



Ekurhuleni  
METROPOLITAN MUNICIPALITY

# Ekurhuleni Metropolitan Municipality

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## Environmental Policy

Final

9/14/2012

The first Ekurhuleni Metropolitan Municipality Environmental Policy was approved in 2006. This document is a revision of the Environmental Policy for EMM taking into account developments over the last seven years and forward planning for the municipality. The Policy is accompanied by an Implementation Plan and Guideline document.



## Document Description

This report is the first deliverable as part of the development of the Revised Environmental Policy and Implementation Plan developed by SSI Engineers and Environmental Consultants on behalf of the Environmental Resources management Department of Ekurhuleni Metropolitan Municipality.



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## *Abbreviations*

AMD	Acid Mine Drainage
AQMP	Air Quality Management Plan
AQO	Air Quality Objective
CBA	Critical Biodiversity Area
CBD	Central Business District
DEA	Department of Environmental Affairs, formerly DEAT
DMR	Department of Mineral Resources, formerly DME
DWA	Department of Water Affairs, formerly DWAF
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMM	Ekurhuleni Metropolitan Municipality
GAPA	Gauteng Agricultural Potential Atlas
GDARD	Gauteng Department of Agriculture and Rural Development
GDP	Gross Domestic Product
GIS	Geographic Information System
GPAES	Gauteng protected area expansion strategy
PGP	Gauteng Provincial Government
GSDP	Gauteng Spatial Development Perspective
ICT	Information and Communication Technology
IDP	Integrated Development Plan
IWMP	Integrated Waste Management Plan
MLL	Minimum Living Level
MRAs	Mine Residue Areas
NCCRS	National Climate Change Response Strategy
NEM:WA	National Environmental Management: Waste Act 59 of 2008
NEM:AQA	National Environmental Management: Air Quality Act 39 of 2004
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEMA	National Environmental Management Act 107 of 1998
NER	National Electricity Regulator
NGO	Non-governmental Organisation
NLC	National Land Cover
NSBA	National Spatial Biodiversity Assessment
NWMS	National Waste Management Strategy
p.a.	per annum
RDP	Reconstruction and Development Programme
RHP	River Health Programme
RWQO	Resource Water Quality Objectives
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SoE	State of Environment
SoER	State of Environment Report
StatsSA	Statistics South Africa
WMA	Water Management Area
WSSD	World Summit on Sustainable Development

WSP      Water Service Provider  
WWTW    Wastewater Treatment Works

## *Glossary*

**Sustainable Development:** Sustainable Development means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations. Source: National Environmental Management Act, 1998 (Act No. 107 of 1998).

**Environment:** The word “environment” means different things to different people. Therefore, it is necessary to define it. For the purpose of this policy, “environment” refers to the environment as defined in the National Environmental Management Act, i.e. the surroundings in which humans exist and that is made up of: The land, water and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination of the above and the inter-relationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing. Source: National Environmental Management Act, 1998 (Act No. 107 of 1998).

**Biodiversity:** Biodiversity refers to the variability among living organisms from all sources including, terrestrial, marine and aquatic ecosystem and the ecological complexes of which they are part and also includes diversity within species, between species and of ecosystems according to the National Environmental Management: Biodiversity Act (2004).

**Hydrological system:** A system of water movement on earth, described in terms of movement, distribution and quality, as well as its management, and typically defined in terms of subsystems or sub-units such as features or management units (catchments, watercourses, wetlands).

**Development:** Development is described as the improvement of human condition that involves the redistribution of resources which includes the transformation of the natural environment to some extent.

**Ecological Corridors:** Ecological Corridors are passages of natural habitats providing connectivity of different spaces of habitats along or through which species may travel without any impediments.

**Ecological goods and services:** Ecological goods and services can be seen as those life-giving functions that the natural systems provide, such as flood attenuation, carbon sequestration, reducing heat islands, purification of air, provision of water; as well as providing a sense of place and identity and contributing to overall human well-being. This is an important consideration in the preparation of the Open Space framework.

**Floodline:** Floodlines refer to the lines on a map depicting the water levels likely to be reached during flood with a specified recurrence interval (usually 1:50 years). A Floodplain is the land adjoining a water course (river) that is susceptible to inundation by water up to the one hundred year recurrence interval.

**Open Spaces:** Open Spaces are seen to include a variety of spaces providing from eco-based to activity-based; from personal to public; from those sustained by clear and substantial manipulation, design and intervention, to those that reflect little or no intervention. The role of natural resources in providing ecological goods and services is becoming more and more critical.

**Riparian Zone:** Riparian Zone is the transition zone between the aquatic and terrestrial environments. The characteristic and type of vegetation associated with this zone is dependent on the geomorphology and the mean annual runoff (MAR) of the river channel.

**Waste Management:** Waste Management is a control system to limit, collect and dispose of waste, through the policies and environmental standards.

**Wetland:** Wetland as defined by the National Water Act (Act No. 36 of 1998): land which is transitional between terrestrial and aquatic ecosystems where the water table is usually at or near the surface, or the land is periodically covered by shallow water that naturally supports vegetation typically adapted to life in saturated soil.

# Part 1: Introduction

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## 1 Introduction

The EMM Environmental Policy was published in 2006, and since this time numerous shifts within the Metro have taken place. The policy therefore needs to be reviewed, updated and contextualised to represent and spear head the aims and objectives of the EMM. This is also an opportune moment to ensure that the metro's policy is aligned with the national and provincial visions, and learn from the successes and failures of local policy implementation.

As the Ekurhuleni Metropolitan Municipality transforms into an aerotropolis, its Environmental Policy must be realigned to new realities, challenges and opportunities that are associated with 'a new urban form placing airports in the centre with cities growing around them, connecting workers, suppliers, executives, and goods to the global marketplace'(City of Ekurhuleni, 2011).

