hourly NO_2 concentrations (Figure 4-9) are below the health-based 1-hour ambient standard for 2012. The hourly data shows a clear seasonal trend with higher NO_2 concentrations occurring in winter. The generally more stable atmospheric conditions in winter inhibit the dispersion of pollutants, resulting in accumulation and higher concentrations.

Particulates

Particulates in the atmosphere result from a number of sources including industrial and motor vehicle emissions, fire, agricultural activities such as ploughing, and wind entrainment of dust from open areas. Seasonal burning for agricultural purposes and incidental burning in Stellenbosch Municipality and neighbouring municipalities, will impact on ambient particulate concentrations. The area most likely to be affected by seasonal burning and other agricultural activities will be the western parts of the Stellenbosch Municipality boarding on the West Coast District Municipality where fields are prepared for winter crops. Furthermore, the Cape Town Brown Haze 2 study (Piketh *et al*, 2004) demonstrated the influence of emissions from motor vehicles, domestic fuel burning and industry in the City of Cape Town on neighbouring municipalities to the north. Air quality in the southern parts of the Stellenbosch Municipality south

of the Stellenbosch Mountain and the western parts, in particular PM_{10} and ozone concentrations, may be affected by the Cape Town Brown Haze in winter.

The average 24-hour PM_{10} and $PM_{2.5}$ concentrations are generally below the current ambient air quality standards, except for two instances in January 2013 when PM_{10} concentrations exceed the ambient standard (Figure 4.9). The tolerance provided in the national standards permits 4 exceedances of daily standards per annum. There were no PM_{10} or $PM_{2.5}$ exceedances in 2012.

The average 24-hour PM_{10} and $PM_{2.5}$ concentrations in 2012 do however exceed the health-based standards that will come into effect in 2015 (Table 3-1). For PM_{10} in 2012 there are significantly more exceedances than the 4 permitted events. Based on these data if can be stated that 24-hour PM_{10} concentrations will not comply with the national ambient standard in 2015.

Similarly, the 24-hour average $PM_{2.5}$ concentrations in 2012 exceed the 2016 national ambient air quality standard on more than 4 occasions. The 2012 $PM_{2.5}$ concentrations continually exceed the ambient that will come into effect in 2030.

Ozone (O_3)

Ozone is generally regarded as a regional scale pollutant that forms some distance from the sources of its precursors, NO_X and VOCs. The O_3 concentrations in the Stellenbosch Municipality are similar at the four monitoring stations, and are relatively low compared with concentrations measured in the City of Cape Town (D:EA&DP, 2006).

The 8-hour average ozone concentrations measured at the CWDM offices show some seasonal variation with summer concentrations higher than in winter. The national ambient air quality standard permits 11 exceedances per annum. In summer average 8-hour ozone concentrations repeatedly exceed the standard at the CWDM office.

Benzene

Average benzene concentrations which may be attributed to fuel handing and motor vehicle tailpipe emissions are low at all of the sites (Table 4-2) compared to the national ambient air quality standard. As may be expected the highest concentration, albeit low, occurs at the du Toit Street site where traffic volumes are higher.

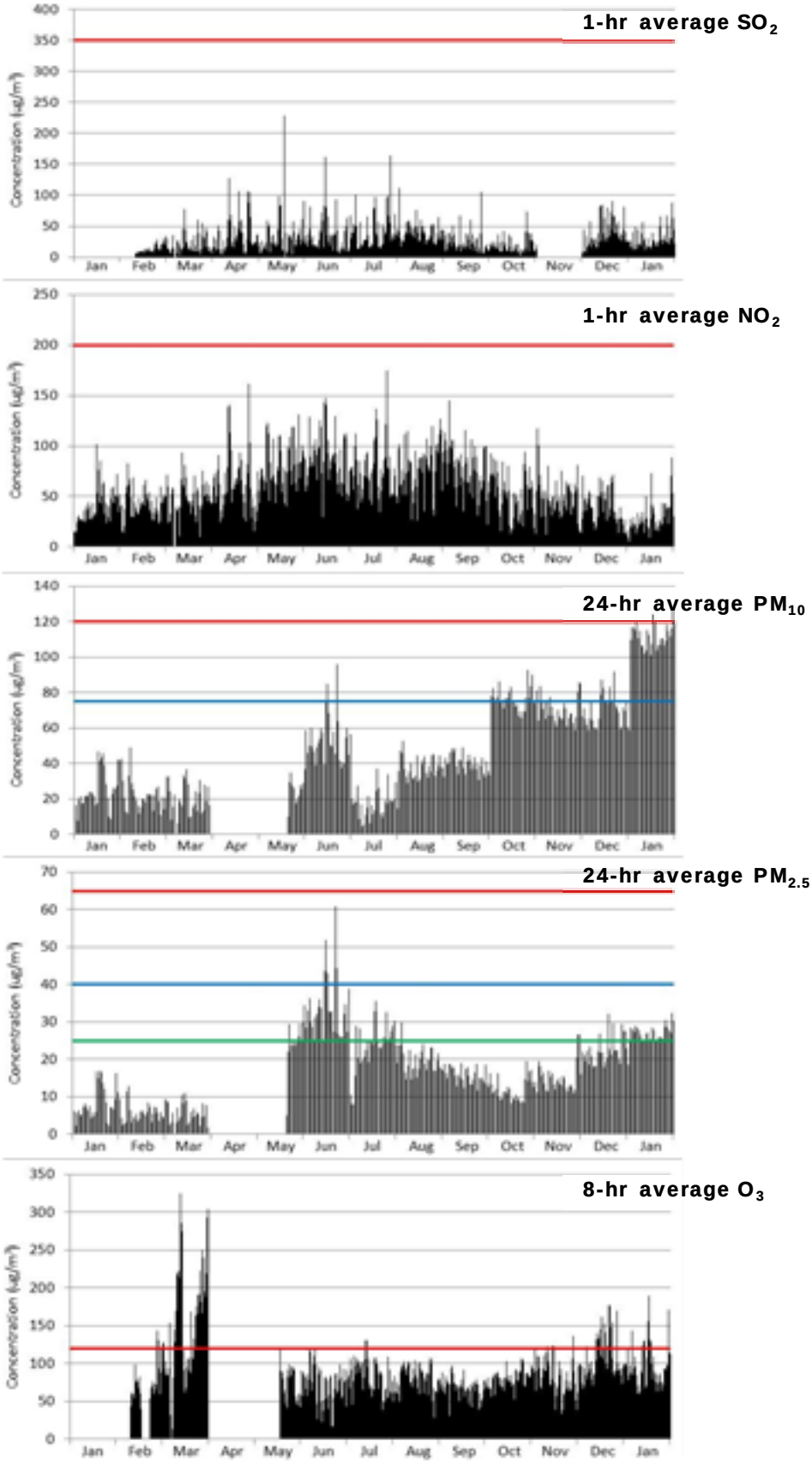

Figure 4-9: Ambient concentrations of pollutants measured in Stellenbosch in 2012 compared with the respective national ambient air quality standards

Pesticides

The use of pesticides, spray drift and the effects on workers and surrounding communities has been well documented as an issue in the CWDM, including Stellenbosch Municipality (London et al, 1994; London et al, 1997; Green Times, 2011). The campaign for improved control of the use pesticide in the CWDM is coordinated and led through The Air That I Breathe Foundation (TATIB) (http://www.tatibfoundation.blogspot.com/).

The nature of spray drift implies an air quality issue, but it is currently is not addressed in the NEM: AQA. The Pesticide Management Policy for South Africa (DAFF, 2010) provides the legal framework for improved protection against the health and environmental risks posed by pesticides. The policy encourages the development and use of alternative products and techniques and promotes the reduction on the dependence of chemical protection of plants.

Complaints

There is no formal system to register and respond to air quality complaints in the Stellenbosch Municipality. In addition there are no appropriate structures and mechanisms currently in place to investigate and address complaints.

4.5.2 AQM capacity assessment

4.5.2.1 Air quality governance

Government's roles and responsibilities for air quality management differ across departments and spheres of government. These functions include legislative and other means to improve air quality and progressively ensure that ambient air is not harmful to health and well-being. Therefore, in implementing the AQA, clarity on governance and technical objectives is very important. To ensure that air quality management measures are implemented in a cohesive, coherent and uniform manner, that safeguards the most benefit, for the least cost and through efficient and effective use of resources. The roles and responsibilities for the three spheres of government and inter-relationships between them are defined in the National Framework for Air Quality Management (DEA, 2007).

The Department of Environmental Affairs (DEA) is the national Lead Agent for environmental management, and subsequently air quality management. Hence DEA must provide national norms and standards to ensure coordinated, integrated and cohesive air quality governance for South Africa. The AQA provides DEA with governance responsibilities, and a number of exclusive powers for air quality management. There all have direct bearing on the implementation of the AQA by municipalities.

Provincial environmental departments are the Lead Agents for provincial environmental management, and therefore air quality management in the respective provinces. Provinces must therefore provide, where necessary, norms and standards to ensure coordinated, integrated and cohesive air quality governance in the province. As with the national department, provincial departments have governance responsibilities, and each provincial Member of the Executive Committee (MEC) responsible for the environment has a number of exclusive air quality management powers. In this regard, the MEC must:

i. Designate an officer in the provincial administration as the provincial Air Quality Officer (AQO) who is responsible for the coordination of all air quality related matters in the province.
ii. Prepare a provincial AQMP as a component of the Environmental Implementation Plan.
iii. Prepare an annual report providing information on progress regarding the implementation of the AQMP and compliance with the provincial implementation plan.
iv. Process an application for an Atmospheric Emission Licence (AEL) if the applicant is a municipality in the province.
v. Review the AQMPs received from the municipalities.

In addition the MEC has discretionary powers which are detailed in the NEM: AQA. Within provinces, municipalities also have governance responsibilities and exclusive air quality management powers. In this regard, municipalities must:

i. Designate a municipal AQO from its administration.
ii. Develop an AQMP for inclusion in its Integrated Development Plan (IDP) in, accordance with Chapter 5 of the Municipal Systems Act.
iii. Prepare an annual report including progress regarding the implementation of the AQMP and compliance with the plan.

The municipality may also:

- Establish municipal standards for emissions from point, non-point and mobile sources if a municipality in terms of its by-laws identifies a substance or mixture of substances in ambient air which through ambient concentrations, bio-accumulation, deposition or any other way, presents a threat to health or well-being or the environment, or which the municipality reasonably believes presents such a threat.
- Require the appointment of an Emission Control Officer (ECO) in a given company thereby extending the powers of the authority by ensuring that the ECO is responsible for the company applying the correct measures to minimise emissions.

- Implement the atmospheric emission licensing system, and carry out the responsibility for performing the functions of the licensing authority as set out in Chapter 5 of the Air Quality Act.

Coordination and cooperation is therefore required between the different spheres of government to ensure effective and efficient management of air quality within the district.

4.5.2.2 Roles and Responsibilities

The air quality management function in Stellenbosch Municipality has been assigned to the Spatial Planning, Heritage and Environment department. The annual reporting requirement has yet not been met. No specific by-laws for air quality have been established and no industry ECO's have been appointed. There is currently no mechanism to track record or investigate air quality related complaints. There is currently no platform where key stakeholders such as government, industry, agriculture and civil society organisations can engage on air quality issues. The development of the AQMP is currently in progress. The Stellenbosch Municipality lack the specialised knowledge required to effectively execute the air quality function and are currently in the process of appointing an AQO, who will assume all air quality related responsibilities. There are plans in place to appoint appropriately qualified air quality personnel and equip them with air quality management training and capacity building. The AQO in the Stellenbosch Municipality will be mandated to effectively implement the AQMP.

The following AQM functions are expected of the AQO:

- The development of AQMP
- Compilation of an emission inventory
- Monitor ambient air quality and point, non-point and mobile sources
- Setting of municipal standards for emissions from point, non-point and mobile sources
- Monitor compliance to prevent offensive odours by any activity
- Monitor compliance with directives to submit an atmospheric impact report
- Monitor compliance with conditions of Atmospheric Emission Licenses (AEL).

The AQO will be expected to regularly report on progress regarding the implementation of the AQMP and will be required to attend the Provincial Air Quality forum which happens on a quarterly basis. The Stellenbosch Municipality has a principle responsibility relating to compliance monitoring and regulation of non-Listed Activities. Stellenbosch Municipality should also take steps to prevent the emission of offensive odours and investigate noise pollution.

