eThekwini Municipality AQMP Review and Update: AQMP goals and Implementation Plan

uMN088-15

eThekwini Municipality

Report details:

Client:	eThekwini Municipality
Report title: Report number: Project number:	eThekwini Municipality AQMP Review and Update: AQMP Goals and Implementation Plan uMN088-15 uMN058-13
Project:	eThekwini Municipality AQMP Review and Update
Version:	Draft (30 September 2015)
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When used in a reference, this document should be cited as follows:
uMoya-NILU (2015): eThekwini Municipality AQMP Review and Update: AQMP Goals and Implementation Plan, Report Number uMN088-15, 18 November 2015, Draft.

EXECUTIVE SUMMARY

eThekwini Municipality developed and implemented its first Air Quality Management Plan (AQMP) in 2007. In terms of good practice, the review of an AQMP is promoted through the National Framework for Air Quality Management and the Department of Environmental Affairs Manual for Air Quality Management Planning. eThekwini Municipality is therefore embarking on a project to assess, evaluate, review, and update their AQMP.

This 18 month project consists of four major components. These are: i) the facilitation of the public participation process, ii) the review of the 2007 AQMP document and implementation thereof, iii) the description of the current state of air quality in the eThekwini Municipality and the identification of gaps, issues and challenges for air quality management and iv) the development of the AQMP document and the supporting implementation plan.

This document focuses on the AQMP and includes the implementation plan to achieve it's the overall objective, i.e.:

eThekwini Municipality manages ambient air quality to protect human and environmental health within a framework of sustainable development

The eight goals of the AQMP are:

Goal 1: Ambient air quality is compliant with the NAAQS in eThekwini Municipality, focuses on appropriate interventions to achieve compliance with the NAAQS in areas where exceedances occur and to maintain the air quality status quo elsewhere. These interventions consider the principles of sustainable development and aim to answer questions on air pollution and impacts in eThekwini Municipality, by proactively managing air quality in light of current activities and proposed development projects.

Goal 2: The AQMP is incorporated municipal policy and planning, recognises that the AQMP needs to be integrated into related municipal policy and in planning mechanisms such as the Integrated Development Plan to realise buy-in, support and implementation success.

Goal 3: Municipal structure facilitates the implementation of the AQMP, recognises that the municipal structure and the structure of the PCRM unit, as well as roles, responsibilities and lines of communication need to be clearly defined for successful implementation of the AQMP.

Goal 4: eThekwini Municipality has the necessary skills to implement the AQMP, refers to the skills needed by incumbent staff to perform their mandated functions and addresses career development through training and other mechanisms.

Goal 5: eThekwini Municipality has the necessary incentives to implement the AQMP, concerns funding for implementation and incentivising staff through motivational policies at an organisational and individual level through the provision of career growth opportunities to achieve the overall objective of the AQMP.

Goal 6: eThekwini Municipality has the necessary systems and tools to implement the AQMP, aiming to enhance existing systems and tools and to develop others where necessary to achieve the overall objective of the AQMP. Included are emission inventories, ambient monitoring, dispersion modelling, information management, compliance and enforcement and complaints management.

Goal 7: AQM in eThekwini Municipality is supported by participatory decision making, acknowledging that AQM is an interdisciplinary field which is dependent on relationships within the municipality, other spheres of government, civil society, industry, Non-Governmental Organisations, academia and other stakeholders.

Goal 8: AQM in eThekwini Municipality is open and transparent, aiming to update stakeholders on progress with AQMP implementation, to improve communication amongst stakeholders, and improve general understanding of air quality in the municipality.

The realisation of the *Overall Objective* of eThekwini's AQMP over its 5-year lifespan is guided by the *Implementation Plan*. The *Implementation Plan* addresses each *Goal* by defining outcomes-based *Objectives* and the *Activities* necessary to achieve the objectives. It is structured to provide strategic and structured input to the annual business planning of executing departments in eThekwini Municipality and of other stakeholders.

For the implementation of the AQMP, each goal is addressed through out-comes based objectives that focus on specific aspects of each goal. In turn, the objectives are addressed through defined activities needed to realise the objective with defined timelines.

Air quality management is a mandated function of eThekwini Municipality's Health Unit's Pollution Control and Risk Management (PCRM). However, air quality management involves a wide range of stakeholders and implementation of the AQMP and realising its Overall Objective depends primarily on PCRM and the participation of other role players, including other municipal departments and external role players.

Indicators are designed to be easily interpreted and focus on outcomes and offer a means of measuring progress with implementation and reporting on progress. They are fundamental in monitoring progress with the implementation of the AQMP, in the evaluation of the AQMP and in the review.

ACKNOWLEDGEMENTS

The following people are acknowledged for their assistance in the compilation of this air quality baseline report for eThekwini Municipality:

- Stakeholders who attended and contributed at the three public meetings in June 2015 and at the Logical Framework Assessment workshop on 22 July 2015;
- Bruce Dale, Sam Sewell and Neil Laratt of eThekwini Municipality for their input, review, direction and leadership during the AQMP development;
- Phumulani Ngema, Lucky Mkhize, Sam Sewlall, Ratasha Pillay, Lizelle Saaiman, Prenthan Chetty, Sanjay Erra and Stembiso Ngidi of eThekwini Municipality for input to the draft AQMP and Implementation Plan.

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AEL	Atmospheric Emission Licence
AQM	Air Quality Management
AQMP	Air Quality Management Plan
AQO	Air Quality Officer
DEA	Department of Environmental Affairs
D: EDT&EA	Provincial Department of Economic Development, Tourism and Environmental Affairs
DSW	Durban Solid Waste
DUT	Durban University of Technology
EMI	Environmental Management Inspectors
ETA	eThekwini Transport Authority
EWS	eThekwini Water and Sanitation
IDP	Integrated Development Plan
KSIA	King Shaka International Airport
NAAQS	National Ambient Air Quality Standards
NEM: AQA	National Environmental Management: Air Quality Act
NGO	Non-governmental Organisation
PCRM	eThekwini's unit Pollution Control and Risk Management
PM	Particulate matter
PM_{10}	Particulate matter of aerodynamic diameter less than 10 micrometres
SCM	eThekwini Supply Chain Management
SDB	South Durban Basin
UKZN	University of KwaZulu-Natal

1 INTRODUCTION

eThekwini Metropolitan Municipality (eThekwini Municipality) is located on the east coast of South Africa in the Province of KwaZulu-Natal and spans an area of approximately 2 297 km^2. eThekwini Municipality is one of eight Category A municipalities in South Africa, and one of 11 district municipalities in KwaZulu-Natal. It includes the City of Durban which covers 225.91 km^2 and home to the Port of Durban, the busiest port in Africa. Durban is a major manufacturing hub and tourism destination.

The importance of the environment and air quality is highlighted in Section 24 of the Bill of Rights, which states, amongst others, that everyone has the right to an environment that is not harmful to health or well-being. Air pollution in eThekwini Municipality and its potential impacts on human health have been highlighted for a number of years. This led to the development and implementation of the Multi-Point Plan (MPP) in 2002, which focused largely on the South Durban Basin (DEA, 2007). The associated health study confirmed high levels of exposure to air pollution in the residential areas surrounding the SDB (University of KwaZulu-Natal, 2006). The MPP, amongst others, resulted in a dramatic decrease in the emission of sulphur dioxide (SO_2) by industries in the SDB and a concomitant decrease in ambient SO_2 concentrations.

The Municipal Systems Act (No.32) of 2000 requires that local government structures prepare Integrated Development Plans (IDPs) which guide the transformation of local governments toward facilitation and management of development within their areas of jurisdiction.

In terms of Section 15 (2) of the National Environmental Management: Air Quality Act (Act No.39 of 2004) (NEM: AQA), municipalities are mandated to include an Air Quality Management Plan (AQMP) in their IDPs. The AQMP provides definitive objectives, strategies, plans and procedures, for the relevant spheres of government to meet the requirements of the NEM: AQA, with respect to good air quality management planning and reporting.

The Pollution Control and Risk Management (PCRM) section of eThekwini Municipality Health Unit developed and implemented an AQMP in 2007 (NILU,2007). In terms of good practice, AQMP review is promoted through the National Framework for Air Quality Management (DEA, 2012a) and the Department of Environmental Affairs (DEA) Manual for Air Quality Management Planning (DEA, 2012b). eThekwini Municipality's Health Unit is therefore embarking on a project to assess, evaluate, review and update their AQMP.

uMoya-NILU Consulting (Pty) Ltd, a Durban-based air quality management consultancy, was appointed in 2014 to lead this project which spans 18 months and consists of four major components. These are i) facilitation of the public participation process, ii) review of the 2007 AQMP document and its implementation, iii) the description of the current state of air quality in the eThekwini Municipality and the identification of gaps, issues and challenges for air quality management and iv) the development of the AQMP document and the supporting implementation plan. This report addresses point (iv) and defines the *overall objective* of the

AQMP, the goals necessary to achieve the overall objective, and presents the supporting implementation plan.