The revision of the policy provides a bigger opportunity to align EMM Environmental Policy with sustainability initiatives, future considerations, e.g. the impacts of climate change, the green economy, mining reclamation and pollution, and land reform and agrarian transformation. Importantly, as the Growth and Development Strategy for EMM is currently being revised there is enormous potential to align the environmental policy and vision to the growth and development vision for the region.

*"...Ekurhuleni is by and large a city poised for bigger things in the future, and the obvious envy of many cities on the continent and internationally" - Executive Mayor, Councillor Mondli Gungubele (City of Ekurhuleni, 2011)*

## 2 Project aim

The aim of this project is two-fold:

1. Review and update the Ekurhuleni Environmental Policy (EEP) and mainstream this policy into EMM daily decision making by developing an Implementation Plan; and
2. Promoting the policy through stakeholder engagement to ensure maximum acceptance and use of the EEP.

In order to effectively achieve the aim, a number of activities were part of this project:

- Literature review of applicable strategies, frameworks, plans and reports
- Strategic assessment of the policy
- Stakeholder engagement
- Develop marketing material
- Develop an implementation plan
- Develop revised environmental policy

This report is part of the first project aim; namely, to review and update the Ekurhuleni Environmental Policy.

## 3 Background

The Ekurhuleni Metropolitan Municipality (EMM) was established in 2000 and covers a large area within Gauteng, over 2000 km<sup>2</sup>. The EMM incorporates a diversity of land uses, including residential, agricultural, natural open spaces, industrial and commercial areas. At its heart lies Southern Africa's largest airport, and this helps to make EMM an equal partner to the adjoining Metropolitan areas of Johannesburg and Tshwane. The growing needs of an increasing population have resulted in a growing demand for development and resulting impacts on the environmental resources. The EMM recognises that, although development must be

economically and socially acceptable, it is imperative that the development challenges facing the EMM be addressed in an environmentally sustainable manner.

The challenge for environmentally sustainable development within urban areas has led to the need for strategic planning processes to be implemented at local government level. An environmental policy forms part of this planning process. The Environmental Policy will form the foundation from which all departments within the EMM can develop a medium and long term environmental management strategy. This policy will make environmental issues and environmental sustainability an essential part of all decision making processes.

#### **4 Method**

A key goal of the project is to review and update the environmental policy for environmental planning and assessment, and to guide non-environmental practitioners and officials to incorporate and apply the new environmental policy in their respective fields of application.

Part 1 provides a desktop analysis and description of changes to the legal and policy contexts since the previous policy was drafted, and includes an assessment of:

- The existing Environmental Policy;
- Important policy and legislative changes that occurred since the original policy, including new legislation and policies at a national and provincial level;
- Planning tools;
- Environmental tools;
- Agriculture and rural development;
- Stormwater management and planning;
- Climate change responses and adaptation; and
- Energy.

Part 2 is the revised Environmental Policy for Ekurhuleni based on the information and knowledge from the literature review.

## Part 2: The Ekurhuleni Environmental Policy

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## 5 Purpose of the policy

Although there are a number of statutory mandates and responsibilities that require Local Government to develop environmental policies, the real purpose of a policy should be linked to the possibilities for an improved living and working environment for the area of focus. This can be expressed simply as two main benefits to be pursued: making Ekurhuleni a desirable place to be in on the one hand, and turning it into a globally acceptable efficient and clean industrial and transportation nexus on the other.

In order to achieve the stated goals, however, the policy needs to provide both an overall framework within which to frame environmental management, as well as detailed guidance to the different entities and departments in the EMM who will be tasked with the implementation responsibilities.

Specifically, this policy will be used to:

- spearhead sustainable development with EMM;
- improve the governance function of the municipality;
- create environmental awareness within the municipality;
- enhance a safe and healthy environment; and
- direct sustainability and responsible decision making.

As mentioned though, the development of an environmental policy for the EMM is a statutory mandate and responsibility placed on Local Governments to ensure a safe and healthy environment to those living and working within their area of jurisdiction. This mandate derives directly from the Constitution of South African and the National Environmental Management Act (NEMA).

## 6 The Legislative Mandate for an Environmental Policy

There is an extensive set of national and international policies and treaties that exist and will affect the development and implementation of an environmental policy for a municipality. Many of these contain norms, values and aspirations of societies where the Municipality may be legally, or morally, bound to implement. This section will provide a brief overview of what these national and international policies and treaties are.

In order to protect the environment and ensure that this development is undertaken in an environmentally responsible manner, there are a number of significant pieces of environmental legislation that need to be taken into account.

### 6.1 The Constitution of South Africa (No 108 of 1996)

The Bill of Rights (Section 24), within the Constitution of South Africa (No. 108 of 1996), states that everyone has a right to a non-threatening environment and requires that reasonable measures are applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development. These principles are embraced in NEMA and given further expression.

The Constitutional mandate of EMM, as for all Local Municipalities, is described in Chapter 7, and specifically Section 152(1)(d) of the Constitution which requires of Local Government to promote a safe and healthy environment. Specific executive duties are described in Part B of Schedule 4 and Part B of Schedule 5 of the Constitution.

Relevant functions listed in Part B of Schedule 4 are as follows:

- Air pollution
- Building regulations
- Electricity and gas reticulation
- Local tourism

- Municipal planning
- Municipal health services
- Municipal public transport
- Pontoons, ferries, jetties, piers and harbours, excluding the regulation of international and national shipping and matters related thereto
- Stormwater management systems in built-up areas
- Water and sanitation services limited to potable water supply systems and domestic waste-water and sewage disposal systems

Similarly, relevant functions contained in Part B of Schedule 5, are:

- Beaches and amusement facilities
- Cemeteries, funeral parlours and crematoria
- Cleansing
- Control of public nuisances
- Facilities for the accommodation, care and burial of animals
- Municipal parks and recreation
- Noise pollution
- Refuse removal, refuse dumps and solid waste disposal

A municipality will act illegally and in contravention of the Constitution if it exercises powers and functions, which fall within the functional areas of another sphere of government, unless such powers and functions were assigned to it.