Capacity building is necessary for specific air quality management aspects in order for the AQO to fully perform the function within the municipality.

These are:

- Competence for ambient monitoring and passive sampling;
- A basic understanding of dispersion modelling;
- Data management and interpretation;
- Complaints investigation;
- Compliance monitoring and enforcement and accompanying technicalities;
- Policy development; and
- Regular reporting on the progress of AQMP implementation
- Reporting at the quarterly Provincial air quality forum
- Identify listed activities and compile a comprehensive emission inventory

4.6 Air quality gaps and issues

This status quo assessment together with the public participation process assessment provides information on gaps in the current air quality management service. The gaps and issues are addressed through the AQMP. The gaps and issues are:

Air quality management capacity:

The AQA requires local municipalities to designate an AQO, to include an AQMP in their IDP, and to report on progress with the implementation of the AQMP on an annual basis. With respect to the three mandated requirements:

- An AQO has not yet been designated in Stellenbosch,
- The AQMP has been drafted, but is not yet included in the IDP, and
- Reporting on air quality is not done.
- The structure within the Stellenbosch Municipality does not accommodate the air quality management function, including the air quality management service, compliance and enforcement to address complaints
- Significant capacity building is required for the Stellenbosch Municipality to effectively implement the AQMP and meet the requirements of the NEM: AQA.
- The current lack of specific air quality by-laws inhibits effective implementation of the AQMP

Furthermore,

- The necessary inter-governmental relationships between the Stellenbosch Municipality and the CWDM are not well defined,

- Stellenbosch Municipality do not currently have the capacity or competence for the AQM function, and
- While the WCDM AQMP address emission reduction at a high level, there are no initiatives in place in Stellenbosch Municipality to manage or reduce the negative effects of air pollution, including waste burning, agricultural burning and the application of pesticides.

Ambient air quality management systems and tools:

It is necessary to have access to reliable and accurate emissions and ambient air quality data to understand the state of air quality and to be able to report with confidence. An air quality management system (AQMS) provides a single repository for all relevant information pertaining to air quality services and data is easily accessible to air quality staff and for reporting and decision-making. There is currently no AQMS in Stellenbosch Municipality.

Awareness and communication

Transparent and inclusive communication is fundamentally important to the successful implementation of the AQMP. Stakeholder communication needs to be strengthened in the Stellenbosch Municipality. It is necessary that a multi-stakeholder forum is established, where progress on the implementation of the AQMP can be reported. There is also a need to encourage communication and discussion on specific air quality issues, such as pesticide drift.

Pesticide drift

Stakeholder workshops conducted during the compilation of this AQMP revealed that pesticide drift is a source of concern for many residents. The juxtaposition of agricultural and residential areas lends itself to a set of complex environmental issues; chief amongst these is the application of pesticides. A greater understanding of the impacts of pesticide drift on human health in the Stellenbosch Municipality is required.

There is a need to foster a culture of transparency and awareness amongst all stakeholders regarding the safe and sustainable use of pesticides. Precautions that residents can take when pesticides are used in their neighbourhood should be clearly communicated. Information requirements include: the time of spraying, the method of spraying, frequency of spraying, and the nature of the pesticides used.

Farmers follow specific methods to get export certification; therefore the spraying of pesticides is somewhat controlled. An example would be the Global G.A.P, a common standard for farm management practice. G.A.P is an acronym for Good Agricultural Practices and is followed by farmers who want to export

their products, which accounts for many farmers in the Stellenbosch Municipality. It is the world's most widely implemented farm certification scheme. Many farmers that participated in stakeholder workshops conceded that while adherence to Global G.A.P had assisted them in implementing sustainable farming practices, it had failed to address specific issues of pesticide use for Stellenbosch Municipality. A GLOBAL G.A.P. tour of South Africa will be held in August 2013 to increase transparency and stakeholder engagement for sustainable pesticide use, with a focus on agricultural production (Global G.A.P, 2013). It is recommended that Stellenbosch Municipality play an active role in these discussions and engage with the GAP certification body to address and remedy the pesticide drift issue.

CropLife South Africa is an example of a local agricultural body, which represents all manufacturers, and suppliers of crop protection products in South Africa. Their code of conduct encourages the safe and sustainable use of all crop protection products by members of its organisation through self-regulation (CropLife, 2013).

A major impediment to safer use of pesticides is that the current legislation governing pesticide use is viewed by some farmers as outdated and impractical. The policy exists but it has yet to be successfully implemented.

While it is evident that use of pesticides in Stellenbosch Municipality is to some extent controlled, the concerns of local residents highlight the need to further probe pesticide application methods. Currently, there are no platforms where all stakeholders can engage and contribute a shared solution to their issues with pesticide usage in the region. A collaborative approach ensures that achievable mitigation measures can be implemented, to reduce impacts from these activities on ambient air quality and human health.

The compilation of a by-law relating pesticide use to air quality should be done in collaboration with the DAFF, agricultural bodies such as GAP and the local community. By addressing pesticide usage with a novel approach, the Stellenbosch Municipality would be making noteworthy progress in encouraging safe and sustainable pesticide use.

6. AQMP for the Stellenbosch Municipality

6.1 A vision and mission

Aligned with the CWDM vision for air quality management, the **vision** for the Stellenbosch Municipality AQMP is:

Air quality in the Stellenbosch Municipality is clean and healthy

The **mission** statement to achieving the vision is:

Air quality in the Stellenbosch Municipality is co-operatively managed for the benefit of present and future generations according to the principles of sustainable development to safeguard health and quality of life, promoting economic and social development

6.2 Goals

The goals to achieve the mission of the AQMP are listed below and their linkages to the Western Cape Provincial AQMP (D: EA&DP, 2010) and the CWDM AQMP (CWDM, 2012) are highlighted.

The three goals for the Stellenbosch Municipality AQMP are:

Goal 1: *Air quality governance meets requirements to effectively implement the AQMP*

This goal addresses the regulatory framework and the institutional capacity required in the Stellenbosch Municipality to carry out the air quality function. This links directly to the goal in AQMP for the Western Cape to 'Ensure effective and consistent air quality management' and the goal in the CWDM AQMP of 'Effective air quality management'.

Goal 2: *Reduce atmospheric emissions of harmful pollutants*

This goal aims to manage activities that impact on air quality to reduce the emissions of harmful pollutants and associated impacts on human health and well-being. This links directly to the Provincial AQMP goal to 'Ensure effective and consistent compliance monitoring and enforcement' and 'To ensure that health-based air quality standards are attained and continually met'. It also links to the CWDM AQMP goal of 'Effective air quality management' through an 'Emission reduction strategy'.

Goal 3: *Systems and tools are established to effectively implement the AQMP*

This goal refers to the systems and tools required for effective AQMP implementation, the cornerstone of which is an Air Quality Management System. The development of an AQMS links directly to the Provincial AQMP goal 'To ensure effective and consistent air quality management' through the development of AQM systems. It also links to the CWDM AQMP goal to develop and AQMS. An AQMS is the fundamental unit towards the management of air quality in an area, incorporating the necessary technical elements that provide information on the status of air quality (D: EA&DP, 2010).

Included in this goal is the need for stakeholders to actively participate in AQM in the Stellenbosch Municipality, which links to the Provincial AQMP goal 'To continually engage with stakeholders to raise awareness with respect to air quality'. It also links to the CWDM AQMP goal to 'Promote communication in relation to Air Quality Management'.

6.3 Time frames

The timeframes defined for the implementation of the AQMP are:

Immediate	First 3 months of AQMP adoption
Short term	First 12 months of AQMP adoption
Medium Term	2 to 3 years
Long term	Year 4 and 5

6.4 AQMP Implementation plan

Goal 1: Air quality governance meets requirements to effectively implement the AQMP				
Objective	**Activities**	**Responsibility**	**Time frame**	**Indicator**
1. Sufficient capacity and competence exists to perform the AQM function	i. Identify capacity and competency needs	Council	Immediate	Capacity and competence needs are identified
	ii. Appoint and designate appropriate person for AQO	Council	Short-term	AQO is designated
	iii. Appoint additional personnel as identified in needs analysis	Council	Short-term	Additional personnel are identified
	iv. Train incumbent and new personnel to meet identified competence needs	Council	Short-term	Personnel are trained
2. The AQMP is included in the IDP	i. Prepare AQ input for inclusion in the IDP ii. Ensure adequate funding in IDP for AQMP implementation	AQO, Council	Immediate	AQMP is included in the IDP
3. A regulatory framework exists in the Municipality for AQM	i. Develop air quality by-law	AQO, Council	Immediate	By-law is enforced
4. Internal relationships with regards to AQM are defined and strengthened	i. Promote AQM across all divisions in the SM, emphasising integration	AQO	Short-term and on-going	An awareness of air quality exists throughout the municipality
5. Intergovernmental relationship for AQM are defined and strengthened	i. Define roles and responsibilities for AQM in SM	AQO	Short-term	Intergovernmental relationships are strong and clearly defined
	ii. Coordinate AQM activities through AQ forum	AQO	Short-term and on-going	
	iii. Report annually, according to reporting template	AQM	Short-term and on-going	
6. Encourage institutional awareness and understanding of air quality in the Stellenbosch Municipality	i. Air Quality should inform all development and planning decisions.	AQM	Short-term and on-going	Development planning decisions are informed by air quality issues

Goal 2: Reduce atmospheric emissions of harmful pollutants				
Objective	**Activities**	**Responsibility**	**Time frame**	**Indicator**
1. Emissions from waste burning are reduced	i. Introduce awareness programmes and public education of waste minimisation and recycling initiatives.	AQO and staff with Dept. Spatial Planning, Heritage and Environment.	Short-medium, and on-going	There is a reduction in the number of complaints associated with waste burning
	ii. Promote efficient service delivery in order to reduce waste burning	AQO and staff with Solid Waste Management.	Short-medium, and on-going	There is a reduction in the number of complaints associated with waste burning
	iii. Enforcement of the by-law	AQO and staff with Solid Waste Management.	Short-medium, and on-going	The by-law is enforced
2. Emissions from agricultural burning are reduced	i. Introduce awareness programmes on the effects of agricultural burning on air quality	AQO and staff	Medium to long term	There is a reduction in the number of fires
	ii. Investigate and promote alternate but equally effective agricultural practices	AQO and local agricultural bodies	Medium to long term	Alternative practices to burning are implemented
	iii. Enforcement of the by-law	AQO	Medium to long term	The by-law is enforced
3. Spray-drift is reduced	i. Investigate and implement optimal application methods for safe and sustainable pesticide use	AQO together with DAFF and other stakeholders	Short term	Optimal pesticide application methods are implemented
	ii. Establish a working group to encourage awareness and understanding of safe and sustainable pesticide use	AQO, CWDM, DEA&DP, DAF, wine growers	Short to medium	A working group is established and functioning
	iii. Build awareness amongst broader	AQO, public	Short to medium	A broader awareness

Goal 2: Reduce atmospheric emissions of harmful pollutants				
Objective	**Activities**	**Responsibility**	**Time frame**	**Indicator**
	stakeholders on pesticide use			of pesticide use exists in Stellenbosch Municipality
	iv. Enforcement of the by-law	AQO	Medium and on-going	The by-law is enforced
4. The understanding of the risks for human health associated with the application of pesticides is improved	i. Review existing studies on pesticides and impacts in the Western Cape, e.g. Provincial health benchmark study ii. Conduct assessment to address research gaps	AQO, DEADP and research institutes AQO and research institutes	Medium to long	An improved understanding of risks associated with pesticide use exists and a mitigation strategy is developed.