Chapter 2 describes the AQMP development process. **Chapter 3** provides a summary of the air quality baseline assessment and **Chapter 4** emphasises the gaps and problems. The *Overall Objective* of the AQMP is presented in **Chapter 5** with the nine specific goals necessary to achieve the Overall Objective. The *Implementation Plan* is detailed in **Chapter 6**. **Chapter 7** presents the methodology for on-going monitoring of progress with implementation of the AQMP, evaluation of the efficacy of the interventions, and the AQMP review process.

2 AQMP DEVELOPMENT PROCESS

An AQMP is a strategic document with a vision and a goal that endeavour to ensure that air quality meets the requirements of Section 24 of the National Environmental Management Act (eThekwini Municipality) and Section 24 of the Bill of Rights, i.e. air quality that is not harmful to health and wellbeing. This implies that governance and management efforts are directed towards maintaining or improving air quality so that it complies with health based national ambient air quality standards (DEA, 2009 and 2012c).

An AQMP must seek to give effect to Chapter 3 of the NEM: AQA. It should aim to:

- 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

AQMP development is a dynamic process that is enhanced by active engagement with a wide range of stakeholders. The baseline assessment describes the current state of air quality in an area and the trends, identifying gaps and issues and recommendations to improve air quality and air quality service delivery. The baseline assessment is followed by the development of the implementation plan that involves setting a vision and overall objective, supported by short and long-term goals and objectives for the implementation of defined management measures. The six stages are described here:

Stage 1 includes the establishment of a stakeholder database and an assessment of baseline air quality. Stakeholders include amongst others the three spheres of government, parastatals, industry, planners, business, communities and non governmental organisations (NGOs). The establishment of the air quality baseline in the eThekwini Municipality includes

an assessment of climate and meteorological information, ambient monitoring data, emission inventory data, the existing air quality management capacity and practices in the eThekwini Municipality. Areas where ambient air quality standards are exceeded or may be exceeded are identified as potential areas of concern. The draft baseline assessment was presented to stakeholders at meetings in Tongaat, the old Durban International Airport and in Pinetown, followed by a comment period. The baseline assessment was revised accordingly.

Stage 2 is the gap and issue analysis which is based on findings of the baseline assessment and is informed by legislative requirements and stakeholder engagement. The draft gaps and issues were included in the baseline assessment report and presented to stakeholders at meetings in Tongaat, the old Durban International Airport and in Pinetown, followed by a comment period. The gaps and issues were revised in the final baseline assessment report.

Stage 3 is the initial phase of the development of the implementation plan and sets the strategic intent through establishing an overall objective and goals. A Logical Framework Assessment (LFA) methodology was used at a workshop involving a wide stakeholder to scope the context of the overall objective of the AQMP, and to develop the supporting goals.

Stage 4 considers the develoment of interventions that address each gap and issue that are SMART (Specific, Measurable, Achievable, Relevant, & Time based). Initial input was provided by stakeholders on desired interventions at the LFA workshop. Specific interventions were developed with stakeholders where implementation depends on their direct involvement.

Stage 5 focuses on the development of an implementation plan where accountability is assigned and timeframes for implementation are established. The implementation plan defines what needs to be done, how it should be done, who is responsible and when it will be done for each intervention.

Stage 6 addresses monitoring and reporting progress with implementaion of the AQMP and evaluating the success of the interventions. The process to review and update the eThekwini AQMP follows the process defined in the Manual for Air Quality Management Planning (DEA, 2012b) and is outlined in the National Framework illustrated in Figure 2-1 (DEA, 2012a).

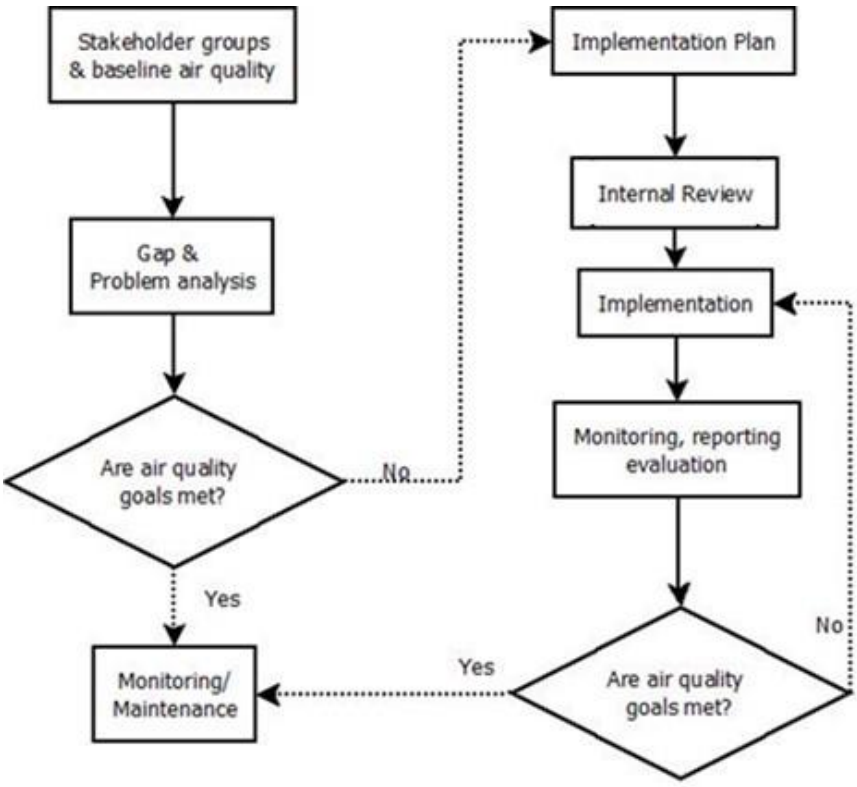

Figure 2-1: Schematic of the AQMP development process (after DEA, 2012b)

3 BASELINE AIR QUALITY IN ETHEKWINI MUNICIPALITY

The air quality baseline assessment for eThekwini Municipality emissions, ambient concentrations of pollutants and the capacity to manage air quality and is detailed in uMoya-NILU (2015). A summary is provided in the following sections.

3.1 Emissions

Emissions of priority pollutants in eThekwini result from a number of different source types. These include industrial facilities that are regulated in terms of their Atmospheric Emission Licenses, i.e. Listed Activities. They also include industrial facilities that operate medium-sized boilers, which are regulated as Controlled Emitters. Smaller facilities that operate Fuel Burning Devices of less than 10 MW heat input are regulated in terms of municipal by-laws. Transportation, which includes motor vehicles and activities in the Port of Durban and the King Shaka International Airport (KSIA) is an important source of emissions. Residential fuel burning is also a source of air pollutants as many homes do not have access to electricity in eThekwini Municipality. Here wood, coal, paraffin and gas are used for cooking, lighting and heating purposes. In the north, sugarcane burning is a seasonal source of air pollutants. There are a number of quarries in eThekwini, which are a source of dust.

A comprehensive emission inventory was developed as part of the baseline assessment, using 2012 as the reference year. The greatest emission from priority pollutants in eThekwini

Municipality is CO, totalling 154 089 tons per annum, with 97% of the emission attributed to transportation, dominated by motor vehicle emissions (Table 2-1). The total NO_X emission is 82 388 tons per annum, resulting primarily from transportation, and mostly heavy duty vehicles with a notable contribution from shipping and Listed Activities. The total SO_2 emission is 26 191 tons per annum with 73% of the emission attributed to industrial sources (Listed Activities and Controlled Emitters) with a significant contribution from transportation, notably shipping.

Table 3-1: Total emissions of air pollutants from the different source sectors in eThekwini in tons per annum

Sectors	SO_2	NO_x	CO	PM_{10}	VOC	Benzene
Listed Activities	13 197	5 090	2 482	2 036	5 307	68
Controlled Emitters	5 845	895	425	1 055	2	
Residential fuels	14	29	437	56		
Motor vehicles	1 585	68 292	147 327	2 439	24 642	38
Port of Durban	5 490	7588	1 898	33	2 421	2[1]
King Shaka IA	60	469	702	78[2]	112	
Biomass burning		25	818	68[2]	151	
Mining				100[2]		
Total	**26 191**	**82 388**	**154 089**	**5 865**	**32 635**	**108**

1: Benzene from storage tanks included in Listed Activities
2: Total particulates

By comparison with other pollutants, the total emission of PM_{10} is relatively low at 5 865 tons per annum. Collectively industrial sources account for 53% of the total PM_{10} emissions with motor vehicles accounting for 41% of the total emissions. The emission of total VOCs is 32 635 tons per annum with 75% from heavy duty vehicles and 16% from Listed Activities. Benzene constitutes 3.3% of the total VOC emission. Benzene emissions account for 108 tons per annum with Listed Activities accounting for 63% of the total emission, followed by light motor vehicles accounting for about 30% of the emission.