## 6.2 The Municipal Systems Act (No 32 of 2002)

Furthermore, the Municipal Systems Act (Act 32 of 2002) within Chapter 2, section 4, states that a "...municipality, within the municipality's financial and administrative capacity and having regard to practical considerations, has the duty to -

- a) exercise the municipality's executive and legislative authority and use the resources of the municipality in the best interests of the local community;
- b) provide, without favour or prejudice, democratic and accountable government;
- c) encourage the involvement of the local community;
- d) strive to **ensure that municipal services are provided to the local community in a financially and environmentally sustainable manner;**
- e) consult the local community about-
  - i. the level, quality, range and impact of municipal services provided by the municipality, either directly or through another service provider; and
  - ii. the available options for service delivery;
- f) give members of the local community equitable access to the municipal services to which they are entitled;
- g) promote and undertake development in the municipality;
- h) promote gender equity in the exercise of the municipality's executive and legislative authority;
- i) **promote a safe and healthy environment in the municipality;** and
- j) contribute, together with other organs of state, to the progressive realisation of the fundamental rights contained in **Sections 24, 25, 26, 27 and 29** of the Constitution." (from the Municipal Systems Act, Chapter 4, own emphasis)

### 6.3 National Environmental Management Act

The **National Environmental Management Act (NEMA) (No. 107 of 1998)** is a pivotal piece of environmental legislation in South Africa on which subsequent environmental legislation in South Africa is built. The main objective of this Act is to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

The NEMA sets out principles for environmental management aimed at guiding all organs of state that may significantly affect the environment. Organs of state at the national and provincial levels are currently required to prepare an environmental management/ implementation plan to ensure that all functions that could significantly affect the environment are performed in a manner that protects the environment. The EMM, may be required to prepare such a management/ implementation plan.

Furthermore, Section 28(1) of the Act states that “every person who causes or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring”. If such pollution cannot be prevented then appropriate measures must be taken to minimise or rectify such pollution.

NEMA states that the principles of Integrated Environmental Management (IEM) should be applied to ensure sustainable development. A vital underpinning of the IEM procedure is accountability to the various parties that may be interested in or affected by a proposed development. The IEM procedure aims to ensure that the environmental consequences of development proposals are understood and adequately considered during all stages of the project cycle, and that negative aspects are resolved or mitigated and positive aspects enhanced.

### 6.4 Disaster Management Act (57/2002)

The Disaster Management Act requires all municipalities to apply section 44 as it relates to the integrated approach that must be promoted by departments within a municipality and such as pre-disaster risk reduction (mitigation, preparedness and sustainable development) are key considerations. The application of section 48 of the Act as it refers to the monitoring and the integration of initiatives aimed at prevention, mitigation and response initiatives with all stakeholders is critical to ensuring that environmental disasters are mitigated and or prevented.

## 7 Vision for the Ekurhuleni Metropolitan Municipality

The Growth and Development Strategy (GDS) for EMM which is in development defines the pathway for the Municipality’s growth and development, based on the needs of residents and taking into account global, national and provincial trends. The GDS 2055 is Ekurhuleni’s long-term plan for service delivery. It is a 20- to 30-year plan that sees to it that services are delivered based on the needs of our people and taking into account the trends globally, nationally and provincially.

Environmental Sustainability and Climate Change is one of 6 key areas of intervention for the GDS. It defines the key environmental issues to be addressed as follows:

#### 1. Urbanisation, industrialisation and population growth

The rate of urbanisation, industrialisation and population growth within EMM requires a more structured approach toward environmental planning. In many areas there **is widespread degradation of land and water resources** and the sustainability of these resources is threatened.

There are **important agricultural resources** within the EMM and approximately 14% of the land is regarded as high potential land suitable for agricultural production, while 12% is regarded as moderate to high potential. The Gauteng Agricultural Potential Atlas identified and mapped 41% of the EMM as important for protection of agricultural resources. Of the 41%, just over half is classified as highly important for agriculture, while 19% is

of moderate to high importance. These areas need to be reserved and protected from development (State of the Environment Report, 2004).

The industrialised nature and high level of urbanisation of the EMM means a heavy reliance on motorised transport. O.R. Tambo International Airport, South Africa's largest airport is also located within the EMM and is an important transport node. All of these factors make **air pollution from transport** a very important environmental concern. Most of these air pollutants are largely anthropogenic and can therefore be controlled to some extent if the right measures and policies are in place.

The EMM is pursuing the development of an **aerotropolis** surrounding O.R. Tambo International Airport. An aerotropolis is defined as "a type of urban form comprising aviation intense business and related enterprises. It is similar in form and function to a traditional metropolis, where there is a central city core and its commuter-linked suburbs. An aerotropolis has an airport city as its core and is surrounded by clusters of aviation related enterprise" (Kasarda, 2000). Furthermore, an "An **Airport City** is an efficiently designed international transport hub for both passengers and cargo with an urban character agglomerating uses associated with the old city centre, and providing a growing number of services and facilities not directly related to actual transport functions" (Kasarda, 2000).

## 2. Energy sources

Apart from transportation, other sources of **air pollution** persist in Ekurhuleni, and include heavy industry, a coal fired power station, mines and associated infrastructure, waste sites, transport, OR Tambo International Airport, veld fires and domestic fuel combustion. Indoor air pollution resulting from the **use of coal and wood for lighting, heating and cooking** has been shown to contribute up to 60% of the pollution load in winter. This is considered the most important environmental health-related issue, especially in low-income areas.

Since domestic fuel is such a large contributor to air pollution there are alternatives that could be considered to switch to more energy efficient and environmentally friendly fuel/energy sources. Coal for instance is still used quite extensively by poorer households for cooking and heating purposes. Better alternatives could be promoted and perhaps incentivised.

Over and above indoor air pollution, **exhaust emissions from motor vehicles** is considered to be the most significant regional source of air pollution, particularly in urban areas. Since Ekurhuleni is made up of a diverse environment (both natural and man-made), biodiversity is an issue of some importance increasingly threatened by a wide range of activities. These and other factors make Ekurhuleni an important area for biodiversity in the grassland biome and in Gauteng.