Goal 3: Systems and tools are established to effectively implement the AQMP				
Objective	**Activities**	**Responsibility**	**Time frame**	**Indicator**
1. An Air Quality Management System exists in Stellenbosch including an emission inventory, ambient air quality monitoring and reporting	i. Develop a comprehensive emissions inventory	AQO and staff	Short-term and on-going	All sources are captured
	ii. Enter into SLA with D:EA&DP to operate the ambient monitoring station	AQO, D:EA&DP	Short-term and on-going	SLA is agreement formalised
	iii. Acquire monitoring equipment, identify sites and install equipment	AQO, D:EA&DP	Short-term and on-going	Monitoring equipment is installed at appropriate sites
	iv. Operate monitoring stations	AQO and staff	Short-term and on-going	90% data recovery from monitoring stations
	v. Establish complaints register for air quality and advise stakeholders on complaints recording and follow-up	AQO and staff	Short-term and on-going	A complaints register is established and air quality complaints are routinely investigated.
	vi. Develop an integrated information system for air quality data including emissions, ambient data and complaints	AQO and staff	Short-term and on-going	All air quality data is accessible to the AQO through an air quality management system.
	vii. Prepare annual report on progress with AQMP implementation and state of air quality including emissions and ambient data and complaints	AQO and staff	Short-term and on-going	Emissions are reported
	viii. Develop procedure to register fuel burning devices according to by-law	AQO and staff	Short-term and on-going	Procedure to register fuel burning devices is developed
2. Stakeholders participate in AQ management	i. Establish multi-stakeholder AQ forum for SM	AQO	Short-term	AQM in the Stellenbosch

Goal 3: Systems and tools are established to effectively implement the AQMP				
Objective	**Activities**	**Responsibility**	**Time frame**	**Indicator**
	ii. Report annually to the forum on AQ status and progress with AQMP implementation	AQO, stakeholders	On-going	Municipality is inclusive and participatory
	iii. Identify appropriate planning fora and take steps to gain representation	AQO	Short-term	
	iv. Attend and input/comment to development planning (e.g. EIA, SDF, EMF)	AQO	On-going	

6.5 Monitoring, evaluation and review

6.5.1 Monitoring

The monitoring component of the AQMP process is an on-going process to assess the success of implementation of all aspects of the AQMP. It ensures that the drive to implement interventions is maintained and it also provides a means of updating stakeholders on progress. Monitoring should be performed through regular and active project management and progress reporting by Stellenbosch Municipality.

6.5.2 Evaluation

Evaluation is an internal mechanism to measure the success of the AQMP implementation. On-going evaluation allows for a thorough assessment of the AQMP, including the shortcomings and strengths evident in implementation. AQMP evaluation is divided into two sections, an internal evaluation of the final AQMP, and an on-going evaluation, which addresses implementation outcomes.

The first evaluation is addressed through internal methods where review of the first edition AQMP will be undertaken Stellenbosch Municipality and possibly members of the technical committee, e.g. CWDM and D: EA&DP. A comprehensive evaluation checklist is provided in DEA's AQMP Manual (DEAT, 2008), which deals with all aspects of the AQMP that require assessment. The checklist includes details on the general document and process, as well as specific information on the performance of interventions.

Annual evaluation of the AQMP is suggested as a minimum timeframe and is ideally incorporated into the annual performance review mechanisms. Indicators are easily interpreted and provide a meaningful method of communicating progress on implementation. These have been developed for the targets specified in the AQMP implementation plan (Section 5.3). These may be incorporated into the annual reports necessary to be submitted by the CWDM AQO, as indicated in Section 17 of the NEM: AQA. Annual review provides the opportunity to adjust the AQMP or parts of the AQMP if the desired outcome is not being achieved.

6.5.3 Review

AQMP review comprises an internal and external review of the AQMP, and addresses further developments in the science and management of air quality. A review period of five years is suggested in the DEA Manual, with the participation of stakeholders. The definition of the review period is subject to funding and political cycles, as well as implementation outcomes. Therefore, an element of elasticity is necessary. The process of a five-yearly review is anticipated to be initiated through an internal review mechanism and incorporates the annual evaluation exercise. This allows for an effective assessment of the five year performance of the AQMP and examines the successes and failures of implementation. An evaluation of the current organisational and air quality

setting is necessary to complete the evaluation portion of the review. Following the comprehensive evaluation, goals and objectives are amended as needed and activities updated. The internal revision is communicated to stakeholders through a limited public participation process, followed by a further iteration and publication.

References

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APPENDIX

STELLENBOSCH MUNICIPALITY AIR QUALITY MANAGEMENT PLAN

PUBLIC PARTICIPATION REPORT

MAY 2013

Prepared by

uMoya-NILU Consulting (Pty) Ltd
P O Box 20622
Durban North, 4016
KwaZulu-Natal
www.umoya-nilu.co.za

Report details

Client:	Stellenbosch Municipality
Report title:	Stellenbosch Municipality, Air Quality Management Plan: Public Participation Report
Project:	Development of an Air Quality Management Plan for the Stellenbosch Municipality
Report number:	uMN011-13

Author details

Author: Mark Zunckel and Sarisha Perumal

When used as a reference this report should be cited as: uMoya-NILU (2013): Stellenbosch Municipality, Air Quality Management Plan: Public Participation Report, Report No uMN013-2013

1. Introduction

uMoya-NILU Consulting (Pty) Ltd has been appointed to develop an Air Quality Management Plan (AQMP) for the Stellenbosch Municipality and to manage the public participation process. This report provides an overview of the steps in the public participation process for the development of the Stellenbosch Municipality AQMP.

2. Scope of the project

The scope of the public participation task was based on the premise that active engagement with stakeholders is crucial to the development of AQMPs, to achieve acceptance and buy-in.

The public participation for the Stellenbosch Municipality included the following:

- Identification and engagement with interested and affected parties who want to contribute to improved air quality through the AQMP development process
- Advertisement of the process in appropriate newspapers
- Establishment and maintenance of a stakeholder database
- Management and administration of the process for the engagement of respondents
- Capture of key information and concerns from stakeholders

3. Database development

The initial phase of the AQMP process and the associated public participation process is the development of database of potential stakeholders to participate in the development of the plan (Figure 1). The initial development of the stakeholder database included existing databases provided by Stellenbosch Municipality. The database was continually updated to include stakeholders that requested to register their interest, provide comment via email or in response to newspaper advertisements placed and those that attended the public meetings held. The individuals registered on the database remained on the database for the duration of the project and received information regarding each stage of the public participation process and the opportunity for comment and input.

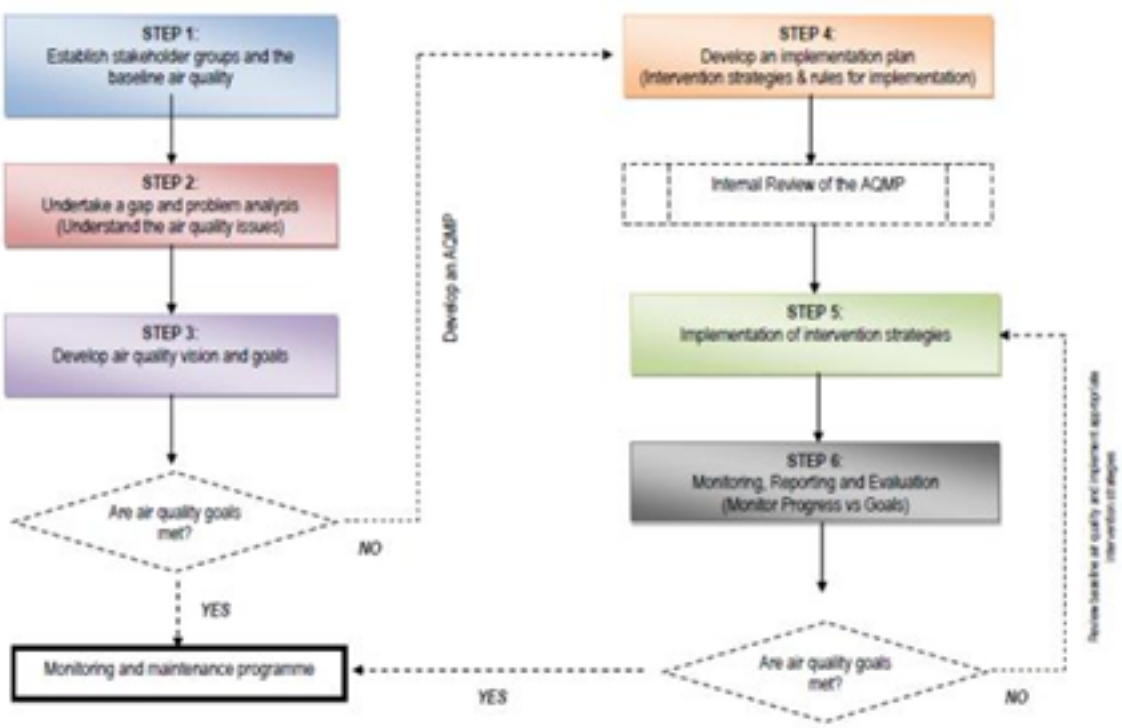

Figure 1: AQMP development process (DEA, 2007)

4. Information sharing and engagement with stakeholders

The sharing of information on the development of the Stellenbosch AQMP forms a key component of the AQMP process. Information has been provided to stakeholders registered on the database and the general public as follows:

Email to Stakeholders: all stakeholders on the database were notified of the AQMP process and the first round of public meetings via email. Appendix B of this report includes a copy of the correspondence sent to stakeholders. Included with email 1 was a background information document. All stakeholders on the updated database were then identified of the second and final round of public meetings held to present the findings of the Draft AQMP.

Public Meetings–two public meetings were held during the development of the AQMP, detailed in Table 1.

Table 1: Public Meetings

Area	Venue	Date
Stellenbosch	Library Hall	21.01.2013
Stellenbosch	Doornbosch Hall	17.05.2013

All stakeholders registered on the project database were notified of the public meetings via email. In addition to emails sent, newspaper advertisements were placed inviting members of the public and interested parties to attend the public meetings. The notes from the meetings held are included in Appendix C of this report and the registration forms from the meetings held are included in Appendix D.

Newspaper Advertisements – In order to notify the broader public of the AQMP process as well as to advertise the public meetings, newspaper advertisements were placed in two Provincial and two regional newspapers, in both English and Afrikaans, as follows:

- Die Eekestad Nuus
- The Paarl Post
- The Cape Times
- Die Burger

Copies of the newspaper advertisements placed are included as Appendix E of this report.

The notes from the public meetings held are included as Appendix C.

5. Next stage in the process

All comments received, and key stakeholder information and concerns will be considered in the finalisation of the plan.

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uMoya-NILU Consulting (Pty) Ltd has been appointed to develop an Air Quality Management Plan (AQMP) for the Stellenbosch Municipality and to manage the public participation process. This report provides an overview of the steps in the public participation process for the development of the Stellenbosch Municipality AQMP.

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- Advertisement of the process in appropriate newspapers
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- Management and administration of the process for the engagement of respondents
- Capture of key information and concerns from stakeholders

8. Database development

The initial phase of the AQMP process and the associated public participation process is the development of database of potential stakeholders to participate in the development of the plan (Figure 1). The initial development of the stakeholder database included existing databases provided by Stellenbosch Municipality. The database was continually updated to include stakeholders that requested to register their interest, provide comment via email or in response to newspaper advertisements placed and those that attended the public meetings held. The individuals registered on the database remained on the database for the duration of the project and received information regarding each stage of the public participation process and the opportunity for comment and input.

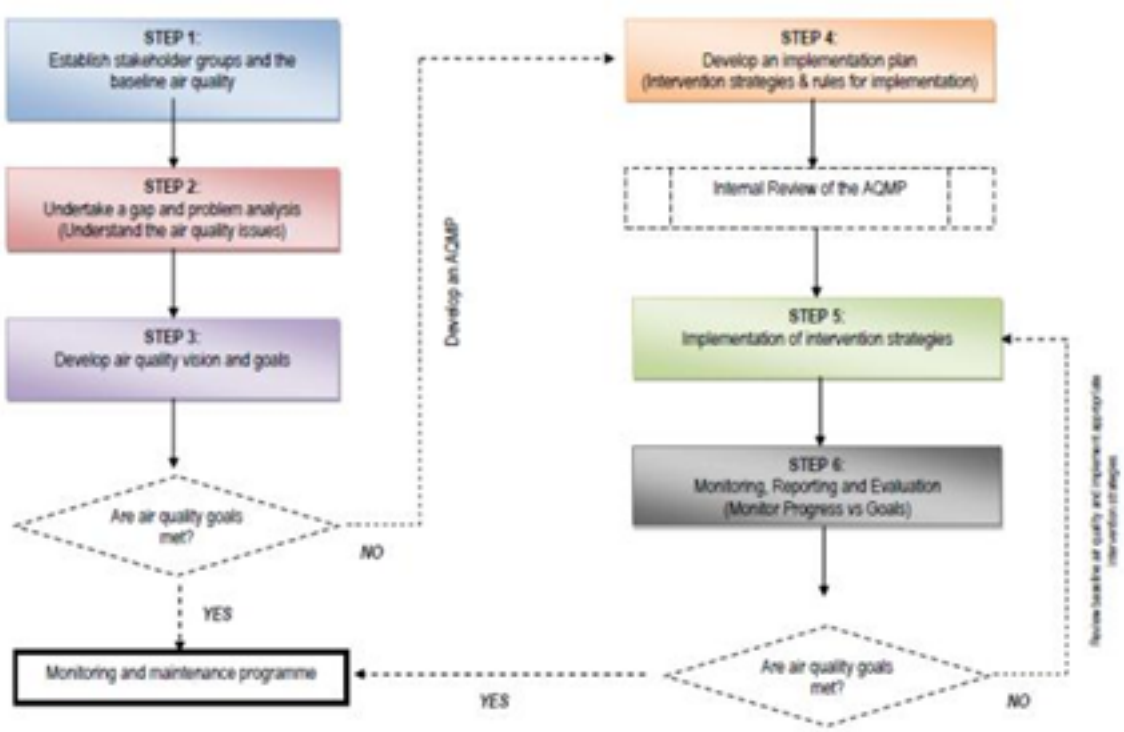

Figure 1: AQMP development process (DEA, 2007)

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Copies of the newspaper advertisements placed are included as Appendix E of this report.