3.2 Ambient air quality

eThekwini Municipality started ambient air quality monitoring in the 1990's using smoke and SO_2 bubblers. This monitoring was augmented in 2005 with 14 fully automated ambient air quality monitoring stations. In 2013 the network expanded with a further four ambient monitoring stations, while the smoke and SO_2 bubbler stations continued to operate. The municipality has also done a number of monitoring campaigns. A good record therefore exists for the criteria pollutants, including SO_2, NO_2, CO, O_3, PM_{10} and benzene.

eThekwini experiences a high frequency of moderate to strong winds, being located on the coast. The influence of the warm Indian Ocean impedes the development of strong temperature inversions and air pollutants generally disperse well along the coast. Persistent inversions can develop inland, especially in valleys in the winter, when pollutants can

accumulate. Air quality in eThekwini is therefore relatively good in general, complying with NAAQS as a result of the meteorology and emission reduction measures by major industrial facilities. However, industry and motor vehicle emissions do result in exceedances of the NAAQS for PM_{10}, NO_2 and benzene. Most air quality complaints concern chemical odour south of the city.

Ambient air quality is informed by measured and predicted data. Monitoring data, where available in the eThekwini Municipality is presented. Using the emission inventory developed for the AQMP, dispersion modelling outputs present a complementary picture of air quality in the region. The CALPUFF dispersion model was used to estimate ambient concentrations of SO_2, NO_2 and particulates resulting from industrial emissions, the Port of Durban and the King Shaka International Airport.

Key points regarding ambient air quality are:

a) A dramatic decrease in ambient SO_2 in the South Industrial Basin in 2006 following the implementation of emission reduction measures by a number of large industrial facilities;
b) There is general compliance with the National Ambient Air Quality Standards (NAAQS) for SO_2 throughout eThekwini since 2006, except in the Umkomaas area where exceedances occur;
c) Ambient SO_2 concentrations from industrial facilities are predicted to exceed the NAAQS near the Port of Durban, in Clairwood, Jacobs, Wentworth, Merewent and at Umbogintwini;
d) There is general compliance with the NAAQS for NO_2 throughout eThekwini except in high traffic zones where exceedances of the limit value occur;
e) The background PM_{10} concentration in eThekwini is about 16 $\mu g/m^3$;
f) There is general compliance with the NAAQS for PM_{10} throughout eThekwini except in high traffic zones where exceedances occur. The number of exceedances has however decreased following the phase-in of clean diesel;
g) Annual ambient concentrations of benzene are relatively high in high traffic zones and in the vicinity of Umlaas Canal which is impacted on by industrial emissions and the Southern Treatment Works;
h) The background O_3 concentrations in eThekwini are relatively high and exceedances of the NAAQS have occurred;
i) Ambient CO concentrations in eThekwini are low relative to the NAAQS;
j) Ambient lead concentrations are very low throughout eThekwini relative to the NAAQS;
k) The combination of a number of sources of dust in the Coedmore Road area result in nuisance and quality of life issues;
l) Most air pollution related complaints received by eThekwini Municipality relate to emissions and to chemical smell; and
m) Most complaints received are in the South 3, South 4 and North 1 sub-districts.

3.3 Capacity for air quality management

eThekwini Municipality has excelled in fulfilling the requirements of the NEM: AQA, at times under challenging conditions and without the appropriate institutional structures. However, the management of air quality in the eThekwini Municipality continues to increase in complexity with growth and development in the municipality. The improvement of technical skills and interdisciplinary studies should be driven by an overarching strategy that is robust and holistic. For the eThekwini Municipality to evolve into a multi-faceted, technically strong and diverse group of Air Quality Management professionals there are gaps that need to be addressed and challenges which need to be overcome, these are highlighted in Table 2-2.

Table 3-2: Summary of the baseline capacity at eThekwini for air quality management considering the components capacity

Assessment	Function/responsibility
Structure	The Air Quality Officer was designated in 2011
	The Air Quality Management function is in the Health Department
	Reporting and communication lines are defined
	The organogram is outdated
Systems	A defined approach for Air Quality Management is limited
	Performance indicators for Air Quality Management exist
	The emission inventory has been updated but gaps exist
	Ambient air quality monitoring is comprehensive, but old
	Data are managed via an air quality data management system
	Atmospheric emission licensing function is established and in operation
	Controlled Emitters are regulated in terms of Schedule Trade Permits
	Air quality by-laws are in draft
Skills	Suitability of staff profiles is mostly in monitoring and related activities
	Departmental learning processes are available
	Skill sharing opportunities are limited
	Technical skills development are limited
	Management skills development is limited
Incentives	A conducive culture and work environment exists
	Opportunities for career growth are limited
	Established partnerships are limited
	There is no external funding to support the function
Strategy	AQMP review is in progress
	AQMP implementation is limited to mandated function
	Vision, mission internalisation is limited
	Flexibility of strategy is limited
Interrelationships	Internal working partnerships exist
	External working partnerships exist
	Working relationship with other organisations exists

4 GAP AND PROBLEM ANALYSIS

The baseline assessment showed that the air quality management requirements of the NEM: AQA are being met in eThekwini. There is a dedicated section for air quality management in the eThekwini Municipality. An AQO has been designated and staff are competent and confident in their abilities to fulfil the AQM function. An Air Quality Officer (AQO) has been designated, the municipality has a dedicated air quality management section and the AEL function is being performed. In addition, the ambient air quality monitoring network is being upgraded and expanded to other parts of the municipality besides the South Industrial Basin. Ambient air quality data is processed and archived, and is critical to directing AQM activities and ensuring that impacts on human and environmental health and well-being are reduced. The AEL function is performed, and routine reporting occurs, ensuring compliance of Listed Activities.

The baseline assessment also highlighted gaps, issues and challenges in air quality management in eThekwini Municipality that inhibit fulfilment of the mandate and should be addressed in the AQMP. These are listed in Table 4-1 for the different aspects of air quality.

Table 4-1: Gaps, issues and challenges for air quality management in eThekwini Municipality

Air quality aspect	Gaps, issues and challenges
Capacity	The structure for the air quality function is not ideal: • It is based on a dated organogram that does not account for mandated functional requirement of the NEM: AQA; • Vacancies exist on the organogram, but job descriptions for the posts do not account for mandated functional requirement of the NEM: AQA; • Mandated functional requirement of the NEM: AQA has increased the work load without staff numbers increasing; • There is a risk of appointing staff with inappropriate skills if the current organogram and job descriptions are used as the benchmark.
	Systems for AQM in eThekwini are lacking: • Emission inventory is incomplete; • Ambient monitoring equipment is old and there are procedural shortcomings; • The is no dispersion modelling capability; • The AEL function is not recognised in the organogram.
	Skills on incumbent staff for air quality management are limited: • Skills exist mostly in ambient monitoring and data management, AELs and reporting; • There are limited opportunities for skills sharing as well as technical and management training.
	Incentives for air quality management are driven by resources to perform the function: • The function has been expanded by the mandated requirements of the NEM: AQA;

Air quality aspect	Gaps, issues and challenges
	• Financial resources for the function are currently limited to the available municipal budget; • Available financial resources inhibit function.
Human health	The health study in eThekwini Municipality showed persistent asthma in children was higher in the south than in the north.
	Other than in the South Durban Basin the health status is less well understood.
	The health status in eThekwini Municipality has not been updated since 2006, prior to the marked SO_2 reductions.
Emissions	The emissions for 2012 developed for the baseline assessment includes information for 84 industrial facilities that hold AELs: • AELs have not been issued to all facilities with Listed Activities so not all sources are included; • Emission testing has not been done at all facilities and emissions have not been estimated; • Emissions of SO_2, NO_X, PM_{10} and VOC from Listed Activities are significant; • Most emissions result from the pulp and paper sector, crude oil refining, the metallurgical sector and sugar milling and refining.
	The Controlled Emitter database: • Information is available in the database for 13 facilities operating 33 boilers; • Not all Controlled Emitters are included; • Most emissions result from coal and (heavy fuel oil) HFO combustion.
	Motor vehicles: • Heavy duty vehicles are significant sources of PM_{10}, CO and NO_X in eThekwini; • Light motor vehicles are a source of benzene emissions; • Emissions from motor vehicles are concentrated in Durban and Pinetown, with lesser emissions elsewhere; • Motor vehicle emissions are estimated using a top-down approach for 9 areas in eThekwini, providing a reasonable coarse estimation.
	The Port of Durban: • Emission is based on 2009 data using the Intergovernmental Panel on Climate Change (IPCC) Tier 1 methodology; • Port of Durban is a major source of SO_2, NO_X and VOCs; • Information from a number of sources in the chemical cluster was omitted from the inventory.
	Airports: • KSIA is not a major source of emission in eThekwini; • Emissions were not estimated for small airports.
	Residential fuel burning: • Emissions of NO_X and PM_{10} from residential fuel burning are relatively small in eThekwini.
	Biomass burning: • Emissions of CO and PM from sugarcane burning are seasonal and relatively small in eThekwini;

Air quality aspect	Gaps, issues and challenges
	• Sugarcane burning is common practice and occurs in close proximity to residential and commercial properties, resulting in nuisance impacts.
	Waste management: • Emissions of air pollutants from Wastewater Treatment Works (WWTW) and landfills are relatively small; • The impacts are mostly nuisance related and are localised.
	Mining: • Emissions of particulates from mining are relatively small; • The impacts are mostly nuisance related and are localised.
Ambient monitoring	A number of technical shortcomings were identified during a supporting study, including: • The monitoring network plan is outdated; • It is not necessary to perform meteorological monitoring at so many locations; • There is no formal QA/QC system in place that documents operational procedures and the basis for the establishment of the monitoring network; • The municipality does utilise a SANAS accredited laboratory, but the calibrations are only performed annually; • External audits performed as a means of independently verifying eThekwini Municipality monitoring activities.
Ambient modelling	Air quality modelling is not used to inform decisions in eThekwini Municipality.
	eThekwini Municipality does not have a modelling capability.