## 3. Waste management

The rapid growth and development of Ekurhuleni has had impacts on the City's ability to collect and manage waste. Currently the main concerns for waste management includes **landfill airspace requirements**, inadequate **sanitation and waste services** and lack of involvement of communities in waste management, backlogs in service delivery and **illegal dumping** particularly in the informal areas. Further to this, the focus on end-of-pipe treatment and little implementation of waste hierarchy is a critical area of focus for future effective and affordable waste management options.

## 4. Water Resources

Rivers, lakes and wetlands have been severely affected by development in Ekurhuleni. Natural streamflows are overshadowed by contributions from sewage works and mining. Due to increases in urbanisation, surface water runoff has increased by as much as 300% (Ekurhuleni SoER, 2004). The higher river flood peaks and levels pose a flooding threat to all developments (especially informal housing) within the flood zones. Many low lying areas are at risk.

Poor **stormwater management** also impacts negatively on streams. Only a few of the stormwater control systems include retention ponds and pollution control litter traps. Regular clearing of dirt road shoulders, kerbs and drains can alleviate the problem. A problem common to all areas is the degradation and erosion of

stream and river banks. All sectors should be alerted to this problem. Loss of soil, loss of riparian vegetation, loss of aquatic habitats and loss of biodiversity should also be addressed. The ingress of polluted surface water into mines and the groundwater is also a potential significant problem that needs to be addressed further.

#### 5. Mining

Gauteng's heritage is firmly rooted in its history as a mining area, with a substantial part of the Witwatersrand mining areas found in Ekurhuleni Metro. Unfortunately, this also means that EMM inherits a history of environmental degradation that is so closely linked to mining practices. Mining is a particularly intrusive land use, and goes hand-in-hand with impacts on groundwater, surface water, natural vegetation, air pollution etc. It must be acknowledged though as necessary for industrial activity, global economic relations and the operation of the modern society. Management of the challenges posed by both active and dormant mines is therefore an important component of the ongoing control and rehabilitation of the existing environmental degradation present in EMM.

## 8 The EMM Environmental Policy Statement

The Ekurhuleni Metropolitan Municipality in delivering services to the community strives to maintain and promote sustainable environmental management by carefully blending ecological, social, and economic considerations into our future planning and decision making processes. The Ekurhuleni Metropolitan Municipality will balance the interests of the present with those of future generations, and ultimately, will strive to reduce the environmental impacts of current operations, activities, products, and services.

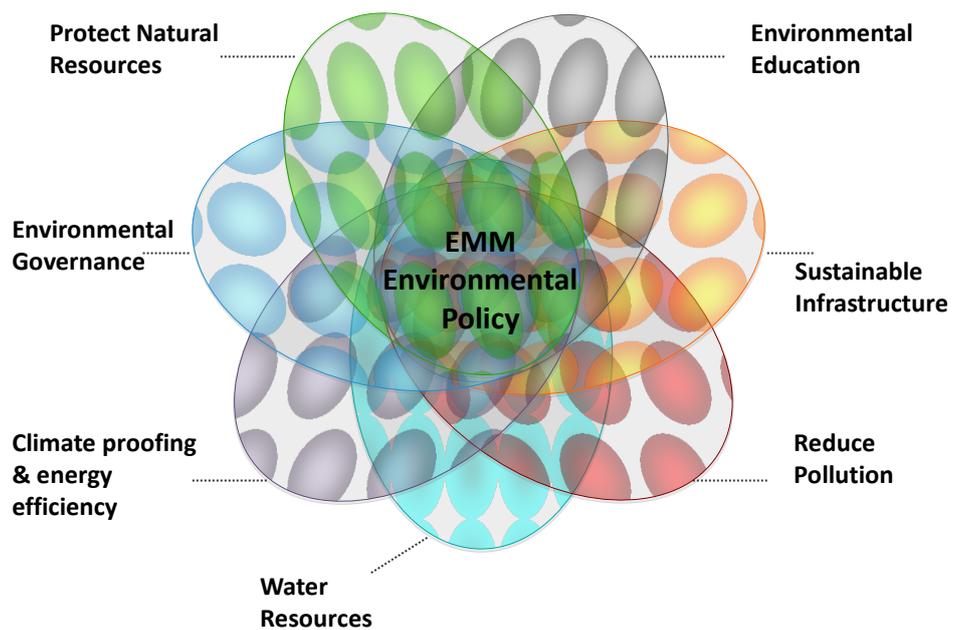
Within the framework of our Environmental Policy the Ekurhuleni Metropolitan Municipality commits to:

- **Comply** with all applicable international conventions, national environmental legislation and policies, regulations, codes of practice, and other environmental requirements to which the Ekurhuleni Metropolitan Municipality subscribes;
- **Protect and manage** the environment, conserve resources, minimise asset losses, and improve our environmental performance;
- Minimise the **environmental impacts** of the activities of the EMM;
- Minimise the contribution to climate change, and adapt to the consequences of global climate change;
- Improve the **quality standard** of the environment through the reduction of pollution, implementation of a waste reduction hierarchy, an increase in social benefits in terms of health and resilience, and increased access to environmental resources;
- **Establish partnerships** with community organisations, government agencies, customers and Interested and Affected Parties (I&APs) and **foster openness and communication** with all stakeholders in order to share relevant information, contribute to the development of sustainable solutions, and respond in a constructive and timely manner;
- **Implement** environmental management activities aimed at enhancing and improving the environment within the Ekurhuleni Metropolitan Municipality by improving the environmental content and performance of existing management systems like the **IDP, GDS and SDBIP** and
- Regulate the **environmental impacts of mining** to restore a balance between consumptive and sustainable environmental resource uses.