The notes from the public meetings held are included as Appendix C.

10. Next stage in the process

All comments received, and key stakeholder information and concerns will be considered in the finalisation of the plan.

Stakeholder Database

Contact person	email adress	Name of organisation
Angela Andrews	angela@lrc.org.za	Legal resources council
Amanda Odendaal	amandaodendaal@gmail.com	The Air That I breathe Foundation
Barbara-Ann Henning	barbaram@stellenbosch.org	Stellenbosch Municipality: Spatial Planning, heritage and environment
Barry Blount	survey@mhws.co.za	D and M
Bernabé de la Bat	BernabyB@stellenbosch.org	Stellenbosch Municipality: Spatial Planning, heritage and environment
Cedric Lottering	cedric.lottering@parmalat.co.za	Parmalat Pty Ltd (Stellenbosch)
Elma Pollard	elma@thegreentimes.co.za	Green Times
Forster Pepteur	forster@capesaw.co.za	Stellenbosch Sawmill
J.Fell	jfell@cabrico.co.za	Cabrico
Jacques Rossouw Pri. Sci. Nat.	JRossouw@distell.co.za	Distell
Jeanne Basson	jeanneb@stellenbosch.org	Stellenbosch Municipality: Spatial Planning, heritage and environment
Jeanne Odendaal	amandaodendaal@gmail.com	The Air That I breathe Foundation
Jeff Jefferson	Jeff.jefferson@westerncape.gov.za	Western Cape: Department of Environmental Affairs and Development Planning
M.Le Roux	manager@dewijnlanden.co.za	De Wijlanden Residential Estate
Malcolm Stuart	mstuart@ejeclico.co.za	Private

Marius Englebrecht	mariuse@capewinelands.gov.za	Cape Winelands District Municipality: Air Quality Officer
Phillip Englebrecht	phillip@engel.co.za	Private
Piet Reyneke	Piet@capepine.co.za	Cape Sawmills
Portia Rululu	Portia.rululu@westerncape.gov.za	Department of environmental affairs western cape
Ray Bradbury	brad@nutriplus.co.za	Private
Saliem H	Saliemh@stellenbosch.org	Stellenbosch Municipality: Solid waste management
Shan Bradbury +1	info@nutriplus.co.za	Private
Y.V. Niekerk	jyvn@absamail.co.za	Private
Angelique Van de Merve	stlandbo@mweb.co.za	Agricultural Society
Kamaseelan Chetty	Kamaseelan.Chetty@westerncape.gov.za	Western Cape: Department of Environmental Affairs and Development Planning
Yvonne van Niekerk	jyvn@absamail.co.za	Resident
Diaan de Villiers	infostlandbo@mweb.co.za	STELLENBOSSE LANDBOUGENOOTSKAP
D. Malherbe	vineyard@lanzurac.co.za	Lanzuac Estate
Pierre Olivier	polivier:absa.co.za	Absa
Corrie Coetzee	corrie.coetzee@absa.co.za	Absa
Deon Carinus	D,Carinus@telkomsa.net , GideonC@capewinelands.gov.za	Cape Winelands District Municipality
Piet Neethling	piet@anwilha.co.za	Anwilha Vineyards
Christo Hartman	Christo@blaauwklipper.com	Blaauuwklipper Estate
Elsarie De At	wjviss	Klein Welmoed

Examples of correspondence sent to stakeholders

1st Public Participation Meeting

Dear Stakeholder

The Stellenbosch Municipality is in the process of developing an Air Quality Management Plan (AQMP) and invites you to the first Stellenbosch Municipality Air Quality Management Planning Workshop to be held on January 21st 2013. Please find the attached agenda and public notice for further information. If you have not yet sent in an R.S.V.P please contact me. We look forward to your participation at the workshop.

--

Kind Regards

Sarisha Perumal

Air Quality Consultant

uMoya-NILU Consulting (Pty) Ltd

P O Box 20622, DURBAN NORTH, 4016

2 Kent House, 1 Neptune Road, Westville, 3629

Tel: +27 (0) 31 266 7357

Fax: +27 (0) 31 266 7307 or 086 613 5460

Cell: 0760 423 683

2nd Public Participation Meeting

Dear Stakeholder

You are invited to the second public participation meeting for the development of the Stellenbosch Municipality Air Quality Management Plan (AQMP). Please note the date, time and venue for the workshop. Attached is an English and Afrikaans version of the invitation, to appear in the local papers this week. The directions to the venue are also attached. Should you have any questions please contact me.

Date: 17th May 2013

Time: 09:00am - 13:00pm

Venue: Doornbosch Hall, Stellenbosch Agricultural Society, Strand Road (R44),

Stellenbosch

Please RSVP by 14th May 2013.

Kind Regards

Sarisha Perumal

Air Quality Consultant

uMoya-NILU Consulting (Pty) Ltd

Tel: +27 (31) 266 7357

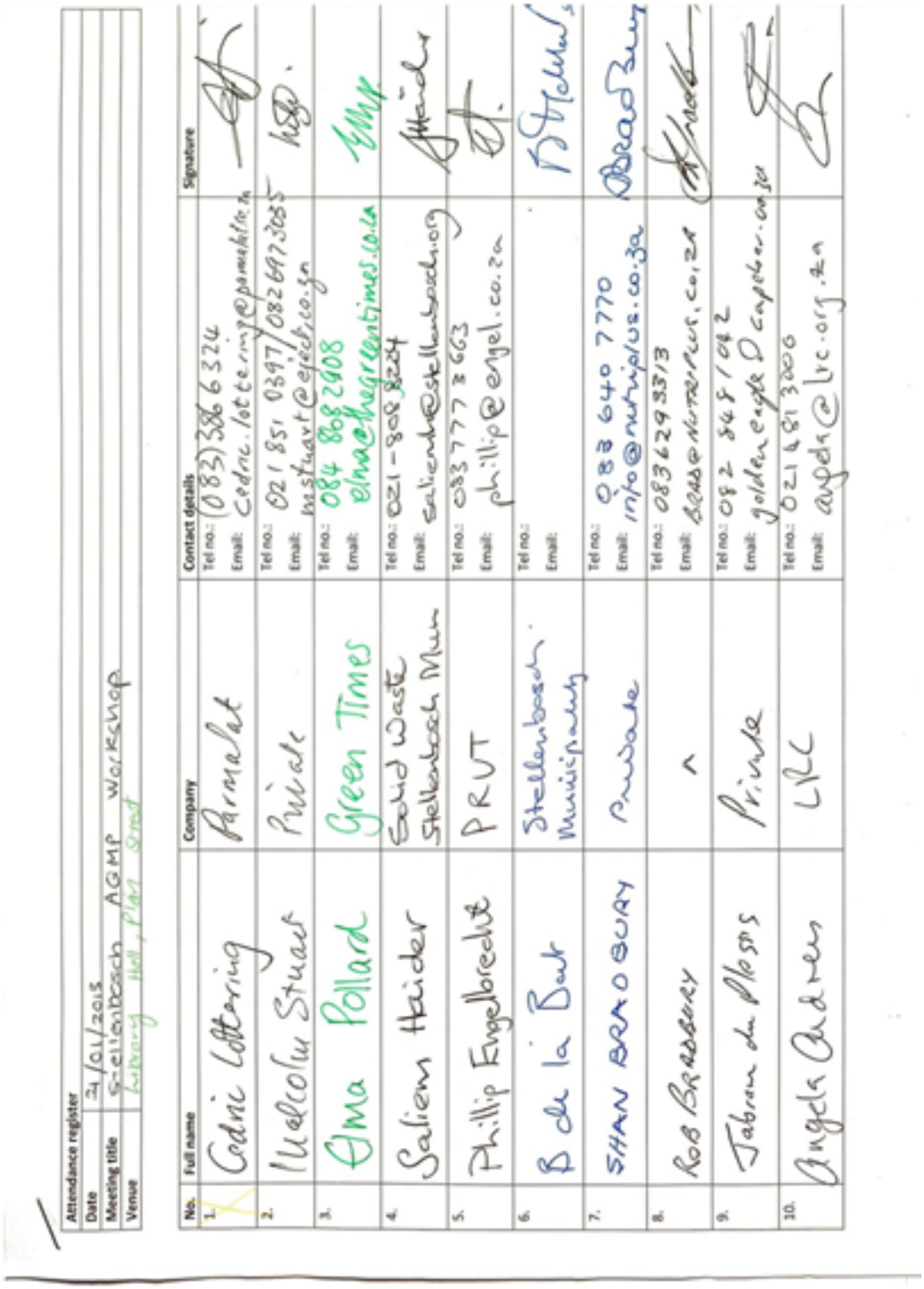
Fax: +27 (31) 266 7307

Cell: +27 (76) 042 3683

Web: www.umoya-nilu.co.za

Appendix C: Registration forms from Public Meetings

Public Meeting 1



Attendance register

Date	24/11/2015
Meeting title	Stellenbosch AQMP Workshop
Venue	Library Hall, Plein Street

No.	Full name	Company	Contact details	Signature
1.	Cedric Lotteringe	Arcadia	Tel no.: (083) 386 6324 Email: cedric.lotteringe@gmail.com	
2.	Mallcolm Stuart	Private	Tel no.: 021 851 0397/0826973085 Email: bastuart@ejedi.co.za	
3.	Ema Pollard	Green Times	Tel no.: 084 868 2908 Email: ema@thegreentimes.co.za	
4.	Salien Haider	Solid Waste Stellenbosch Mun	Tel no.: 021-808 8284 Email: salienh@stellenbosch.gov	
5.	Phillip Engelbrecht	PRUT	Tel no.: 0337773663 Email: phillip@engel.co.za	
6.	B de la Bat	Stellenbosch Municipality	Tel no.: Email:	
7.	SHAN BRADBURY	Private	Tel no.: 083 640 7770 Email: info@municipals.co.za	
8.	ROB BRADBURY	^	Tel no.: 0836293313 Email: BRADS@NETPAGE.CO.ZA	
9.	Jabraan du Plessis	Private	Tel no.: 082 545 1042 Email: goldenengle@capemer.com	
10.	Angela Andrews	LRC	Tel no.: 021 481 3000 Email: angela@lrc.org.za	

No.	Full name	Company	Contact details	Signature
11.	Barry Stauch	D & M	Tel no.: (021) 859 3800 Email: survey@mhws.co.za	
12.	Portia Rululu	DEA&DP	Tel no.: 021 483 2968 Email: portia.rululu@westerncape.gov.za	
13.	Jeff Jefferson	DEA&DP	Tel no.: 021 483 2895 Email: Jeff.jefferson@westerncape.gov.za	
14.	Y. v. Niekerk	private	Tel no.: 0828383037 Email: jyvr@absamail.co.za	
15.	J. Fell.	CABRICO	Tel no.: 021 865 2070 Email: jfell@cabrico.co.za	
16.	M. le Roux	De Wijnlanden Residential Estate	Tel no.: 021 843 3880 Email: manager@dewijnlanden.co.za	
17.	F. Pepetemi	Stellenbosch Sawmill	Tel no.: 021 208 7440 Email: fpe@capesaw.co.za	
18.	P. Reyneke	Stellenbosch Sawmill	Tel no.: 021 8087440 Email: piet@capepine.co.za	
19.	J Rossouw	Distell	Tel no.: 021 809 7570 Email: jrossouw@distell.co.za	
20.	B. Henning	Stellenbosch Municipality	Tel no.: 021 8088656 Email: barbaram@stellenbosch.org	
21.	J. Odendaal	private	Tel no.: Email: jeanne.ode@gmail.com	