5 OVERALL OBJECTIVE AND GOALS OF THE AQMP

5.1 Overall objective

The overall objective of the 2015 AQMP recognises that:

i. AQM is a municipal responsibility and function

ii. Effective AQM is underpinned by cooperative governance and stakeholder involvement.

iii. Ambient air quality is poor in some parts of the eThekwini Municipality and protection of air quality implies management to improve quality of life in these areas while maintaining the status quo in others.

iv. eThekwini Municipality is a key manufacturing hub that will continue to develop.

v. AQM in the eThekwini Municipality is strategic with regards to future development.

vi. There are co-benefits between AQM and Climate Change imperatives.

The Overall Objective for the 2015 AQMP therefore states that:

> ***eThekwini Municipality manages ambient air quality to protect human and environmental health within a framework of sustainable development***

The following definitions apply:

i. *eThekwini Municipality* means the Health Unit's Pollution Control and Risk Management (PCRM) Unit and supporting structures.

ii. *Manages* means carrying out all functions dictated by the National Framework for AQM (DEA, 2012a), the NEM: AQA and municipal air quality bylaws through cooperative governance and active stakeholder engagement.

iii. *Ambient air* excludes air regulated by the Occupational Health and Safety Act (Act 85:1993).

iv. *Protection of human and environmental health* refers to Section 24 (b) of the Constitution (Act No. 108 of1998) that aims to enhance the quality of ambient air to secure an environment that is not harmful to the health and well-being of people.

v. *Sustainable development* promotes justifiable economic and social development through the application of reasonable measures to reduce environmental degradation and pollution.

5.2 Goals

The Overall Objective will be achieved through the attainment of eight associated goals that address compliance with the NAAQS associated with current and future activities, the six aspects of capacity for air quality management (structure, systems, skills, incentives, systems and tools, and inter-relationships), and air quality awareness. The goals are defined in Table 5-1 with supporting context.

Table 5-1: Goals supporting the Overall Objective of the 2015 AQMP for eThekwini

Goal 1: Ambient air quality is compliant with the NAAQS in eThekwini Municipality *Goal 1 focuses on appropriate interventions to achieve compliance with the NAAQS in areas where exceedances occur and to maintain the air quality status quo elsewhere, considering the principles of sustainable development. Goal 1 also aims to answer questions on the impact of air pollution in eThekwini to inform decision making regarding current activities and proposed development projects*
Goal 2: The AQMP is incorporated municipal policy and planning *Goal 2 recognises that the AQMP needs to be integrated into related municipal policy and in planning mechanisms such as the Integrated Development Plan to realise buy-in, support and implementation success*
Goal 3: Municipal structure facilitates the implementation of the AQMP *Goal 3 recognises that the municipal structure and the structure of the PCRM unit, as well as roles, responsibilities and lines of communication need to be clearly defined for successful implementation of the AQMP*
Goal 4: eThekwini Municipality has the necessary skills to implement the AQMP *Goal 4 refers to the skills needed by incumbent staff to perform their mandated functions and addresses career development through training and other mechanisms*
Goal 5: eThekwini Municipality has the necessary incentives to implement the AQMP *Goal 5 concerns securing adequate funds for the function and incentivising staff through motivational policies at an organisational and individual level to achieve the overall objective of the AQMP*
Goal 6: eThekwini Municipality has the necessary systems and tools to implement the AQMP *Goal 6 aims to enhance existing systems and tools and to develop others where necessary to achieve the overall objective of the AQMP. Included are emission inventories, ambient monitoring, dispersion modelling, information management, compliance and enforcement and complaints management*
Goal 7: AQM in eThekwini Municipality is supported participatory decision making *Goal 7 acknowledges that AQM is an interdisciplinary field and requires participatory decision making, which is dependent on the relationships within the municipality, other spheres of government and external stakeholders*
Goal 8: Awareness of AQM in eThekwini Municipality is open and transparent *Goal 8 aims to update stakeholders on progress with AQMP implementation, to improve communication amongst stakeholders, and improve general understanding of air quality in the municipality*

The association between the AQMP goals is important to note. For example, for the AQMP to be incorporated municipal policy and planning (Goal 2), it is necessary that the Municipal structure facilitates the implementation of the AQMP (Goal 3), and that awareness of AQM in eThekwini Municipality is open and transparent (Goal 8). The nature of the association is explicit in the next section, in the AQMP's Implementation Plan.

6 IMPLEMENTATION PLAN

The realisation of the *Overall Objective* of eThekwini's AQMP over its 5-year lifespan is guided by the *Implementation Plan*. The *Implementation Plan* addresses each *Goal* by defining outcomes-based *Objectives* and the *Activities* necessary to achieve the objectives.

The *Implementation Plan* is structured to provide strategic input to the annual business planning of executing departments in eThekwini Municipality and of other stakeholders, which in turn, informs the respective operational planning.

The so-called SMART principles are applied, i.e. the Implementation Plan should be:

Specific: To address specific air quality management issues;
Measurable: Provide indicators to monitor progress with implementation;
Assignable: Specify responsibilities for executing the plan;
Realistic: Address issues that can realistically be achieved, given available resources;
Time-related: Specify when result(s) can be achieved.

The different components of the *Implementation Plan* are described in the following sections.

6.1 Objectives and activities

For the implementation of the AQMP, each goal is addressed through SMART out-comes based objectives which focus on specific aspects for each goal. In turn, the objectives are addressed through the definition of the sequential activities that need to be undertaken to realise the objective. The objectives and related activities for each goal in the Implementation Plan are presented in Tables 6-1 to 6-9.

6.2 Roles and responsibilities

Air quality management is the mandated function of the PCRM Unit. Air quality management is influenced by a range of stakeholders. The implementation of the AQMP therefore depends on PCRM and the participation of other role players. Responsibilities for executing the work required of each activity are defined in Tables 6-2 to 6-9. Note that municipal posts referred to in the Implementation Plan may not currently exist. They are posts required in a revised structure for effective implementation of the AQMP. The role players referred in Tables 6-2 to 6-9 are:

PCRM Head	Ultimately responsible for the implementation the AQMP, reports to Council and Senior Management
AQO	Responsible for managing PCRM resources and air quality management in eThekwini
PCRM Network Manager	Responsible for ambient monitoring and data
AEL Team Leader Team Leader (TL)	Responsible for the AEL function
PCRM Emission TL	Responsible for the emission inventory development and maintenance function
PCRM Modelling TL	Responsible for the dispersion modelling function
PCRM Complaints Management	Responsible for the complaints management and reporting
Permitting Officer	PCRM official responsible for permitting
Health IT	Health Depts. Unit for Information Technology Management
DSW	Durban Solid Waste
EWS	eThekwini Department of Water and Sanitation
ETA	eThekwini Transport Authority
HR	eThekwini unit for Human Resource Management
UKZN	University of KwaZulu-Natal's Nelson Mandela Medical School
eThekwini Legal Department	Responsible for by-law drafting and legal support in enforcement action
Industry representatives	Official mandated to act on behalf of an industrial facility and agree on emission control and reduction initiatives

6.3 Time frames

Time frames are defined for the implementation of the AQMP over its 5-year term. They provide input to the annual business planning, which in turn, informs operational planning. The timeframes provide for a phased implementation of the AQMP, accounting for priority activities and those with longer lead times. The defined time frames are:

Daily, monthly or annually	Refers to the frequency of task execution
Year 1, 2, 3, 4, or 5	Considers resource requirements of activities, the available or incumbent resources, and provides input to annual business, CAPEX and OPEX planning

The time required to undertake each activity is defined in Tables 6-2 to 6-9.

6.4 Indicators

Indicators are designed to be easily interpreted and focus on outcomes. Indicators offer a means of measuring progress with implementation and reporting on progress. The indicators for each activity are defined in Tables 6-2 to 6-9.

6.5 Cost estimate

Indicative cost is also provided for each activity in the Implementation Plan, to guide annual planning for operational and capital budgets. Three cost bins are defined in Table 6-1. The estimated cost per activity is shown in Tables 6-2 to 6-9.

Table 6-1: Cost bins for the eThekwini AQMP

Cost bin 1: No cost (included in normal operational budgets)	
Cost bin 2: Legislative requirement (No additional cost because of the AQMP, but part of functions as stipulated by law and funded from operational budget)	
Cost bin 3: Additional cost (Estimated cost)	

6.6 Implementation tables

The Implementation Plan for the AQMP is detailed in the Implementation Tables for each Goal (Tables 6-2 to 6-9). These provide objectives, activities, responsibility, timeframes, and indicator and the estimated cost.