## 9 The EMM Environmental Policy Ultimate Outcomes

To meet the goals and intended outcome of the Environmental Policy seven areas of impact are defined that require implementation. These focus areas are defined in FIGURE 1. The long term outcomes are:

1. Key natural resources are protected and conserved
2. EMM employees are aware of environmental matters and environmental education initiatives are implemented
3. Environmental principles are embedded in Infrastructure and development activities in EMM
4. Land, water and air pollution is prevented and reduced
5. Catchments are managed in an integrated manner
6. EMM is energy efficiency and has adapted to climate change impacts
7. Sound environmental governance



**FIGURE 1: SEVEN ENVIRONMENTAL POLICY FOCUS AREAS, OR ULTIMATE OUTCOMES**

## Part 2: Policy Ultimate Outcomes or Focus Areas

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## 10 Protect and conserve the natural resources of Ekurhuleni

As natural habitats are reduced as a result of the increased demand for development, the biodiversity and natural resources of EMM are threatened. Therefore, the EMM requires an integrated environmental approach to ensure that development is undertaken in a manner that sustains biodiversity and natural resources in the EMM, and is socially beneficial.

Consequently, the first focus area of the EMM Environmental Policy is the development of a plan for managing spatial and physical development that will protect and enhance priority biodiversity areas.

### 10.1 Ultimate Outcome

Ensure the long term sustainability of the EMM's natural resources through the protection and management of renewable and non-renewable resources and biodiversity.

### 10.2 Activities

- Integrate goals and targets for renewable and non-renewable resources into planning processes, specifically within the IDP and SDF
- Prioritise and implement the Bioregional Plan for Ekurhuleni
- Incorporate land use guidelines from the Bioregional Plan into Spatial planning
- Protect Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) and in so doing, promote the protection targets
- Develop, where needed, Environmental management plans for ecosystems (BMP-E) for the CBAs
- Increase the area under formal protection for conservation purposes
- Increase incentives for private owners to conserve natural resources
- Reduce the area covered by Invasive Alien Plant Species
- Increase the sustainable use and protection of agricultural land and resources in the EMM
- No loss of conservation areas and protection of the Blesbokspruit in terms of the requirements as laid down in the Ramsar Convention
- All applicable legislation and policy must be considered and followed in land use planning and development
- EMM policies must be aligned with provincial and national priorities in terms of conservation and protection of natural and other resources
- Increase the land protected within the open space system in EMM to ensure long-term survival of habitats and to sustain the range of services that open spaces provide to humans and the ecosystems
- No loss of land on ridges, in accordance with the Gauteng Ridges Policy
- Develop Guidelines for the implementation of environmental tools such as conservation servitudes, biodiversity offsets, and development set-back lines

## 11 Manage and protect the valuable water resources

Ekurhuleni is located not only on a local watershed, but actually on a continental divide in an area where important river and hydrological systems originate and forge their beginnings through the industrial and agricultural heartland of the economic powerhouse of Africa. This intricate network of rivers, wetlands and pans is the single most important natural feature of the EMM and provides an overall backbone for an open space system and the system of biodiversity resources. The internationally recognised Ramsar Site in the Blesbokspruit forms part of this system.

The prevalence of a large number of pans in the EMM is one of the outstanding characteristics of the area and is directly linked to the flat topography. Most of the pans are seasonal. Most of the pans are surrounded by

urban areas or agriculture. In addition, a number of man made lakes occur in the central areas of EMM that were mostly created by the gold mines in the area. Some of these lakes are extensively utilised as outdoor recreational parks, and Germiston and Benoni lakes are typical examples.

Of concern though is the fact that these systems have, for many years, been used as a dumping ground for many of the excesses and waste products of the adjoining urbanised areas. Polluted urban stormwater runoff, altered hydrological flows, nutrient and pesticide loading from agricultural areas, heated and contaminated water from industrial practices, and in particular, contaminated acidic mine water all contribute to a fairly dire situation. These drivers of degradation need to be addressed before the water resources can be used for the benefit of society; whether as natural open spaces for recreation or as ecologically sound components of a hydrological cycle.

### 11.1 Ultimate Outcome

Integrated catchment management practices should be used to protect and manage water resources in a manner that allows for water quality, quantity and ecosystem health suitable to both residents and the natural environment.

### 11.2 Activities

- Develop a catchment management strategy for EMM to provide strategic direction and decision support
- Develop detailed Catchment Management Plans
- Publish a State of Water Resources (Rivers) Report for EMM
- Maintain ideal surface water quality levels through constant monitoring and rapid response actions
- Where Environmental Reserves or Environmental Flow Requirements have been determined these should be strictly adhered to
- All effluent (including municipal, sewerage, mining and industrial waste water) as well as acid mine drainage should be treated to required specifications before release
- Limit access to riparian and wetland areas where needed for safety of residents during flooding and to protect the resource
- Areas such as floodplains (e.g. areas within the 1:100 year floodline), riparian areas (e.g. as a minimum, a 32m buffer along rivers) or buffers around wetlands (with size dependent on location, size and state of the wetland), must have no development within them, remain in a natural state or are rehabilitated to a state that ensures adequate ecological functioning
- Delineate and update floodlines for all major water resources
- Areas that are degraded or disturbed should be rehabilitated, through programmes such as Working for Water or Working for Wetlands

## 12 Reduction and prevention of pollution

The EMM environment is currently impacted by various pollution sources and large quantities of gaseous, liquid and solid hazardous and nonhazardous waste. Pollution impacts on the quality of water, land and air and this can have negative health and social impacts.

### 12.1 Ultimate Outcome

The overall goal is therefore to promote and implement appropriate management and prevention of pollution, at a minimum in accordance with the relevant National guidelines and regulations, in order to maintain a healthy and safe environment. This will be achieved through means of the following general activities:

**Activities:**

- Adopt the principle of pollution avoidance and prevention planning;
- Institute rehabilitation measures for past pollution, or management planning for the reduction in current pollution;
- Sustain and progressively enhance the pollution monitoring and reporting, and compliance enforcement systems;
- Ensure the appropriate avoidance, reduction and management of the transportation and handling of hazardous substances; and
- Promote the assigning of clear responsibilities for pollution avoidance and management practises.