No.	Full name	Company	Contact details	Signature
22.	A. Odendaal	TATIB / private	Tel no.: Email: amandaodendaal@gmail.com	
23.			Tel no.: Email:	
24.			Tel no.: Email:	
25.			Tel no.: Email:	
26.			Tel no.: Email:	
27.			Tel no.: Email:	
28.			Tel no.: Email:	
29.			Tel no.: Email:	
30.			Tel no.: Email:	
31.			Tel no.: Email:	
32.			Tel no.: Email:	

Public Meeting 2

Attendance register	
Date	Doornbosch Hall, Stellenbosch
Meeting title	Stellenbosch Municipality AQMP Workshop
Venue	27.05.2019

No.	Full name	Company	Contact details	Signature
1.	M. Engelbrecht	Cape Winelands District Municipality	Tel no.: 021 - 888 5871 Email: mariusse@capewinelands.gov.za	
2.	M. Zuncked	uMoya-NILU	Tel no.: 031 2667357 Email: mark@umoya-nilu.co.za	
3.	Dana Malherbe	Lanzerac Estate	Tel no.: 0820438736 Email: vineyard@lanzerac.co.za	
4.	Pierre Olivier	ABSA	Tel no.: 0827712761 Email: pierreol@absa.co.za	
5.	Corrie Coetzee	ABSA	Tel no.: 082 3366652 Email: corrie.coetzee@absa.co.za	
6.	Deon Carstens	Cape Winelands District Municipality	Tel no.: 021-888 5100 - 0827443717 Email: D.CARSTENS@TELKOMSA.NET, CARSTENS@CAPEWINELANDS.GOV.ZA	
7.	Angelika van der Merwe	Stellenbosch Landbougenootskap	Tel no.: (021) 886 5050 Email: stlandbou@mweb.co.za	
8.	Piet Meethling	Anwilka Vineyards	Tel no.: 0824432088 Email: piet@anwilka.com	
9.	Christo Hamman	Blaauwklippen Estate	Tel no.: 0828985796 Email: Christo@blaauwklippen.com	
10.	Elsarie De Ath	Klein Welmoed	Tel no.: 021 - 881 3252 Email: wjvisser@telkomsa.net	

No.	Full name	Company	Contact details	Signature
11.	Thinus Smith	Wenkem SA	Tel no.: 0832611291. Email: thinus.smith@wenkem.co.za	
12.	Peter Zeier	Wenkem	Tel no.: 082 491 6828 Email: peter.zeier@wenkem.co.za	
13.	Marthinus le Roux	De Wijnlander Meerlust	Tel no.: 021 843 3580 Email: manager@dewijnlander.co.za	
14.	Elke Nabbefeld	De Zalze	Tel no.: 082 520 6026 Email: eco@dezalceestate.com	
15.	JOHAN BOSTRIER	KLEINE ZALZE WYNE	Tel no.: 083 304 4045 Email: jbestbier@kleinezalze.co.za.	
16.	HENNING RETIEF.	KLEINE ZALZE WYNE.	Tel no.: 082 451 2037 Email: hretief@kleinezalze.co.za	
17.	Barbara-Ann Henning	SB Municipality	Tel no.: 0218088656 Email: barbaram@stellenbosch.gov.za	
18.	Jeff A Jefferson	WC Dept. Environmental Affairs	Tel no.: (021) 4832895 Email: Jeff.jefferson@westerncape.gov.za	
19.	Hannes van Wyk	EOS CONSULTING	Tel no.: 082 805 7429 Email: hannesvanwyk@gmail.com	
20.			Tel no.: Email:	
21.			Tel no.: Email:	

Notes from Public Meetings

Public meeting 1: Stellenbosch Municipality AQMP Workshop

Date: 21.01.2013

Time: 09:00am – 13:00pm

Attendees: (see attendance register)

Apologies: Director of DEAD:P (Air Quality)

Venue: Library Hall, Stellenbosch Municipality, Plein Street, Stellenbosch

Please note: This record represents a summary of issues raised during the workshop.

Welcome

Bernabe de la Bat (BB), welcomed attendees to the Stellenbosch Municipality Air Quality Management Plan (AQMP) workshop. uMoya-NILU is a specialist air quality consultancy appointed by the Stellenbosch Municipality to draft the AQMP. The AQMP development is important work for the future of Stellenbsoch. There are various linkages between growth and development and air quality issues, therefore it is important to make strategic planning decisions. BB used the examples of air pollution in Beijing, strikes in South Africa and the impacts of climate change. It is important to get a balance between development and conservation. The aim is to complete the AQMP for inclusion into the next revision of the Integrated Development Plan (IDP). BB acknowledged the importance of stakeholder participation in the formulation of the plan and thanked stakeholders for wanting to contribute in a positive manner.

Introduction (MZ)

MZ described the workshop as interactive and encouraged input from stakeholders. The workshop will include a presentation on the background to the AQMP process, a baseline assessment of air quality in the Stellenbosch Municipality and a collaborative session to assess gaps and issues. Participants introduced themselves and MZ briefly described uMoya-NILU's background in air quality planning. MZ invited those present to provide details of other interested and affected parties.

What is an Air Quality Management Plan?

MZ went on to define what an AQMP is and explained the AQMP development process in South Africa, as well as the legislative background. The AQMP was

defined as a strategic document, required by legislation to achieve air quality objectives. Stellenbosch Municipality is mandated to include an AQMP in its IDP. uMoya-NILU has been appointed to draft the plan but Stellenbosch Municipality will be tasked to implement the plan.

What is happening in the Stellenbosch Municipality is happening within a much larger framework. The National Environmental Management: Air Quality Act (NEAM:AQA) sets the boundaries and the National Framework for Air Quality Management (DEA,2012) gives the 'how to' around the act. It is the overarching framework for National Government. In terms of section 15 all provinces and municipalities must have an AQMP in its IDP. The Western Cape Province (WC) is leading the way in terms of air quality in the province and the Cape Winelands District Municipality have been implementing their AQMP which will be revised in 5 years. Drakenstein municipality also has an AQMP.

What should an AQMP achieve (6 steps):

The Department of Environmental Affairs' National Framework schematic of an AQMP was used to illustrate the 6- step process, namely:

- Establish stakeholder groups and baselines air quality
- Undertake gap and problem analysis
- Develop air quality vision and goals
- Develop an implementation plan
- Implementation of intervention strategies
- Monitoring, reporting and evaluation

The AQMP process entails implementing the smart principle, which involves achievable goals within realistic timeframes as well as defining roles and responsibilities. It involves an assessment of existing resources and looks at trends in terms of short term implementation and a long term review process.

Discussion (All)

Amanda Odendaal (AO) of The Air That I Breathe Foundation (TATIB) then questioned why Stellenbosch Municipality did not have an Air Quality Officer (AQO), to which BB and MZ responded that they could not comment on the past but that an AQO is going to be appointed in the near future as it is a legal obligation.

With regard to the first stage of the AQMP development process, stakeholders queried why members of the agricultural community were not present, to which MZ and BB responded that they would make concerted efforts to involve the agricultural community further. AO also queried about whose responsibility it was to control pesticide use. MZ replied that it was the responsibility of the department of agriculture, but to address the consequences to ambient air quality there was a need for collaboration between different departments. MZ proposed that all discuss the issue further once the baseline was established.

Saliem Haider (SH) asked whether the Drakenstein Municipality has these, and Marius Englebrecht (ME) of the CWDM responded that they have an environmental manager who assumes the AQO role.

Presentation of baseline assessment of air quality for the Stellenbosch Municipality (SH)

The baseline assessment of air quality considers current emissions of air pollutants, the air quality capacity in the municipality and interrelationships present as well as the identification of gaps and issues. The baseline is a point of departure for the formulation of the AQMP. The emissions inventory was presented with a quantification of common pollutants and sources, which is a small amount compared to an area like the Durban south basin. Biomass emissions have not been quantified and uMoya-NILU is still awaiting data from the CSIR Meraka Institute. Waste burning emissions have not been quantified.

The assessment considers:

- Receiving environment
- Atmospheric emissions
- Ambient air quality
- Air quality management capacity

Background to study area

Stellenbsoch is one of 5 Local Municipalities in the CWDM. The population is 270 000 and Stellenbosch is the main commercial centre with main economic activities linking to agriculture.

The **topography** is characterised by mountains and fertile valleys in the central and western parts and undulating hills and plains in the east.

There are three major **land use** types in the municipality: cultivated, natural and urban.

In terms of **climate and meteorology ,** the western cape experiences a Mediterranean climate with a dry warm summer and wet mild winters.

Wind at Cape Town representative of western parts of SLM and wind at Paarl representative of central and eastern parts of SLM.

Meteorology and dispersion:

Air pollutant dispersion occurs both horizontally and vertically. Typically, better dispersion occurs in summer than winter, and by day than at night and typically better in flat or elevated terrain than in valleys.

Discussion:

AO emphasised that they are concerned most with the health impacts on those

who are exposed to pesticide use and how do these factors of dispersion and topography affect them? MZ replied that the solution to pollution is dilution but this is not necessarily the case in SM.

There are 7 Categories of emission sources:

- *Industrial and manufacturing*
- *Motor vehicles*
- *Residential fuel burning*
- *Biomass burning*
- *Agriculture*
- *Waste management*
- *(Transboundary pollution)*

Industrial emissions

An emissions inventory that includes listed activities in the Stellenbsoch Municipality was compiled. Seven facilities with fuel burning devices and SO_2, NOx and PM10 were estimated for these facilities. - Jaques Rossouw (JR) of Distell pointed out that their information was incorrect, they use HFO and coal. Several of the stakeholders wanted an explanation of PM_{10} which MZ described as fine particulate matter that can get into the lining of the lungs.

Residential emissions

Most of Stellenbosch is electrified and except for some wood use, energy use for residential purposes does not impact on ambient air quality.

Motor vehicle emissions

Emissions from motor vehicles were estimated using data from the National Motor Vehicle Emissions Inventory. Taking into account: Exhaust emissions, evaporative emissions, brake and tyre wear. Western Cape is 12.8% of South African total and Stellenbosch is 2.1% of the Western Cape total

Elma Pollard (EP) of the Green Times wanted to know if different cars have different emissions. MZ responded that there are euro standards to compare the data to.

Biomass burning

Biomass burning is defined as both controlled and uncontrolled fires, pollutants include CO, NOx and VOC sources. Estimation of emission based on fuel load (amount and type) and emission factors .Proxy used is area burnt, from CSIR Marika Institute and the Satellite Application Centre and vegetation mapping. Requested recent data for Stellenbosch from CSIR Maraka Institute.

Waste Management

Emissions from waste management occur from two sources:

Landfill

Emissions of landfill gas – mostly methane and CO2

Emissions of particulates – waste handling, vehicle movement and wind entrainment

Waste burning

Emissions a product of the waste

Saliem Hader (SH) pointed out that waste water treatment plants have not been included and that there is a need for the AQMP and waste management planning to align.

Agricultural Emissions:

There are two main sources of emissions from agricultural activities; biomass burning and pesticide use.

- Burning results in:
  - CO, NO_X, VOC and particulates
  - It is a controlled and seasonal practice
- Chemical spraying
  - Involves the use of pesticides, herbicides, fungicides
  - There are different methods of application
  - Spray drift potentially affects ambient air quality

Persistent Organic Pollutants (POPS) are an issue in terms of pollutants associated with pesticide use. POPs have a range of detrimental health effects and while quantification is not practical, it is important to understand that it is an issue.

Trans boundary pollution occurs as a result of the Cape Town Brown Haze from April to September and is attributed mostly to motor vehicles (diesel) and fires in neighbouring municipalities and influenced by prevailing winds.

Emissions summary

A summary of estimated emissions in tons per annum of SO_2, NO_x and PM_{10} was given from industrial and manufacturing activities, residential fuel burning and motor vehicle emissions. With the highest contributor being from industrial and manufacturing activities.

Ambient air quality

The results of 3 campaigns were used and based on these results; ambient air quality in the Stellenbosch Municipality is generally good, with the exception of a few localised sources.