Table 6-2: Implementation table for Goal 1 - Ambient air quality is compliant with the NAAQS in eThekwini Municipality

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated costs
1.1 Ambient concentrations of air pollutants comply with NAAQS in the Umkomaas area	1.1.1 Identify a site and deploy the mobile monitoring unit to improve the understanding of ambient concentrations of $S0_2$ and other pollutants	PCRM Network Manager	Year 1	Site identified and station deployed	Additional cost < R50k Calibration and siting costs
	1.1.2 Operate the mobile unit for 12 months at the selected site	PCRM Network Manager	Year 1	12 monthly air quality reports	Additional cost approximately R250k Running costs
	1.1.3 Conduct dispersion modelling to improve the understanding of the ambient non-compliance.	AQO, PCRM Dispersion TL	Year 1	Dispersion modelling report	Operational budget
	1.1.4 Evaluate possible interventions using dispersion modelling that will reduce ambient concentrations.	AQO, PCRM Dispersion TL, Industry representatives	Year 1	Peer reviewed intervention report	Additional cost < R100k Peer review costs
	1.1.5 Amend AELs to include the identified interventions	AQO, AEL TL, Industry representatives	Year 1	Amended AEL	Legislative requirement
	1.1.6 Monitor implementation of the interventions through AEL compliance monitoring.	AQO, AEL TL	As dictated by the AEL	Compliance monitoring reports	Legislative requirement
1.2 Ambient benzene concentrations in Jacobs comply with the NAAQS	1.2.1 Verify that the latest emission reduction measures at industries in Jacobs result in compliance with the NAAQS	AQO, AEL TL, Industry representative	Year 1	Verification reports	Legislative requirement
	1.2.2 Monitor implementation of the emission reduction measures through AEL compliance monitoring.	AQO, AEL TL	Year 1 to 5	Compliance monitoring reports	Legislative requirement
1.3 Ambient benzene concentrations comply with the NAAQS in the refinery corridor	1.3.1 Augment existing information on benzene emissions from the Petrochemical Industry in the emission inventory	PCRM Emission TL, Industry representatives	Year 1	Emission inventory complete	Operational budget
	1.3.2 Estimate emissions of benzene from the Southern Treatment Works	PCRM Emission TL, EWT	Year 2	Emission inventory complete	Operational budget
	1.3.3 Use the dispersion model to apportion ambient benzene concentrations from contributing sources	AQO, Industry representatives, PCRM Modelling TL	Year 2	Source apportionment report	Operational budget

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated costs
	1.3.4 Identify interventions to reduce benzene emissions from the Petrochemical Industry	AQO, Industry representatives, PCRM Emission TL, DCMR cooperation	Year 2	Peer reviewed intervention report	Operational budget
	1.3.5 Identify interventions to reduce benzene emissions from the Southern Treatment Works	AQO, EWS	Year 2	Peer reviewed intervention report	Operational budget
	1.3.6 Enforce mechanisms to implement interventions for the Petrochemical Industry through the AEL	AQO, AEL TL Leader, Industry representatives	Year 2	Amended AEL	Legislative requirement
	1.3.7 Monitor implementation of those interventions for the petrochemical industry through AEL compliance monitoring.	AQO, Permitting officer	Year 1 to 5	Compliance monitoring reports	Legislative requirement
	1.3.8 Recommend implementation of findings of intervention report at Southern Treatment Works	AQO, EWS	Year 3	Action of intervention report recommendations	Operational budget
	1.3.9 Monitor progress with implementation of interventions at Southern Treatment Works	AQO, EWS	Year 3 to 5	Progress report	Operational budget
1.4 Dustfall in the Coedmore area complies with acceptable dustfall limits for residential areas	1.4.1 Consolidate and review all available ambient dust information from contributing sources	PCRM, Network Manager	Year 2	Review report	Operational cost
	1.4.2 Enforce the implementation of the dust management plans that is in line with BAT at the Listed Activities	AQO, Permitting Officer, DEA (for BAT)	Year 1 to Year 5	Compliance monitoring reports	Legislative requirement
	1.4.3 Verify the progress with implementation of the dust management plans at Listed Activities	AQO, Licencing officer, Industry representatives	According to AEL conditions	Compliance monitoring reports	Legislative requirement
	1.4.4 Assess the efficacy of the of the dust management plan for listed Activities	AQO, Licencing officer, Industry representatives	Year 1 to Year 5	Audit Report	Legislative requirement
	1.4.5 Include the dust management plans at facilities with Schedule Trade Permits	Permitting Officer	Year 1	Amended Schedule Trade Permit	Legislative requirement

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated costs
	1.4.6 Enforce the implementation of the dust management plan that is in line with BAT through the Schedule Trade Permits	Permitting Officer, DEA (for BAT)	Year 1 to Year 5	Compliance monitoring reports	Legislative requirement
	1.4.7 Verify the progress with implementation of the dust management plans at facilities with Schedule Trade Permits	Permitting Officer	Year 1 to Year 5	Audit Report	Legislative requirement
	1.4.8 Establish a working committee to explore opportunities of re-routing trucks from the Coedmore complex directly to the N2	Health, PCRM, ETA, Industry representatives, SANRAL, Industrial Forum, Affected Communities	Year 2	Working committee established	Additional cost < R50k Running costs
1.5 Impacts of sugarcane burning on ambient air quality in eThekwini are reduced	1.5.1 Amend the draft air quality by-laws to include the regulation of sugar cane burning	AQO, eThekwini Legal Dept., SASRI, Cane Growers	Year 1	Burning code of practice amended	Legislative requirement
	1.5.2 Work with growers to ensure that complaints regarding cane burning are submitted to PCRM	AQO, PCRM Complaints Management, Cane Growers	Year 1 to Year 5	Complaints registers submitted	Operational cost
1.6 Impacts of odour are reduced in eThekwini	1.6.1 Update the 2008 odour management strategy	PCRM Head, AQO, PCRM Network Manager, Permitting Officer	Year 2	Revised odour management strategy	Operational cost
	1.6.2 Implement the revised strategy in PCRM using lessons learnt from the DCRM cooperation	AQO, PCRM Network Manager, Permitting officer	Year 2 to Year 5	Inventory of odour sources	Operational cost
	1.6.3 Work with stakeholders in the area to identify sustainable interventions	AQO, Permitting Officer, Facility official	Year 2	Revised AELs include interventions	Legislative requirement
	1.6.4 Enforce the agreed interventions through the appropriate legislation	AQO, Permitting Officer	Year 2 to Year 5	Audit report	Legislative requirement
	1.6.5 Monitor implementation of those interventions through compliance monitoring.	AQO, Permitting Officer	Year 2 to Year 5	Audit Report	Legislative requirement

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated costs
1.7 The health baseline in the South Durban Basin is confirmed	1.7.1 Set the terms of reference for a revision of the 2006 health study	PCRM Head, AQO, UKZN, DUT	Year 2	Terms of reference set	Operational cost
	1.7.2 Source funding for the revised health study	PCRM Head, AQO	Year 2	Funding secured	Operational cost
	1.7.3 Issue Request for Proposal	PCRM Head, AQO	Year 2	RFP issued	Operational cost
	1.7.4 Appoint service provider	AQO, SCM	Year 3	Service provider appointed	Operational cost
	1.7.5 Monitor project implementation	AQO	Year 3 and 4	Project progress reports	Additional cost R3M to R5M specialist study
1.8 Traffic emissions are mitigated through sustainable interventions	1.8.1 Identify sensitive receptor areas (e.g. schools) impacted by traffic emissions using tools such as monitoring data, traffic data, GIS and dispersion modelling	PCRM Modelling TL, eThekwini GIS, ETA	Year 3	List of areas in order of priority	Operational cost
	1.8.2 Research approaches to reduce the impacts of traffic emissions, including natural screens such as trees or manmade screens	PCRM	Year 3 to year 5	Assessment report	Operational cost
	1.8.3 Develop a strategy to mitigate the impacts of traffic emissions in sensitive areas	PCRM, ETA, Parks Recreation & Culture, Land Use Management	Year 3	List of areas in order of priority	Operational cost
	1.8.4 Work with relevant traffic and infrastructure planning to implement measures to reduce the impact of vehicle emissions at the identified sensitive receptor areas	PCRM, ETA, Parks Recreation & Culture, Land Use Management	Year 2 to Year 5	Progress report	Additional cost < R50k Running costs
	1.8.5 Conduct ambient monitoring campaigns to assess the efficacy of the implemented measures	PCRM, Network manager	Year 2 to Year 5	Monitoring Report	Additional cost approximately R200k Ambient monitoring
1.10 Regional scale transport of pollutants and the effects on air quality in the municipality are better understood	1.10.1 Use data from background monitoring stations to assess regional PM_{10} input to eThekwini	Network manager	Year 1 and 2	Report on regional scale transport	Operational costs
1.11 The potential impacts of development projects on ambient air quality	1.11.1 Use dispersion modelling to predict potential impacts of development projects on ambient	AQO, PCRM	Year 3 to Year 5	Assessment report	Operational costs