Since different types of activities result in different types of pollution, and thus require more specific objectives to be set, a customisation of pollution management strategies according to specific areas of impact namely Waste, Air Quality, Noise and Water Quality.

## **12.2 Waste Management**

Currently, large quantities of gaseous, liquid and solid waste, both hazardous and nonhazardous, are produced by human activities within the EMM. The appropriate avoidance and disposal of this waste is essential to the maintenance of a healthy environment.

### **12.2.1 Intermediate Outcome**

Implementation of the 'waste management hierarchy' that aims to, in order of preference, avoid, reduce, reuse, repair and recycle waste in order to promote the avoidance and minimisation of waste, in accordance with appropriate overall waste management strategies.

### **12.2.2 Activities**

- Finalise and implement the Integrated Waste Management Plan for EMM
- Increase the co-operation with national and provincial government in encouraging industry and other producers to work towards eliminating the production and transport of all waste, including hazardous waste, in accordance with the principles of the National Waste Management Strategy
- Increase waste avoidance, minimisation, reuse and recycling initiatives to reduce the amount of waste that is created and disposed of in the EMM
- Community awareness programmes to create awareness of waste management and litter control
- Correct licensing and management of all landfill sites, including all Hazardous Waste landfill sites
- Correct management and rehabilitation of old and closed landfill sites
- Overall waste management strategy and sustainable criteria are used to plan, locate and design new disposal sites

## **12.3 Air Quality Management**

Clean air is one of the basic requirements for human health and well-being. Air pollution is caused by the emission of gas, vapour and particulate matter into the atmosphere as a result of human activities and, on occasion, natural activities (such as veld fires). The EMM Air Quality Management Plan is the key plan to guide development and manage the quality of air in Ekurhuleni. Ekurhuleni Metropolitan Municipality is an Atmospheric Emission Licensing Authority in terms of Chapter 5, Section 36(a) this implies Ekurhuleni must issue license to all the listed activities/industries conducted within its area of jurisdiction. Ekurhuleni Municipality is in the "Highveld Priority Area" which implies that the air quality in the region is poor.

Local Municipalities are given the mandate to monitor ambient and point, non-point and mobile sources of emissions, and the obligation to prepare Air Quality Management Plans through the National Environmental Management: Air Quality Act, 2004 (NEM:AQA) and the National Framework for Air Quality Management,

2007. The management of air quality on a local level may be effected through local by-laws, and by Metro and District Municipalities as licensing authorities for atmospheric emission licenses.

### **12.3.1 Intermediate Outcome**

Monitor, manage and improve the air quality in the EMM.

### **12.3.2 Activities**

- The current EMM Air Quality Management Plan must be integrated with other strategic planning projects
- Emission reduction measures that are:
  - (i) environmentally beneficial taking all media into account,
  - (ii) technically feasible,
  - (iii) economically viable, and
  - (iv) socially and politically acceptable will be used
- Achieve and sustain acceptable air quality levels throughout the EMM with the view to constant improvement of the air quality
- Cleaner production and continuous improvement in best practice as it pertains to air pollution prevention and minimisation
- Implement a set of tools to prevent air pollution in line with national guidelines. The integration of a wide range of emission reduction measures is required given the diversity in the nature of air pollution sources.
- Clean indoor air quality and ambient air quality management for all EMM buildings
- Reduction of all significant sources of air pollution relative to their contributions to ambient air pollutant concentrations. This will improve air quality and can be secured in the most timely, even handed and cost effective manner
- The integration of air quality issues into the health, transportation, housing and land use planning process which will result in air quality issues being addressed in the long term
- Empowerment of communities by providing easy access to ambient air quality information, including information on air pollution concentrations and environmentally harmful practices with the facilitation of public consultation to encourage public participation in air quality management.

## **12.4 Noise Control**

An important issue within the EMM is the impact of noise pollution on the local residents, especially in consideration of the presence of O.R. Tambo International Airport. Infrastructure such as major roads, railway lines and airports impose severe constraints on development in terms of the noise they create, as ambient noise levels can lead to adverse health effects, and noise related interruptions can impact extremely widely on productivity. Environmental noise is regulated in terms of Gauteng Noise Control regulations, 1999 promulgated under Environment Conservation Act, 1989 has been developed, used with some guidelines as per SANS documents. An environmental noise policy has been developed that will be aligned to Ekurhuleni land use and South African National Standard documents.

### **12.4.1 Intermediate Outcome**

Avoid, reduce, manage and monitor noise disturbances and nuisances within the EMM.

### **12.4.2 Activities**

- The noise policy and noise guidelines must be included in consultation with all relevant authorities and stakeholders
- Reduce noise pollution in the EMM

- Land use and development must take cognisance of noise contours, noise standards and legislation
- Environmental impact assessments for new developments must take potential noise impacts into consideration

## 12.5 Water Quality Management

The quality of water resources is directly affected by discharges into the water resource systems. Potential sources of water pollution within the EMM include excess mine water, acid mine drainage, industry, waste disposal sites, sewage treatment works, urban development, stormwater, informal housing developments and agriculture.

### 12.5.1 Intermediate Outcome

Improve, manage and monitor the water quality in the EMM in accordance with predefined water quality objectives for specific water related uses.

### 12.5.2 Activities

- Identify and control pollution sources (point and diffuse sources) that impact negatively on the water quality of both surface and ground water resources, with a view to avoiding such pollution
- Planning for, building, and maintenance of wastewater treatment works (WWTW) of sufficient capacity, and all associated infrastructure
- Ensure stormwater management does not negatively impact on rivers, wetlands and general human health.
- Reduce the impacts of higher density developments on stormwater management
- Implement appropriate mechanisms to minimise and improve the quality of urban runoff in existing and planned developments
- Development of a co-ordinated and consolidated water quality monitoring programme for the EMM

## 13 Managing for climate change and increased energy efficiency

EMM plays an important role in the South African contribution and response to climate change as it forms part of an acknowledged inefficient urban complex, relies heavily on 'dirty fuels', and hosts transportation modes with high emissions. It also houses a large portion of the urban population of the country that is highly vulnerable in terms of energy security, food security and extreme climatic events. Interventions in EMM will therefore have a significant effect on the national climate change contribution and response, but it is important that all sectors and areas contribute to climate change mitigation.