AQMP function

The roles and responsibilities for air quality management in the municipality were then considered in terms of the requirements of the national framework and the current capacity of the Stellenbsoch Municipality. An air quality officer has yet to be appointed and The AQMP is in progress, no reporting takes place. As such capacity building is required.

Discussion (All)

Cedric Lottering (CL) asked how the desired state of air quality is defined, and MZ responded that it is the presence of healthy air. Several of the residents asked why the air quality was presented as good if so many people were sick or unhappy because of pesticide use. AO questioned why there has been no AQO since 2010. BB responded that it was an issue of resource constraints but that one would be appointed in the next 6 months. MZ replied that the municipality must appoint an AQO in terms of legislation and ME replied that it is important to first develop the plan then appoint the AQO. The Stellenbosch Municipality is not the only Municipality without an AQO. Residents requested that someone who is impartial and objective be appointed. Many residents felt that the main issue which was pesticide spray drift was not adequately addressed in the baseline assessment. MZ proceeded to workshop gaps and issues with all stakeholders.

Identification of gaps and issues (All)

The following key gaps and issues were discussed with regard to:

Regulatory context for pesticide use:

- Encourage compliance with pesticide labels
- Consider ways to ensure compliance and reduce pesticide use at the fenceline of residential areas.
- Consider enforcement through a bylaw
- Need to work with agricultural authorities and farmers
- Consider other case studies
- Awareness of safe sustainable pesticide use is also important
- Many residents called for no more spraying near houses due to health effects

Need to understand health impacts of pesticide spray drift

- Jeff Jefferson (JJ) of the DEAD:P made reference to a provincial health study that could be linked to pesticide use in Stellenbosch.

Conflicting land use:

- Where you have conflicting land uses, in this case residential and agricultural, the risk of impacts increases.
- There is a need for air quality to inform planning and development decisions.

Gap in record keeping for pesticides:

- Need to understand what chemicals are being used, how often and with what application methods.

Consider alternative pesticide application methods to reduce impacts of pesticide spray drift:

- Farmers have regimes of spraying and research suggests that some technologies lends itself to non-compliance while others significantly reduce spray drift.
- There is a need to involve other stakeholders, including agricultural bodies, widen the database.
- AA proposed the formulation of a working group and involve research institutions.
- There is a need for more awareness.
- MZ emphasised that the pesticide issue has been tabled and will be considered in the plan but that there are other air quality issues that should also be considered.

Ambient monitoring:

- There is a need for a better understanding of ambient air quality and air pollution sources.

Capacity building

- An AQO needs to be appointed as soon as possible.

The following air quality issues were highlighted by the stakeholders present:

1. Consider mechanisms to enforce compliance with labels conditions for pesticides

2. Land use conflicts are indicative of the need for air quality to inform planning and development decisions

3. Education: awareness around air quality and specific air quality issues

3. Capacity building in the Stellenbsoch Municipality is required

4. Monitoring of pollutants needs to be expanded

5.Emissions need to be appropriately quantified to get an understanding of

common air pollutants and their sources in the Municipality

Way forward

uMoya-NILU will finalise baseline assessment, incorporating discussions from today's stakeholder meeting. The baseline will then inform the draft AQMP which will be presented at the second stakeholder meeting, which everyone will be informed of via email and through newspaper adverts. The aim is to finish the AQMP in time to be included in the next revision of the Stellenbosch Municipality IDP.

Closure (BB)

BB closed the meeting with the sentiment that all participants have learned a lot about air quality through our interactions at this workshop. He then thanked stakeholders for their positive way of contributing. Environmental health is a worldwide issue and coupled to growth and development. He asked stakeholders to please accept the municipality's integrity, and intention to implement AQMP and continuously improve AQMP.

2nd Public Participation Meeting for the Stellenbosch Municipality AQMP Development

Date: 17.052013

Time: 09.00 -12.57

Venue: Doornbosch Agricultural Centre

Welcome and Introduction

Marius Englebrecht (ME) welcomes workshop attendees and states the purpose of the workshop. Participants introduced themselves.

Attendance and apologies: (see attendance register)

- Bernabe de la Bat (Manager: Spatial Planning, Heritage and Environment, Stellenbosch Municipality)
- Basil Davidson (Director: Planning and Development, Stellenbosch Municipality)

1. Objective of the workshop and expectations

Mark Zunckel (MZ) presented in English but offered to clarify information in Afrikaans where necessary. MZ then outlined the agenda and expectations.

Agenda:

- Recap on the Air Quality Management Plan Process

- Progress thus far
- Air quality gaps and issues in Stellenbosch
- Draft AQMP
    - Vision
    - Mission
    - Goals
    - Objectives and activities

2. Recap of AQMP process, and gaps and issues

AQMP: The South African context

The pertinent legislation and policy guiding the AQMP process was discussed. The two main pieces of legislation being the *National Environmental Management: Air Quality Act* (Act 39 of 2004) (NEM: AQA) and the *National Framework for Air Quality Management* (2007, revised in 2012) which provides the overarching plan for air quality management in South Africa. Section 15 of the NEM: AQA requires provinces, municipalities to develop an AQMP. There are differing roles and responsibilities at a municipality level with regard to air quality and it is important to consider the municipality's mandated functions.

What is an AQMP?

An AQMP is a strategic planning document that assists the implementing organisation to achieve air quality management objectives in a structured and measured manner.

- It is applied at a specified spatial scale
- It is driven by defined goals or objectives
- It concerns management of activities that impact on air quality
- It implies monitoring of progress towards reaching objectives

An AQMP develops in a 6 step process, The Department of Environmental Affairs' National Framework schematic of an AQMP was used to illustrate the 6- step process, namely:

- Establish stakeholder groups and baselines air quality

- Undertake gap and problem analysis
- Develop air quality vision and goals
- Develop an implementation plan
- Implementation of intervention strategies
- Monitoring, reporting and evaluation

This workshop entailed the presentation of gaps and issues and the draft AQMP implementation plan.

The following air quality gaps and issues derived from the baseline assessment, were discussed:

- An AQO has not yet been designated in Stellenbosch Municipality
- The current structure in Stellenbosch Municipality does not provide for an air quality management service
- There is no capacity or competence for air quality management
- The AQMP is not yet included in the IDP, it is being drafted
- No by-laws specific to air quality management in the Stellenbosch Municipality to the enforcement for compliance and enforcement
- Internal relationships are not well defined
- Inter-governmental relationships are not well defined
- Air quality is not considered in planning decisions
- There is no emission inventory in Stellenbosch Municipality
- Ambient is undertaken by D:EA&DP, not Stellenbosch Municpality
- No air quality reporting is done
- No initiatives in place to reduce emission of harmful pollutants
- No initiatives in place to inform stakeholders of air quality management and effects of activities on air quality
-

Discussion (All)

The localisation of the AQM function with regards to the gaps in capacity and resources to address these air quality issues was considered. There has been a trend in the Western Cape to devolve the AQ function to local municipalities. The roles and responsibilities of the AQO were expanded further, taking into consideration that the AQO has legislative responsibilities, such as the development of bylaws, as well as monitoring and reporting functions according to NEMA. There will be a lot of work to be done as the AQO for Stellenbosch will be dealing with a wide range of issues.

The draft AQMP was then presented

The draft plan was presented and stakeholder comments captured accordingly.

Vision: Air quality in the Stellenbosch Municipality is clean and healthy

Mission: Air quality in the Stellenbosch Municipality is co-operatively managed for the benefit of present and future generations according to the principles of

sustainable development to safeguard health and quality of life, promoting economic and social development

Goal 1: Air quality governance meets requirements to effectively implement the AQMP

Goal 2: Systems and tools are established to effectively implement the AQMP

Goal 3: Emissions of harmful pollutants are reduced

Discussion of the Plan:

Goal 1: Air quality governance meets requirements to effectively implement the AQMP

The enforcement of the bylaw will be done in collaboration with DAFF and is likely to be similar to the current pesticide regulation. It's much easier to check whether a farmer has been audited, the bylaw enables the AQO to be aware that something is being done.

Angelika van der Mervwe (AM) of the Agricultural Society asked whether there is a need to outsource systems and tools while there are planning mechanisms in place? MZ responded that with a flexible approach there is no right/wrong answer, but according to NEMA the Municipality must have an AQO.

Goal 2: Systems and tools are established to effectively implement the AQMP

Some stakeholders felt that it would be pertinent to capture all these activities and incorporate them into and Air Quality Management system.

Goal 3: Reduce atmospheric emissions of harmful pollutants

The goal was described as ambiguous by stakeholders who required further details on the quantification of emissions and the steps that would be taken to reduce them.

In the WC province, poor service delivery has necessitated waste burning in certain areas. Reference to the waste management plan needs to be made as well as awareness around alternative practices. In terms of agricultural burning, it is a seasonal practice done under certain guidelines. In Stellenbosch, the fire department issues the burning permits. One farmer relayed how he burns plumb chippings and says that alternative farming practices need to be promoted. Dumping of wood shavings on the farm from residential areas is also a common practice.

An additional gap was considering reduction of motor vehicle emissions in the

plan as well as other perceived air quality issues.

Other perceived issues included:

- Odour from the Valpre Disposal chipping works
- Odour from landfill,
- Emissions from cemetery
- Sawmills emissions

Goal 3: (Objective 3) Spray-drift of pesticides is reduced

The objectives around spray drift were then considered further :

The term alternative application methods are topical and have a range of meanings.

i. Investigate optimal alternative application methods together with DAFF and other stakeholders such as CropLife SA

Instead of : *Investigate alternatives to pesticide products and measures together with DAFF* the following was suggested as an activity *Establish a working group to encourage awareness and understanding*

Other stakeholders were added: *Promote the safe and sustainable use of pesticides together with DAFF other stakeholders such as Crop Life SA and EuroGap requirements*

iv. Two additional goals were added: Assessment of health studies relating to pesticides to understand risks

v. Investigate opportunities of incentives to encourage self-regulation

Other aspects to be considered with regard to pesticide use in the plan:

- Public participation and awareness
- Evaluate Health risks from pesticide usage
- Establish working group for pesticides
- Incentivise co-regulation and self-regulation
- Investigate alternative application methods- optimise
- Where it says DWAFF, it should also include interested parties

A need to consider sustainable development and adopt a new style of doing things for future generations was voiced by many of the farmers present. There was a suggestion from the farmers present that the municipalities need to incentivise alternative practices to agricultural burning. In CT, ME explained that the agricultural permit to burn is very expensive, and any alternative is cheaper. There was also a suggestion that farmers and the municipality collaborate with GlobalGAP. What also needs to be considered is the manner in which people

burn. Many of those present were under the impression that industries were the biggest contributor to air pollution in Stellenbosch. However, the relative contribution of agriculture in the district and the local municipality is quite large.

Farmers follow specific methods to get export certification; the spraying of pesticides is to an extent, controlled. Each product has a specific limit and code. In the objectives for goal 3, the word alternative should be reconsidered and replaced with optimised, consider other manners of spraying etc. There are also the conditions under which you spray that need to be considered. Also need to consider the seasonality of spraying. Euro gap has brought positive changes but it's not quite enough for the regulation of pesticides. There are existing farming regulations.

A major impediment to safer use of pesticides is that the legislation is outdated and impractical. The policy exists but it has not yet been implemented. For example, it takes six months away from your job to become a pollution control officer.MZ stressed that the issue of pesticide spray drift needs to be included and recognised as it's what people are concerned about. AVM says that the air quality issues need to be considered in an integrated manner. The role of the municipality needs to be considered as well. For mixed use developments there should be a requisite air quality assessment. There is a suggestion that all role players should be gathered together, which would prove to be a very difficult task but would be beneficial. The municipality needs to encourage and educate the public about what they need to do as well, to protect themselves. In terms of pesticide use and agricultural practices it was agreed that there is a need to encourage awareness and transparency between residents and farmers, as well s other stakeholders. There are practices both residents and farmers can follow to facilitate safe and sustainable pesticide use.

A discussion on which aspects of the plan were of high priority to the stakeholders followed. Of high importance was the need for the AQMP to be included in the IDP and for sufficient capacity building in the municipality so that the air quality function could be effectively carried out. The objectives around goal 1 (Air quality governance meets requirements to effectively implement the AQMP) and goal 2 (Systems and tools are established to effectively implement the AQMP) were all deemed high priority activities that required immediate attention as was the objective around pesticide spray drift reduction from goal 3.