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated costs
in eThekwini municipality are mitigated	air quality, including cumulative impacts				
	1.11.2 Use dispersion modelling to evaluate development alternatives to mitigate the direct and cumulative impacts	AQO, PRCM	Year 2 to Year 5	Assessment report	Operational costs
	1.11.3 Work with stakeholders to find alternative scenarios to mitigate impacts on air quality	AQO, Spatial planning, ETA, SANRAL, KZN Roads Department	Year 2 to Year 5	Development plans contain alternative scenarios	Operational costs

Table 6-3: Implementation table for Goal 2 - The AQMP is incorporated municipal policy and planning

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
2.1 The objectives of the AQMP are supported by council	2.1.1 Prepare presentation on status quo assessment and AQMP implementation progress	Head PCRM	Year 1, then twice annually	Record of presentation	Operational costs
	2.1.2 Present AQMP implementation progress to council	Head PCRM	Year 1, then twice annually	AQMP implementation prioritised in council minutes	Operational costs
2.2 The objectives of the AQMP are supported by senior management	2.2.1 Prepare presentation on AQ status quo in eThekwini, gaps and challenges	Head PCRM	Year 1	Record of presentation	Operational costs
	2.2.2 Present AQ status quo in eThekwini, gaps and challenges to senior management	Head PCRM	Year 1	Gaps and issues prioritise in management minutes	Operational costs
	2.2.3 Present AQMP implementation progress to senior management	Head PCRM	Year 1, then twice annually	AQMP implementation priorities in senior management minutes	Operational costs
2.3 The AQMP is included in the IDP	2.3.1 Prepare submission for the annual IDP revision of AQMP objectives for the coming year	Head PCRM	Year 1, then in the annual IDP Review	Record of submission	Legislative requirement
	2.3.2 Work with the IDP drafting team to include AQMP objectives in the IDP	Head PCRM	Year 1, then in the annual IDP Review	AQMP objectives included in the IDP for the coming year	Legislative requirement
2.4 Departmental business planning considers the objectives of the AQMP	2.4.1 Use the AQMP and implementation plan to advise the development of the annual business plan for PCRM	Head PCRM	Year 1	PCRM business plan informed by the AQMP	Operational costs
	2.4.2 Establish inter-departmental forum for AQM that includes ETA, DSW, EPCPD and DSS	Head PCRM	Year 1	Forum established	Operational costs
	2.4.3 Present objectives of the AQMP and implementation plan to forum. Workshop cross cutting issues, where other departments affect air quality or they have stakeholder interests	Head PCRM	Year 1	Workshop minutes	Operational costs

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
	2.4.2 Use the AQMP and implementation plan to advise the development of the annual business plan for municipal other departments	Departmental heads	Year 1	Departmental business plans include the relevant objectives of the AQMP	Operational costs

Table 6-4: Implementation table for Goal 3 - Municipal structure facilitates the implementation of the AQMP

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
3.1 eThekwini Municipality Health structures facilitates the implementation of the AQMP	3.1.1 Motivate to senior management to revise the existing structure to include all the functional requirements of the AQA in a single section	Head PCRM	Year 1	Motivation prepared	Operational costs
	3.1.2 Advise senior management on changes necessary to municipal structure	Head PCRM	Year 1	Record of presentation to Municipality	Operational costs
3.2 The structure of PCRM facilitates the implementation of the AQMP	3.2.1 Revise the organogram for AQM to include all functional requirements of the AQA in a single section, including regional functions	Head PCRM, AQO	Year 1	Revised organogram	Operational costs
	3.2.2 Develop roles and responsibilities of each section in the organogram in terms of the mandated function	Head PCRM, AQO	Year 1	Roles and responsibilities defined	Operational costs
	3.2.3 Establish reporting lines for each section in the organogram and within each section	Head PCRM, AQO	Year 1	Reporting lines defined	Operational costs

Table 6-5: Implementation table for Goal 4 - eThekwini Municipality has the necessary skills to implement the AQMP

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
4.1 There is sufficient human resource capacity in eThekwini to meet the mandated requirements for AQM	4.1.1 Perform an analysis of incumbent staff and the desired compliment according to the revised organogram	Head of PCRM, AQO	Year 1 and Year 2	Gap analysis	Operational costs
	4.1.2 Embark on a recruitment campaign to fill the identified posts	AQO, HR	Year 1 and Year 2	All post in organogram filled	Operational costs
	4.1.3 Establish career development plans for all PCRM staff	AQO, HR, PCRM staff	Year 1 and Year 2	Career developments plans for all staff	Operational costs
	4.1.4 Establish and maintain mentorship programmes between senior and junior staff, according to Career Development Plans	Head of PCRM, AQO, HR, PCRM staff	Year 1 to Year 5	Mentorship programs established	Operational costs
	4.1.5 Establish mechanisms for the sharing and transfer of skills, e.g. on-the-job training, secondments, etc. according to Career Development Plans	Head of PCRM, AQO	Year 1 to Year 5	Mechanisms established	Operational costs
4.2 The human resource capacity in eThekwini is appropriately skilled to meet the mandated requirements for ambient air quality monitoring	4.2.1 Identify appropriate training mechanisms to meet the needs of the ambient monitoring in the eThekwini Municipality and individual Career Development Plan requirements	AQO, Network Manager, HR	Year 1	Training included in Career Development Plans	Operational costs
	4.2.2 Include ambient air monitoring training for individuals as per career development plans in PCRM business planning and budgeting	PCRM Head, AQO, Network Manager	Year 1	Training budget in PCRM annual business plan	Operational costs
	4.2.3 Undertake training as per Career Development Plans	PCRM monitoring staff	As per Career Development Plans	Course completion certificate	Additional cost <R50k per staff member
	4.2.4 Monitor progress with career development in ambient air quality monitoring	Network Manager	Year 1 to year 5 as part of staff performance evaluation process	Performance evaluation report	Operational costs

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
4.3 The human resource capacity in eThekwini is appropriately skilled to meet the mandated requirements for ambient air quality modelling	4.3.1 Identify appropriate training mechanisms to meet the requirement of the DEA regulations for dispersion modelling and individual Career Development Plan requirements	AQO, HR	Year 1	Training included in Career Development Plans	Operational costs
	4.3.2 Include ambient air quality modelling training for individuals as per career development plans in PCRM business planning and budgeting	PCRM Head, AQO	Year 1	Training budget in PCRM annual business plan	Operational costs
	4.3.3 Undergo dispersion modelling training according to Career Development Plans	PCRM modelling staff	As per Career Development Plans	Course completion certificate	Additional cost <R50k per staff member
	4.3.4 Monitor progress with career development in ambient air quality modelling	AQO	On-going as part of staff performance evaluation process	Performance evaluation report	Operational costs
4.4 The human resource capacity in eThekwini is appropriately skilled to meet the mandated requirements for the maintenance of the emission inventory	4.4.1 Identify appropriate training mechanisms to meet the reporting and auditing requirements of the National Atmospheric Emission Inventory System and individual Career Development Plan requirements	AQO, HR	Immediate	Training included in Career Development Plans	Operational costs
	4.4.2 Include emission inventory training for individuals as per career development plans in PCRM business planning and budgeting	PCRM Head, AQO, PCRM Emission Inventory TL	Immediate	Training budget in PCRM annual business plan	Operational costs
	4.4.3 Undergo emission inventory training according to Career Development Plans	PCRM emission inventory staff	As per Career Development Plans	Course completion certificate	Additional cost <R50k per staff member
	4.4.4 Monitor progress with career development in emissions inventories	AQO, PCRM Emission Inventory TL	On-going as part of staff performance evaluation process	Performance evaluation report	Operational costs

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
4.5 The human resource capacity in eThekwini is appropriately skilled to meet the mandated requirements for the maintenance and management of the ambient air quality data base	4.5.1 Identify appropriate training mechanisms for database management to meet the requirements of the norms and standards for reporting ambient air quality data and individual Career Development Plan requirements	AQO, HR	Immediate	Training included in Career Development Plans	Operational costs
	4.5.2 Include data management training for individuals as per career development plans in PCRM business planning and budgeting	PCRM Head, AQO, Network Manager	Immediate	Training budget in PCRM annual business plan	Operational costs
	4.5.3 Undergo data management training according to Career Development Plans	PCRM data management staff	As per Career Development Plans	Course completion certificate	Additional cost <R50k per staff member
	4.5.4 Monitor progress with career development in data management	AQO, Network Manager	On-going as part of staff performance evaluation process	Performance evaluation report	Operational costs
4.6 The human resource mechanism in eThekwini is appropriately skilled to meet the mandated requirements for tracking compliance and enforcement of national legislation and by-laws	4.6.1 Include EMI training for individuals, as per career development plans, in PCRM business planning and budgeting	PCRM Head, AQO, AEL TL	Immediate	Training budget in PCRM annual business plan	Operational costs
	4.6.2 Staff undergo EMI training according to individual Career Development Plan requirements	Permitting Officers, PCRM AEL staff	Immediate	Course completion certificate	Additional cost <R50k per staff member
	4.6.3 Monitor progress with EMI career development	AQO, AEL TL	On-going	Performance evaluation report	Operational costs
	4.6.4 Enhanced capacity in the Legal Dept. to support compliance and enforcement activities of the AQM function	PCRM, Legal Dept.	Immediate, then on-going	PCRM team proficiently assisted by Legal Department on air quality enforcement issues	Included in OPEX