Of particular concern are biodiversity conservation and energy supply and use.

Wetland and grassland ecosystems play an important role in carbon sequestration and protecting remaining intact areas of natural habitat is important from a climate change perspective to minimize the magnitude of long term climate change effects. Issues important for climate change adaptation include -

**Corridors and connectivity:** The high levels of development of in Gauteng have created very limited connectivity of ecosystems. Gauteng is a key bottleneck to west-east connectivity of ecosystems, which can impact on the long term survival of a range of species and ecosystems in the context of ongoing climate change. Maintaining connectivity is critical for long term persistence of biodiversity in the face of ongoing climate change, and represents the major contribution to facilitating climate change adaptation within the Gauteng Province and South Africa as a whole. (EMM Draft Bioregional Plan, 2012)

**Climate change refugia and high diversity areas:** Ridges and higher altitude areas are important for both biodiversity and as important habitats to adjust to climate change impacts. These areas are critical for ensuring the long term persistence of both species and ecosystems, as they include both the ecological gradients

required to allow species and habitats to adjust to climate change impacts and are likely to include refuge areas.

**Areas for minimizing climate change impacts on society:** Climate change is likely to result in significant increases in climate variability. In the urban context, perhaps the most important consequence is an increase in the likelihood of extreme flood events. Protection of intact natural habitat (especially wetlands, floodplains and intact riparian habitat) is extremely important for reducing the magnitude of flood events as these areas play an important role in regulating hydrological processes such as storm runoff. In addition, these areas (especially floodplains) are extremely high risk for communities living in these areas, and ensuring that development is avoided where possible in high risk areas will reduce the long term impact of climate change particularly on poor communities.

Energy is the lifeblood of society and without it cities would grind to a halt. Yet there are problems associated with energy use. Energy use commonly results in pollution, and contributes to global warming through the release of Greenhouse Gasses into the atmosphere. Typically, fuels used by poor households are also unsafe and unhealthy. South Africa is one of the developing world's heaviest carbon emitters due to our energy use patterns and reliance on coal supplies. The country has ratified the Kyoto Protocol, an international agreement that aims to address global warming and South African cities have an important role in reducing global warming emissions.

Since the 2006 Environmental Policy there has been enormous shifts in the dynamics of energy policy and actions within South Africa. As a result there is a clear emphasis and action on the use and implementation of renewable energy options. Many of the newer policies within EMM already place great emphasis on energy efficiency and this environmental policy do not only formalise this, but build on the existing momentum and assist other municipal departments to implement energy saving initiatives.

### 13.1 Ultimate Outcome

Integrate an awareness of, and pro-active response to the direct and indirect effects of climate change within the planning and development activities within EMM, especially in terms of energy efficiency and renewable energy use, as well as social vulnerability and resilience.

### 13.2 Activities

Climate change

- Lead by example, and decrease the carbon footprint of the EMM Council
- The climate change strategy must set targets for each economic sector in the EMM, linked to implementation programmes
- Reduce the greenhouse gas footprint within the jurisdictional area of EMM and support the council's climate change protection programme
- Limit the production and use of ozone depleting substances in line with national and international requirements
- Anticipate the increased load on the health system from climate change impacts on disease vectors

Energy

- An energy efficient integrated transport system based on (i) improved Travel Demand Management, (ii) promotion of public transport and (iii) discouraging inefficient private vehicle use
- Departments to increase transport energy efficiency and core urban areas to increase the use of non-motorised transport
- EMM must increase energy efficiency for its own assets and buildings and day-to-day activities
- Cleaner and more efficient fuels and transport technologies in EMM fleet, all public buildings and street lights

- Increase energy efficiency within all sectors including industrial, commercial, institutional, mining, transportation and domestic energy use
- Increase the generation and use of renewable energy use within EMM

## **14 Promote environmental awareness and environmental education**

Education and public awareness is an integral part of sustainable development and an important part of a community's understanding of the environmental impacts and how these relate to their actions. Lack of knowledge by industry and community members can cause the degradation of the environment. The empowerment of industry and communities with regards to the environment not only enables them to understand what may be wrong and how they can rectify this, but also enables understanding and appreciation, which in turn leads to a desire to conserve and protect the surrounding environment.

### **14.1 Ultimate Outcome**

Promote environmental education and awareness that enhances the understanding of environmental rights, responsibilities and the protection and appreciation of the environment.

### **14.2 Activities**

- All EMM officials must be familiar with the Environmental Policy and implement its principles in their daily activities.
- Strengthen partnerships in environmental education between local government and existing community environmental education organisations and networks, including schools that enhances a sustainable environmental literacy
- The active involvement of business and industry in environmental education and awareness programmes for employees, local communities and the broader public
- Strengthen partnerships with Non-Governmental Organisations (NGOs), Community Based Organisations (CBOs) and business partners through establishment of Environmental Forums within EMM
- Increased awareness for days of environmental importance

## **15 Legal, Finance and Governance for environmental compliance**

Governance issues must be dealt with in terms of the requirements of the Constitution. In terms of the Act, Government is constituted as national, provincial and local spheres with different environmental mandates allocated to each tier. Specific responsibilities in terms of governance and management of various environmental issues are, however, stipulated in the relevant individual pieces of environmental legislation.

### **15.1 Ultimate Outcome**

Create an effective, appropriately resourced and harmonised institutional framework able to facilitate the implementation of the EMM Environmental Policy.