Way forward

The AQMP process should encourage positive comments and look to the future.

- uMoya-NILU to revise the draft AQMP and implementation plan based on stakeholder input
- uMoya-NILU to submit draft plan to Stellenbosch Municipality for internal review then presentation to council and adoption

- Aim: Inclusion of AQMP in the IDP revision

Closure

MZ closed the meeting and thanked everyone for their participation

Proof of publication of newspaper adverts

16 Eikestadnuus 2 Mei, 2013

Geklassifiseerd Classifieds

JOBS

Besigheid Business

Woonstelle te huur Flats to let

RHENISH GIRLS' HIGH SCHOOL

1860

APPLICATIONS ARE INVITED FOR THE FOLLOWING SGB PART TIME POST TO START 1 JULY 2013 UNTIL 31 OCTOBER:

MATHEMATICAL LITERACY

GR10-12

Previous experience essential

CLOSING DATE 20 MAY 2013

Submit letter of application, CV, and testimonials to:
The Principal
PO Box 87, Stellenbosch, 7599
principal@rhenish.co.za
Fax 021 887 8090
Enquiries:
Tel 021 887 6807

LAERSKOOL STELLENBOSCH

SKOONMAKER

Foreman Vacancy

on Wine Farm in Stellenbosch area.

Send CV to

Fax: 021-885-1800

Send E-mail for smalls to: smalls@eikestadnuus.com

RECEIVING CLERK

JUNIOR MANAGER

SERVICE DEPARTMENT SUPERVISOR

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KENNISGEWING VAN PUBLIEKE VERGADERING
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Your Stellenbosch property up for rental!
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office 021 8871017 or
suzette.kruger@pamgolding.co.za
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Let us make it happen for you!

Eekestad Nuus: 02.05.2013

Eikestad Nuus 17
7 Desember, 2012

GEREEDSKAP HERSTEL TEGNIKUS - TYDELIK

Blomme rangskikker

Benodig Drywers vir aflewerings

Bemarking- en Verkoopspersoon

Restaurant Manager
Chef, Cook, Griller
Pizza & Takeaways
In Stellenbosch
Experience: +- 5yrs
Fax C.V. 0867751680
Closing date: 10 December 2012

NTT Volkswagen Stellenbosch
NTT VW Stellenbosch benodig die dienste van 'n gekwalifiseerde
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RUST EN VREDE
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Restaurant
Part/full time staff needed

Die dienste van 'n gekwalifiseerde verpleegsuster word benodig by 'n mediese praktyk in Stellenbosch. 'n "Travel" kwalifikasie sal as aanbeveling dien. Stuur u volledige CV aan:
coetzee1@medicross.co.za
Sluitingsdatum:
21 Desember 2012.

STELLENBOSCH
MUNISIPALITEIT • UMASIPALA • MUNICIPALITY
NOTICE OF PUBLIC SECTION
STELLENBOSCH MUNICIPALITY
AIR QUALITY MANAGEMENT PLAN DEVELOPMENT

LOGISTIEK - VERVOERSKUDULEERDER – LUTZVILLE

GUDE WERF HOTEL soeks a
WAITER

General Assistant

STELLENBOSCH
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PUBLIC NOTICE
STELLENBOSCH MUNICIPALITY

NOTICE OF DRAFT PARKING BY-LAW AND INVITATION TO LOCAL COMMUNITY TO SUBMIT REPRESENTATIONS TO THE MUNICIPALITY

Notice is hereby given in terms of Section 160(3) of the Municipal Financial Management Act, (No. 56 of 2003) that Council intends to submit a new parking by-law for approval.

Written objections, with reasons, may be submitted at the office of Municipal official as stated below before or on the 7 January 2013, quoting " Draft Parking By-Law", as well as contact details. Any objections received after aforementioned closing date will be deemed invalid.

Enquiries may be directed to jtante@stellenbosch.org, Tel 021 808 8611,
Fax 021 883 2652
(weekdays during 08:00 - 16:00)
Postal Address:
For Attention: Jacob Tante
Stellenbosch Municipality
Department: Public Safety Traffic Services
Private Bag X3045
Stellenbosch
7599

TUIN NUTSMAN

CHEF DE PARTIE

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HERSONERING : GEDEELTE 128 VAN PLAAS NR 468
STELLENBOSCH

Eekestad Nuus: 07.12.2012

Die Burger 21.01.2013

NEWS 7

R 21bn COMPENSATION IN 5 YEARS

Workplace injuries soaring in SA

REAL SAFETY BEGINS WITH ME

briefs

Crocodile killed after four years

Power to be cut for upgrade

De Lille is mayor of the month

Eight poaching suspects held

Two tons of dagga seized in KZN

Police changed their version of events at Marikana, Bizos tells Farlam Commission

Musician sings out against gender-based violence

City chief executive loses R360 000 after SIM swop done in Pretoria

Cape Times: 03.05.2013

Cape Times

Cycling cheats may be even bigger dopes...

Human sperm count continues to decline

Not for Sale to Persons Under the Age of 18.

Cape Times: 07.12.2012

24 Paarl Post 13 Desember, 2012

Sake Post Business Post

Sake Post

Eiendomme, Poste, Flinkgids

Say cheese!

Local cheeseries have excelled at the World Cheese Awards 2012.

The World Cheese Awards, run by the United Kingdom's Guild of Fine Food, is the largest and most respected competition of its type in the world.

This year 2 781 cheeses from 30 countries were evaluated by 255 judges from around the world during the competition which was staged alongside the BBC Good Food Show.

South African cheeses won no fewer than four gold, six silver and five bronze awards.

Paarl estate, Fairview, won gold awards for their De Leeuwen and the Blue Rock, a silver award for their Brie de Roché and a bronze for their goat feta.

Dalewood Fromage, near Franschhoek, also scooped gold for their Huguenot.

And Rhodes Food Group, also situated near Franschhoek, received a silver for their Franschhoek Angelot and a bronze for their Melange.

"We are immensely proud to see South African dairy products out-perform so many other countries at this competition," said Bertus de Jongh, CEO of the Milk Producer's Organisation.

"However, we need more than the stamp of approval from international judges, we need local consumers to realise the value of our local cheeses too," De Jongh said.

TOP-PRODUSENT: By die jaareindfunksie van die Windmeul Kaasmeesters is Jacques-Pierre Malan (middel) van die plaas Malaniel en Daniel as hul Produsent van die Jaar aangewys. Hier oorhandig Windmeul winkelbestuurder, Danie Malan, Jacques-Pierre se trofee aan hom.

ERKENNING VIR PUIK DIENS: Die personeel van die Monument Shell-dienstasie in Paarl-Suid het onlangs erkenning gekry vir hul puik diens. Die dienstasie is uit meer as 550 vulstasies landswyd aangewys as een van die Top-10 in die Service Excellence Awards vir die derde kwartaal van 2012. Tydens dié kompetisie word daar onder meer gekyk na dienslewering, klant-interaksie, omset en veiligheid. Hier is van die rybaan- en winkelpersoneel saam met eienaar Schalk Pieterse (agter), en Carlo Pieterse (areabestuurder Shell SA). Die personeel verdien met die toekenning elkeen 'n bykomende R1 000. FOTO: SEB SEBERHAGEN

DRAKENSTEIN

VOORGESTELDE AANVAARDING VAN BELEIDE VIR DRAKENSTEIN MUNISIPALITEIT

Kennis geskied hiermee dat die Raad van voorneme is om die volgende beleide vir Drakenstein Munisipaliteit te aanvaar:

1. **BEVORDERING VAN INVESTERING EN AANSPORING SKEMA BELEID**
2. **GELEENTHEIDS - ONDERSTEUNINGS-BELEID**

Die konsep beleidsdokumente lê ter insae gedurende normale kantoorure by die volgende munisipale kantore:-

1. Wellington Munisipale Kantore, Pentz Straat, Wellington
2. Drakenstein Biblioteke

Die algemene publiek word hiermee genooi om enige insette of kommentaar te lewer, wat die ondertekende nie later nie as **Donderdag 31 Januarie 2013** moet bereik. Telefoniese navrae kan gerig word aan die **Plaaslike Ekonomiese Ontwikkelings Departement** by **021-807 4737 of e-pos by girdrwiel@drakenstein.gov.za**

JF METTLER
MUNISIPALE BESTUURDER

DRAKENSTEIN

PROPOSED ADOPTION OF POLICIES FOR DRAKENSTEIN MUNICIPALITY

Notice is hereby given that Council intends to adopt the following Policies for Drakenstein Municipality:

1. **INVESTMENT PROMOTION AND INCENTIVE SCHEME POLICY**
2. **EVENTS POLICY**

The proposed policy documents are open for inspection at the following municipal offices during normal office hours:-

1. Wellington Municipal Offices, Pentz Street, Wellington
2. Drakenstein Libraries

The general public is hereby invited to submit any comment or input, which should reach the under mentioned by not later than **Thursday, 31 January 2013**. Telephonic enquiries may be directed to the **Local Economic Development Department** at **021 807 4737 or email at girdrwiel@drakenstein.gov.za**

JF METTLER
MUNICIPAL MANAGER

DRAKENSTEIN

VERKEER

Geliewe kennis te neem dat die Daljosphat Verkeersentrum op Vrydag 14 Desember 2012 om 12:00 sluit. Die Wellington kantoor is oop soos gebruiklik.
Drakenstein Munisipaliteit vra om verskoning vir enige ongerief.

JOHANN METTLER
MUNISIPALE BESTUURDER

DRAKENSTEIN

TRAFFIC

Please be advised that the Daljosphat Traffic Centre will close at 12:00 on Friday 14 December 2012. Wellington Office will however be open as usual.
Drakenstein Municipality apologises for any inconvenience caused.

JOHANN METTLER
MUNISIPALE BESTUURDER

DRAKENSTEIN

EZOTHUTHO

Nceda nazi inzuzo sokuba I Daljosaphat Traffic Centre izakuvalwa ngo 12:00 ngolwesihlanu 14 Disemba 2012.
Kanti iOfisi yase Wellington izakuvulwa njengasiqhelo.
uMasipala waseDrakenstein uxolo uxolo ngengxanileko yakho.

JOHANN METTLER
UMANEJALA KAMASIPALA

DRAKENSTEIN

BIBLIOTEEK DIENSTE

Alle Biblioteke sluit vanaf 18 Desember 2012 tot 4 Januarie 2013 om 17:00
Drakenstein Munisipaliteit vra om verskoning vir enige ongerief.

JOHANN METTLER
MUNISIPALE BESTUURDER

DRAKENSTEIN

LIBRARY SERVICES

From 18 December 2012 to 4 January 2013 all libraries closes at 17:00.
Drakenstein Municipality apologizes for any inconvenience caused.

JOHANN METTLER
MUNISIPALE BESTUURDER

DRAKENSTEIN

ITHALA LENCWADI

Ukusukela ngo 18 Disemba 2012 ukuya ngo 4 Januwari 2013 onke amathala encwadi azakuvalwa ngo 17:00.
uMasipala waseDrakenstein uxolo uxolo ngengxanileko yakho.

JOHANN METTLER
UMANEJALA KAMASIPALA

STELLENBOSCH

NOTICE OF PUBLIC MEETING STELLENBOSCH MUNICIPALITY AIR QUALITY MANAGEMENT PLAN DEVELOPMENT

In terms of Section 15 of the National Environmental Management: Air Quality Act (Act No.39 of 2004, (NEM: AQA) all municipalities are required to develop an Air Quality Management Plan (AQMP). An Air Quality Management Plan (AQMP) is a strategic document with a vision and goals that strives to guide air quality management activities and ensure that air quality is not harmful to health and wellbeing. The Stellenbosch Municipality is in the process of drafting an AQMP and welcomes your participation. The AQMP will serve to direct air quality initiatives specific to the municipality.

Details of the public meeting:

Date: 21st January 2013
Time: 10:00 am to 14:00 pm
Venue: **Library Hall, Stellenbosch Municipality, Plein Street, Stellenbosch**

Should you have any queries or wish to be registered on the database as a stakeholder, please contact the Stellenbosch Municipality or uMoya-NILU Consulting.