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
4.7 The human resource capacity in eThekwini is appropriately skilled to implement the odour management strategy	4.7.1 Identify appropriate training mechanisms to meet the needs of the revised odour management strategy and individual Career Development Plan requirements	AQO, HR	Immediate	Training included in Career Development Plans	Operational costs
	4.7.2 Include training for odour management for individuals as per career development plans in PCRM business planning and budgeting	PCRM Head, AQO	Immediate	Training budget in PCRM annual business plan	Operational costs
	4.7.3 Undertake training in odour management as per Career Development Plans	PCRM odour management staff	As per Career Development Plans	Course completion certificate	Additional cost <R50k per staff member
	4.7.4 Monitor progress with career development in odour management	AQO, PCRM Odour Management TL	On-going as part of staff performance evaluation process	Performance evaluation report	Operational costs
4.8 AQM in eThekwini is supported by appropriately skilled administrative personnel	4.8.1 Develop in-house training mechanisms to capacitate support staff in air quality management, according to individual Career Development Plans	AQO, HR	Immediate	Training included in Career Development Plans	Operational costs
	4.8.2 Include training for support staff in PCRM business planning and budgeting	PCRM Head, AQO	Immediate	Training budget in PCRM annual business plan	Operational costs
	4.8.3 Undertake training in AQM support functions according to Career Development Plans	PCRM support staff	As per Career Development Plans	Course completion certificate	Additional cost <R50k per staff member
	4.8.4 Monitor progress with training in AQM support	AQO	On-going as part of staff performance evaluation process	Performance evaluation report	Operational costs

Table 6-6: Implementation table for Goal 5 - eThekwini Municipality has the necessary incentives to implement the AQMP

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
5.1 eThekwini Municipality has the financial resources to implement all aspects of the AQMP	5.1.1 Secure annual OPEX and CAPEX through municipal planning and budget processes	Head of PCRM	Immediate, than annually	Budget secured	Operational costs
	5.1.2 Motivate for the use of funds derived from the AEL processing fee to implement the AQMP	Head of PCRM	Immediate	Motivation submitted	Operational costs
	5.1.3 Revise the Air Quality by-law to ensure that AEL fees are payable to PCRM for implementation of the AQMP	Head of PCRM, Legal Dept.	Year 1	By-law revised	Operational costs
	5.1.4 Identify appropriate external funding sources for projects not funded by OPEX and CAPEX (see Goal 1)	Head of PCRM, AQO	Annually	List of potential funders	Operational costs
	5.1.5 Develop proposals to secure external funding for projects not funded by OPEX and CAPEX (See Goal 1)	Head of PCRM, AQO	Annually	Proposals submitted	Operational costs
	5.1.6 Track proposal evaluation process	AQO	As required	Feedback provided	Operational costs
5.2 eThekwini Municipality offers stimulating and challenging career opportunities in the field of air quality	5.2 1 Deploy staff to perform tasks they are skilled or equipped to execute	Head of PCRM, AQO, PCRM TLs	On-going		Operational costs
	5.2.2 Grow individual careers through the mentorship programmes to extend and technically challenge junior staff	Head of PCRM, AQO, PCRM TLs	On-going	Progress vs career plans	Operational costs
	5.2.3 Include workshop, conference and Lekgotla attendance for staff as in career development plans and in in PCRM business planning and budgeting	Head of PCRM, AQO	Annually	Workshops, etc. included in annual PCRM Business Plan	Additional cost <R50k per staff member
	5.2.4 Conduct routine evaluation and provide feedback to staff in PCRM, with respect to career development plans	Head of PCRM, AQO, PCRM TLs	On-going	Feedback provided	Operational costs

Table 6-7: Implementation table for Goal 6 - eThekwini Municipality has the necessary systems and tools to implement the AQMP

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated cost
6.1 eThekwini Municipality's atmospheric emission inventory is accurate, complete and includes GHGs	6.1.1 Verify emission information submitted by facilities with Listed Activities on the NAEIS, ensuring completeness and accuracy	PCRM emission inventory TL	Immediately, then annually	Listed Activities verified on the NAEIS	Operational costs
	6.1.2 Improve the accuracy of the Emission Inventory for Controlled Emitters by collecting and using data on fuel consumption	PCRM emission inventory TL	Year 1, then annually	Complete and accurate inventory for Controlled Emitters	Operational costs
	6.1.3 Improve the accuracy of the Emission Inventory for Fuel Burning appliances by including data on fuel consumption	PCRM emission inventory TL	Year 1, then annually	Complete and accurate inventory for Fuel Burning Appliances	Operational costs
	6.1.4 Update the Emission Inventory for motor vehicles in eThekwini Municipality using a Tier 3 approach	PCRM emission inventory TL, ETA	Year 4	Complete and accurate inventory for motor vehicles	Operational costs
	6.1.5 Improve the accuracy of the Emission Inventory for Residential Fuel burning using fuel use information at household level	PCRM emission inventory TL, EPCPD	Year 3	Complete and accurate inventory for residential fuel burning	Operational costs
	6.1.6 Improve the spatial resolution of the Emission Inventory for biomass burning using fire scar data	PCRM emission inventory TL, CSIR Meraka Inst.	Year 4	Complete and accurate inventory for biomass burning	Operational costs
	6.1.7 Estimate emissions from WWTW and landfill and include in the eThekwini Municipality Emission Inventory	PCRM emission inventory TL, DSW, EWS	Year 3	Complete and accurate inventory for waste management	Operational costs
	6.1.8 Estimate emissions from quarries and include in the eThekwini Emission Inventory	PCRM emission inventory TL, quarry representatives	Year 2	Complete and accurate inventory for quarries	Operational costs
	6.1.9 Input verified emission inventory information on the NAEIS for Controlled Emitters, Port of Durban, KSIA, motor vehicles, domestic fuel burning and bio mass burning	PCRM emissions inventory TL	As determined by the NAEIS	Complete data for eThekwini on the NAEIS	Operational costs

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated cost
6.2 Ambient monitoring in eThekwini provides an understanding of the status of air quality throughout the eThekwini municipality	6.2.1 Revise the ambient air quality monitoring plan to meet norms and standards for continuous and campaign monitoring, including conventional pollutants and contaminants of potential concern	AQO, Network Manager	Year 1	Ambient monitoring plan	Operational costs
	6.2.2 Restructure the ambient air quality network to the requirements of the revised monitoring plan	Network Manager	Year 2	Restructured ambient monitoring network	Additional cost > R5M for monitoring equipment, infrastructure and relocation costs
	6.2.3 Establish SOPS for all aspects of the ambient air quality monitoring network, including maintenance	AQO, Network Manager	Year 1	Documented SOPS	Operational costs
	6.2.4 Carry out network operations according to the SOPS	Network Manager, PCRM network TL	Year 1	Monthly operations reports	Operational costs
	6.2.5 Carry out network maintenance according to the SOPS	Network Manager, PCRM network TL	Year 1	Monthly maintenance reports	Operational costs
	6.2.6 Report on network performance according to SPOs	Network Manager, PCRM network TL	Year 1	Monthly network performance reports	Operational costs
6.3 Ambient AQ data in eThekwini municipality meets norms and standards	6.3.1 Motivate and purchase a server dedicated to ambient monitoring data handling and storage	Network Manager	Year 1	Server purchased	Additional cost <R50k for server
	6.3.2 Process and validate raw data according to QA/QC protocol in the DEA norms and standards and store on a dedicated server	PCRM data management TL	Year 1 to year 5	QA/QC data stored on data server	Operational costs
6.4 Ambient monitoring data from private monitoring stations is used to augment eThekwini data	6.4.1 Engage with private data holder regarding access and use of continuous monitored data	Network Manager, TNPA, Sappi Saiccor, ACSA, Assmang	Year 1	Data agreements	Operational costs
	6.4.2 Establish mechanism to acquire data on a continuous basis to the data server	Network Manager, TNPA, Sappi Saiccor	Year 1 to Year 5	Data logged on eThekwini server	Additional cost <R50k for hardware

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated cost
6.4 eThekwini municipality's air quality modelling capability supports AQM in the municipality	6.4.1 Purchase computing hardware and the CALVIEW dispersion modelling software	PCRM dispersion modelling TL	Year 1	Dedicated computer and modelling software at PCRM	Additional cost <R80k for computer and software
	6.4.2 Set up the CALPUFF dispersion model that was established during the AQMP project at PCRM	PCRM modelling TL, Health IT	Year 1	CALVIEW installed and operational	Operational costs
6.5 eThekwini municipality's air quality complaints management system is accessible and fully functional	6.5.1 Design an appropriate air quality complaints management system	AQO, Health IT	Year 2	Approved system design	Additional cost <R100k for design costs
	6.5.1 Establish a dedicated air quality complaints management system	AQO, Health IT	Year 2	Complaints management system installed and tested	Additional cost <R250k for system development
	6.5.2 Develop SOPS for managing air quality complaints	AQO	Year 2	SOPs developed	Operational costs
6.6 eThekwini municipality's odour reduction and management system is fully functional	6.6.1 Design an odour management system according to the revised odour management strategy	AQO, Health IT	Year 1	Approved system design	Additional cost <R100k for design costs
	6.6.2 Establish the odour management system according to the revised odour management strategy	AQO, Health IT	Year 1	Odour management system implemented	Additional cost <R250k for system development
	6.6.3 Develop SOPs for odour management	AQO	Year 1	SOPs developed	Operational costs
6.7 eThekwini municipality's Air Quality Web Page is fully functional and current OK	6.7.1 Design Air Quality web page for PCRM	PCRM Head, AQO, Health IT, Communications Dept.	Year 2	Approved webpage design	Additional cost <R50k for design costs
	6.7.2 Develop air quality web page according to design specifications	PCRM Head, AQO, Health IT, Communications Dept.	Year 2	Air quality web page developed	Additional cost <R80k for system development

Objective	Activity	Responsibility	Timeframe	Indicator	Estimated cost
	6.7.3 Arrange webpage hosting	AQO, Health IT	Year 2	Hosting arranged	Additional cost <R20k for Web hosting
	6.7.3 Develop SOPs for maintenance and routine update of the webpage	AQO, Network Manager, Communications Dept.	Year 2	SOPs developed	Operational costs

Table 6-8: Implementation table for Goal 7 - AQM in eThekwini Municipality is supported participatory decision making

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
7.1 AQM in eThekwini is strengthened by a sound relationship with the National Department	7.1.1 Promote AQM in eThekwini through participation at WG2 meeting	AQO	Year 1 to Year 5	Meeting minutes	Operational costs
	7.1.2 Collaborate with the National Department to address AQM issues beyond the mandate and scope of the municipality	AQO, PCRM Head	Year 1 to Year 5	DEA involvement	Operational costs
7.2 AQM in eThekwini municipality's is strengthened by a sound relationship with the Provincial Department	7.2.1 Promote AQM in eThekwini through participation at Provincial AQO forum	AQO	Year 1 to Year 5	Meeting minutes	Operational costs
	7.2.2 Collaborate with the D:EDT&EA to address AQM issues that go beyond the mandate and scope of the municipality	AQO, PCRM Head	Year 1 to Year 5	D:EDT&EA involvement	Operational costs
	7.3.2 Collaborate with D:EDT&EA in the environmental authorisation process to achieve consistency in EIA and AEL processing	AQO	Year 1 to Year 5	Record of decision	Operational costs
7.3 AQM in eThekwini is strengthened by a sound relationship with Municipal Departments	7.3.1 Finalise Air Quality by-laws	PCRM Head, AQO, Legal Dept.	Year 1	Air Quality by-laws published	Operational costs
	7.3.2 Improve the understanding of linkages between exposure to ambient and indoor air pollution, the effects and mitigation with other Municipal departments	PCRM, Head, AQO, Public Health	Year 1 to Year 5	Meeting minutes	Operational costs
	7.3.3 Collaborate with DSW to enhance the understanding of the linkages between AQM and waste management	PCRM, Head, AQO, DSW	Year 1 to Year 5	Air quality management is practiced at DSW facilities	Operational costs
	7.3.4 Collaborate with EWS to enhance the understanding of the linkages between AQM and WWTW	PCRM, Head, AQO, EWS	Year 1 to Year 5	Air quality management is practiced at EWS facilities	Operational costs

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
	7.3.5 Collaborate with ETA to enhance the understanding of the linkages between AQM and transport in eThekwini Municipality	PCRM, Head, AQO, ETA	Year 1 to Year 5	Air quality management is included in ETA agendas	Operational costs
	7.3.6 Collaborate with the Planning Department to enhance the understanding of the linkages between AQM and housing and infrastructure planning in eThekwini Municipality	PCRM, Head, AQO, Planning Department	Year 1 to Year 5	Air quality management is included in Planning Dept. agendas	Operational costs
	7.3.7 Identify opportunities for co-benefits, clean technologies and GHG reduction when addressing emission reduction interventions in AQM	PCRM, Head, AQO, EPCPD	Year 1 to Year 5	Co-benefits, clean technologies and GHG reduction are included, where relevant, in emission reduction plans	Operational costs
7.4 AQM in eThekwini is strengthened by a sound relationship with TNPA	7.4.1 Collaborate with TNPA to enhance the understanding of the linkages between AQM and port activities	PCRM, Head, AQO, TNPA	Year 1 to Year 5	Air quality management is practiced at the Port of Durban	Operational costs
7.5 AQM in eThekwini is strengthened by a sound relationship with ACSA	7.5.1 Collaborate with TNPA to enhance the understanding of the linkages between AQM and port activities	PCRM, Head, AQO, TNPA	Year 1 to Year 5	Air quality management is practiced at the King Shaka International Airport	Operational costs

Table 6-9: Implementation table for Goal 8 - Awareness of AQM in eThekwini Municipality is open and transparent

Objectives	Activities	Roles and Responsibilities	Timeframes	Indicators	Estimated cost
8.1 All stakeholders are aware of progress with the implementation of the AQMP	8.1.1 Progress with the implementation of the AQMP is provided to the DEA at WG2 meetings	AQO	Quarterly	Meeting minutes	Operational costs
	8.1.2 Progress with the implementation of the AQMP is provided to DAEA at the AQO forum	AQO	Quarterly	Meeting minutes	Operational costs
	8.1.3 Progress with the implementation of the AQMP is provided to Council at Council Meetings	AQO	Quarterly	Meeting minutes	Operational costs
	8.1.4 Progress with the implementation of the AQMP is provided to Senior Management at management meetings	AQO	Quarterly	Meeting minutes	Operational costs
	8.1.5 Progress with the implementation of the AQMP is provided to stakeholders at a feedback workshop	AQO	Annually	Meeting minutes	Operational costs
	8.1.6 Progress with the implementation of the AQMP is provided to stakeholders via routine articles in Metro Beat	AQO	Quarterly	Published article	Operational costs
	8.1.7 Progress with the implementation of the AQMP is reported routinely on the PCRM AQM web page	AQO, Communications Dept.	Quarterly	Published article	Operational costs
8.2 All stakeholders have access to air quality information in eThekwini	8.2.1 Upload QA/QC and campaign ambient data routinely to the SAAQIS	PCRM data management TL	Year 1 to Year 5	Data available on SAAQIS	Operational costs
	8.2.2 Publish summary data to the eThekwini webpage	PCRM data management TL	Year 1 to Year 5	Data published on webpage	Operational costs
	8.2.3 Publish summary data in monthly municipal reports	AQO PCRM data management TL	Monthly	Monthly reports	Operational costs

7 MONITORING, EVALUATION AND REVIEW

7.1 Monitoring

Monitoring progress with implementation of the AQMP must be on-going process. See the reporting activities detailed in Goal 8, Objective 8.1.

7.2 Evaluation

Evaluation aims to measure the success of implementation of the AQMP that consists of two assessments. The first is the internal evaluation of the final AQMP and the second is an on-going evaluation to assess implementation outcomes.

It is recommended that the evaluation checklist provided in DEA's AQMP Manual (DEA, 2012b) is used to guide the process. The checklist includes details on the general document and process, as well as specific information on the performance of interventions.

Annual evaluation of eThekwini's AQMP is suggested using the indicators provided in the Implementation Plan (Tables 6-2 to 6-9).

7.3 Review

AQMP review includes internal and external review. A review period of five years is recommended for air quality management plans in the Manual for Air Quality Management (DEA, 2012b).

The review assesses any change in the baseline air quality considering emissions, ambient air quality, the receiving environment and air quality management capacity. The overall objective and goals are validated and their relevance is re-evaluated. Goals and objectives may be amended and activities updated.

The review should be communicated to stakeholders through the defined communication channels.

REFERENCES

DEA, 2007. South Durban Basin Multi-Point Plan: Case Study Report, Air Quality Act Implementation: Air Quality Management Planning, Authors: Lisa Guastella and Svein Knudsen, Series C, Book 12.

DEA, 2009. National Ambient Air Quality Standards, Government Gazette, 32861, Vol. 1210, 24 December 2009.

DEA, 2012a. The 2012 National Framework for Air Quality Management in the Republic Of South Africa.

DEA, 2012b. Manual for Air Quality Management Planning, April 2012.

DEA, 2012c. National Ambient Air Quality Standard for Particulate Matter of Aerodynamic Diameter less than 2.5 micrometres, Notice 486, 29 June 2012, Government Gazette, 35463.

NILU, 2007. Air Quality Management Plan for eThekwini Municipality. eThekwini Health and Norwegian Institute for Air Research, NILU OR 2006.

uMoya-NILU, 2015. eThekwini Municipality AQMP Review and Update: Baseline Assessment, Report Number uMN032-15, 18 August 2015, Final.

University of KwaZulu-Natal, 2006. South Durban Health Study, Multi-Point Plan Project 4 – Health Study and Health Risk Assessment, Final Report