Stellenbosch Municipality:
Bernabé de la Bat
Manager: Spatial Planning, Heritage & Environment
Bernabe@stellenbosch.org
Tel: 021 808 8652

uMoya-NILU :
Sarisha Perumal
Project administrator
sarisha@umoya-nilu.co.za
Tel: 031 266 7507

Paarl Post: 13.12.2012

16 Paarl Post
2 May, 2013

Sake Post
Business Post

Sake POST
Poste | Geklassifiseerd

Nederburg announces line-up for auction 2013

Nederburg has a firmly focused line-up of top-level wines featured on the 2013 Nederburg Auction, and has welcomed the organisers' revised and taut selection approach this year.

Nederburg cellar master, Razvan Macici.

The auction has always been a showcase for excellence. Now this year, the super quality criteria has once again been coupled with singularity, amplifying the collectability status of the special cuvées available, while staying true to the original ethos of the annual event, now in its 39th year.

Commenting on the Nederburg wines chosen by the selection panel, cellar master Razvan Macici said: "This is a healthy development in the evolution of the auction. With the wider availability of exceptional quality wines globally through a variety of channels, it becomes essential to present auction bidders with options deemed truly original or unique, and we are proud to be amongst those having such limited-edition wines to offer.

"Buyers will notice, for example that this year, we have only the 1980 and 2005 vintages of Edelkeur and the 1988 and 2007 vintages of Eminence on offer."

Both the wines from the 1980s were made by Günter Brözel, who developed a legendary reputation for Nederburg sweet wines. Macici, who was first exposed to wines in this style by his father, Mihai (who enjoyed similarly iconic status in his native Romania), won the Diners Club Winemaker of the Year title last year for his sweet wines.

"This year we have an ideal opportunity to demonstrate our versatility with three very different expressions of Sauvignon Blanc that will come under the hammer in September.

"Ranging from four to six years old, these are all age-worthy wines. There's the once-off, 2008 Il Centurio Sauvignon Blanc, made from fruit picked from individually selected vines in Cape Agulhas and Darling and left on the fermentation lees for 12 months before racking and blending. The wine was judged the best wooded Sauvignon Blanc at the Old Mutual Trophy Wine Show. It's very fresh but layered with crisp fruit and herb notes.

"Darling fruit features again in the 2009 Private Bin D224, where we have grapes from a single vineyard in Groenekloof area but here the wine shows fig, grass and tropical characters. Then we have the 2007 Private Bin D215 that at six years' old is showing absolutely remarkable vitality."

Other Nederburg reds on offer include the 2005 vintage of the velvety rich Private Bin R163 Cabernet Sauvignon, a best-in-class gold medallist at the International Wine & Spirit Competition and also a Veritas double gold winner; the 2006 vintage of the same wine that won gold at the Decanter World Wine Awards, as well as the 2007 R181 Merlot, another Veritas double gold medallist.

Cheese-makers head for France

Six young South African cheese makers will soon benefit from the century old cheese-making know-how of the French after being awarded scholarships at the DuPont Qualité Award Ceremony.

Warren Phipson (Kasselshoop Cheese), Petrus October (Langeberg Cheese), Wiseman Nkamisa (Simonsberg), Kerwick Boonzaaier (Portobello), Marika Claasen (Forest Hill) and Karla Steyl (La Montanara) will spend three weeks at the CFPPA – Centre for Training and Promotion for Agriculture – in Macon Davayein, Burgundy, France to gain first-hand experience from various experts as part of a co-operation agreement between the governments of the Western Cape and Burgundy.

Six young cheese makers were awarded scholarships recently at the DuPont Qualité Award Ceremony. Here (from left) are Dudley Adolph (Western Cape Department of Agriculture), cheese makers Warren Phipson, Kerwick Boonzaaier, Karla Steyl, Marika Claasen, Wiseman Nkamisa, Petrus October and Marius Paulse (Western Cape Department of Agriculture).

Agri-Expo, organiser of the SA Dairy Championships and the popular SA Cheese Festival, has been the facilitator of this project for the past eight years. "Since 2005, no fewer than 32 trainee cheese makers have benefited from this practical course that covers the wide spectrum of the making and marketing of cheese," says Johan Ehlers, CEO of Agri-Expo. "Most of the scholarship winners are from sectors that in the past have been exposed to fewer opportunities."

According to Ehlers, part of the success of this project lies in the fact that young cheese makers are empowered and inspired in France and then return with new vigour and ideas to make a difference in their jobs and in the industry.

According to Marius Paulse, director of the programme for structured agricultural education and training at the Western Cape Department of Agriculture that funds the scholarships, this exchange programme is one of the department's flagship initiatives. "We are significantly contributing to the local dairy and cheese industries. The young and emerging cheese makers gain by being exposed to the most recent technology and practical information that are not yet available in South Africa."

In Burgundy the cheese makers will visit some 15 cheese factories and learn from highly qualified cheese masters.

For more details about the cheese maker bursaries contact Agri Expo at 021 975 4440 or Marius Paulse from the Western Cape Department of Agriculture at 021 808 5019 or mariusp@elsenburg.com

Paarl Sakekamer AJV by Domaine Brahms-landgoed

Die algemene jaarvergadering van Paarl Sakekamer vind Woensdag 8 Mei 2013 om 18:00 plaas by Domaine Brahms-landgoed.

Vanjaar se gasspreker is Mark Cliff van PSG Konsult met die tema: "In perspektief is Suid-Afrika 'n klein dorpie in die wêreld."

Die aand, wat 'n heerlike maaltyd insluit, is gratis vir lede en hul gades. Nie-lede betaal R150 per persoon.

Een gelukkige besoeker het 'n kans om 'n gratis naweek vir twee mense te wen na Club Mykonos. Besprenk jou sitplek voor Maandag 6 Mei by Francis Nieuwhoudt by 078 028 0689 of info@paarlsakekamer.co.za.

DRAKENSTEIN

AANSOEK OM HERSONERING: PLAAS 1579 PAARL AFDELING

Kennis geskied hiermee ingevolge Artikel 17(2)(a) van die Ordonnansie op Grondgebruikbeplanning, 1985 (Ord 15 van 1985), dat 'n aansoek soos hieronder uiteengesit ontvang is en gedurende normale kantoorure ter insae is by kantoor van die Hoof: Beplanningsdienste, Administratiewe Kantore, h/v Hoof- en Marketstraat, Paarl, Tel: 021 807 4822:

Eiendom : Plaas Sandrivier No 1579, Paarl Afdeling
Aansoeker : P-J Le Roux Stads- en Streekbeplanners en David Hellig & Abrahamse Landmeters
Eienaar : Jan Frederik Le Roux namens Sandrivier Landgoed (Edms) Bpk
Ligging : Gelee ±6km noord van Wellington, aangrensend tot die R45 pad
Grootte : ±189ha
Sonering : Landbouzone I
Huidige Gebruik: Landbou met grasssoorde aktiwiteite
Voorstel : Hersonering van 'n gedeelte van Plaas 1579 Paarl Afdeling (±3.7ha) vanaf Landbouzone I na Landbouzone II ten einde die permanente grondgebruiksregte vir 'n verpakkings- en koelerloor toe te laat, waar die eienaar sy geoeste plaas produkte kan verpak en stoor.

Gemotiveerde besware teen bogemelde aansoek kan skriftelik gerig word aan die Munisipale Bestuurder, Drakensteln Munisipaliteit, Posbus 1, Paarl, 7622, teen nie later nie as **Maandag, 3 Junie 2013**. Geen laat besware sal oorweeg word nie.

Indien 'n persoon nie kan lees of skryf nie, kan so 'n persoon sy kommentaar mondelings by die Munisipale Kantore, Bergrivier Boulevard, Paarl, aflê, waar 'n personeellid sal help om sy kommentaar vertoë op skrif te stel.

2 Mei 2013

J F METTLER
MUNISIPALE BESTUURDER

DRAKENSTEIN

APPLICATION FOR REZONING: FARM 1579 PAARL DIVISION

Notice is hereby given in terms of Section 17(2)(a) of the Land Use Planning Ordinance, 1985 (Ord 15 of 1985), that an application as set out below has been received and can be viewed during normal office hours at the office of the Head: Planning Services, Administrative Offices, c/o Main and Market Street, Paarl, Tel: 021 807 4822:

Property : Farm Sandrivier No 1579, Paarl Division
Applicant : P-J Le Roux Town and Regional Planners and David Hellig & Abrahamse Land Surveyors
Owner : Jan Frederik Le Roux on behalf of Sandrivier Landgoed (Pty) Ltd
Locality : Located approximately 6km north of Wellington, adjacent to the R45 road
Extent : ±189ha
Current Zoning: Agricultural Zone I
Existing Use: Agriculture with associated uses
Proposal : Rezoning of a portion of Farm 1579 Paarl Division (±3.7ha) from Agricultural Zone I to Agricultural Zone II in order to grant permanent land use rights for a packaging plant and cold store for the packing and storing of the owner's harvested farm products.

Motivated objections to the above can be lodged in writing to the Municipal Manager, Drakenstein Municipality, P.O Box 1, Paarl, 7622 by not later than **Monday, 3 June 2013** of the date hereof. No late objections will be considered.

Persons who are unable to read or write, can submit their objections verbally at the Municipal Offices, Berg River Boulevard, Paarl, where they will be assisted by a staff member, to put their comments in writing.

2 May 2013

J F METTLER
MUNICIPAL MANAGER

STELLENBOSCH

KENNISGEWING VAN PUBLIEKE VERGADERING STELLENBOSCH MUNISIPALITEIT LUGGEHALTE BESTUURSPLAN ONTWIKKELING

Artikel 15 van die Nasionale Omgewingsbestuurswet (Wet 39 van 2004) bepaal dat alle munisipaliteite 'n Luggehalte Bestuursplan (LGBP) moet ontwikkel. 'n Luggehalte Bestuursplan is 'n strategiese dokument met 'n visie en doelwitte wat daarna streef om luggehalte bestuurskwessies te reguleer en te verseker dat luggehalte nie skadelik vir gesondheid en welstand is nie. Stellenbosch Munisipaliteit is in die proses om die LGBP op te stel en verwelkom u deelname. Die eerste publieke vergadering is gehou op 21st Januarie 2013 waartydens die stand van die luggehalte bespreek is asook doelwitte van 'n luggehalte bestuursplan voorgestel is. Die 2de vergadering gaan gehou word op 17de Mei 2013 om die voorlopige LGBP te bespreek. Die Luggehalte Bestuursplan sal dien tot direkte luggehalte inisiatiewe spesifiek met betrekking tot Stellenbosch Munisipaliteit.

Besonderhede van die publieke vergadering:
Datum: 17 Mei 2013
Tyd: 09:00 am – 13:00 pm
Plek: Doornbosch Saal, Stellenbosse Landbougenootskap, Strandweg (R44), Stellenbosch

Indien u enige navrae het of wil registreer op die databasis as 'n belanghebende, kontak asseblief Stellenbosch Munisipaliteit of uMoya-NILU Consulting.

Stellenbosch Munisipaliteit:
Bernabé de la Bat
Bestuurder: Ruimtelike Beplanning, Erfenis&Omgewing
Bernabyll@stellenbosch.org
Tel: 021 808 8652

uMoya-NILU:
Sarisha Perumal
Projek Administrateur
Sarisha@umoya-NILU.co.za
Tel: 031 266 7307

Four Fairview favourites in SA top 100 challenge

Fairview in Paarl once again excelled at the prestigious Top 100 South African Wine Awards 2013. The Top 100 SA Wine Challenge is an independent and specialised rating of SA's finest wines, showcasing great quality local wines that can compete on a global level.

The panel of esteemed national and international judges selected and featured four Fairview wines for the Top 100 of 2013.

The judging panel included SA judges Duncan Savage, Jenny Ratcliffe-Wright, Richard Kershaw and Higgo Jacobs (tasting director) and adjudicators from the UK.

The multiple award-winning Fairview Nurok 2011, the Fairview La Beryl Blanc 2012, the Fairview Beacon Shiraz 2009 and the Fairview Primo Pinotage 2011 were all placed.

The Fairview Nurok 2011 is a blend of Chenin Blanc, Viognier, Roussanne and Grenache Blanc.

Fairview La Beryl Blanc 2012 is named after Charles Back's late mother, Beryl Back.

The Fairview Beacon Shiraz 2009 is a limited release wine.

The Fairview Primo Pinotage 2011 is also a limited release wine, made from the finest wine of the vintage.

Contact Fairview: tasting@fairview.co.za; phone 021 863 2450; visit www.fairview.co.za.