### **15.2 Activities**

- Standard operating procedures for EMM Departments must be environmentally sound best practice
- All EMM departments must make adequate budgetary provisions for environmental responsibilities and activities
- Ensure the development of a green procurement policy
- Ensure that all EMM by-laws are compliant with environmental legislative requirements or standards

- All safety and security issues relating to the enforcement of environmental legislation, policies, procedures, bylaws, crime prevention through environmental design, etc be dealt with in consultation with the Department Public Safety vis à vis the Ekurhuleni Metro Police Department (EMPD)
- Incorporate environmental legislation, regulation, procedures and policy (including national and provincial) into all municipal planning.
- Compliance with International Conventions, Treaties and Protocols, e.g. the Ramsar, Basel Conventions and Kyoto Protocol
- EMM must implement fleet management interventions to reduce its own transportation related pollution

## **16 Environmental principles are embedded in Infrastructure and development activities**

Infrastructure and development planning affects a wide range of activities and as such this section is split in different areas of impact.

### **16.1 Land use**

Land is the most important resource available for development in the EMM. The growing population and the increasing demand for development and associated infrastructure are intensifying the pressure for land to be made available for residential, agricultural, industrial and recreational uses. Appropriate planning of land use zones to meet this demand can assist in achieving a quality urban environment that provides for environmental, social and economic needs.

The Ekurhuleni Metropolitan Spatial Development Framework is the primary tool applied to the spatial restructuring of the municipal area in order to correct the spatial imbalances and inefficiencies and reach the desired spatial form.

It is crucial that the Ekurhuleni open space system is protected through spatial planning processes and that the decision-making process for land development and the change in land use rights be used to protect the open space system.

#### **16.1.1 Intermediate Outcome**

Ensure the sustainability of the EMM through the integration of environmental, social and economic principles in all spatial development planning processes.

Principles for open space development:

- The natural open space system includes highly stressed and sensitive natural environments such as wetlands, rivers/streams and remnant patches of representative indigenous fauna and flora that are necessary to maintain biodiversity and forms the primary open space network in Ekurhuleni and must be considered as “no go” areas for development;
- The primary open space network is considered as development “no-go areas” and only limited recreational, educational (environmental), tourism related uses and facilities, subject to environmental authorisation, may be developed within the primary open space network;
- The secondary open space system comprise of neighbourhood parks (“Public Open Space” zoned land and land indicated on a general plan as “Park”), as well as various servitudes and must, where possible, be linked to the primary open space network in the LSDF;
- A detailed open space analysis, based on the minimum standards as provided in the guidelines for “Human Settlement Planning and Design”, should be conducted for each of the Spatial Development Framework Areas;

- Sensitive environmental features such as local pans and wetlands that are not included in the primary open space network must be accommodated into the secondary open space network of a specific LSDF area;
- The primary and secondary open space network should be linked where possible to facilitate a range of continuous recreational opportunities and act as conduits for indigenous species, potentially facilitating the movement of pollinators and the dispersal of seed from one space to another; and
- Land uses surrounding primary and secondary open space network must be carefully considered to protect the integrity of the primary open space network and to secure access for the general public to the primary open space network.

### **16.1.2 Activities**

- GIS data on priority environmental areas should be kept up to date and be available in a manner that they can be integrated into the various Spatial Development Frameworks (SDFs)
- SDFs as a priority for areas where there is development pressure that may threaten the integrity, continuity or access to the primary open space network in the SDFs
- Security and safety concerns relating to EMM owned open space should not be used as an excuse for the alienation of such land
- Appropriate specialist studies regarding geological constraints (i.e. dolomite areas), environmentally sensitive and high potential agricultural areas must be undertaken during EIAs, and land use planning
- Develop a policy to guide the development of undeveloped suitable land within the EMM understanding that open spaces have a valuable role to play in the EMM
- Rehabilitate areas previously mined or degraded into a state that the areas can be used
- Increase urban greening and urban agriculture.
- Increase food security through protection of agricultural land and enterprises

## **16.2 Sustainable Human Settlements**

Adequate affordable and sustainable housing with access to services and facilities is one of the most basic needs for the health and wellbeing of residents within the EMM.

Sustainable Human Settlements are defined as “Well managed entities in which economic growth and social development are in balance with the carrying capacity of the natural systems on which they depend for their existence and result in sustainable development, wealth creation, poverty alleviation and equity ... The delivering of integrated residential settlements that are viable and in a manner that takes care of the environment and maintains it for future generations” (Breaking New Ground in Housing Delivery: A Comprehensive plan for the development of Sustainable Human Settlements, Department of Sustainable Human Settlements). As an example, provision of basic services to informal settlements has a major impact on the health of a community.

### **16.2.1 Intermediate Outcome**

Ensure that the need for housing and associated services is met in a way which minimises impacts on natural resources and promotes sustainable development while improving the quality of life of the inhabitants.

### **16.2.2 Activities**

- Clean, healthy, safe and efficient living environments, which take communities, their needs and the surrounding environment into account i.e. sustainable human settlements
- Reduce uncontrolled urban expansion, which threatens the resources of the EMM, by working towards creating a more compact metropolitan area
- Implement efficient building designs and alternative energy sources and sustainable use of water.

### **16.3 Roads and Stormwater Management**

The provision of good roads and stormwater systems combats erosion and possible flood damage during high rainfall events. It also ensures proper access to the community to provide important services such as waste collection, health services and public transport. The EMM acknowledges the importance and advantages of an adequate stormwater management system, as it will assist in maintaining a suitable quality of inland water, maintain biodiversity and ensure the protection of human health.

#### **16.3.1 Intermediate Outcomes**

Ensure the provision of adequate road infrastructure and stormwater management systems in a way that reduces negative impacts on humans and natural resources and promotes sustainable development.

#### **16.3.2 Activities**

- Promote appropriate transportation systems which reduce environmental impacts while increasing mobility for all;
- Planning that includes appropriate and adequate stormwater management infrastructure for existing and planned developments
- Promote the continued improvement of the streets and intersections within the EMM through maintenance, construction and traffic engineering management; and
- Promote effective development planning to include appropriate and adequate stormwater management infrastructure for existing and planned developments.
- Promote the recycling and reuse of grey water

### **16.4 Dolomite and geotechnical constraints and mining land**

More than 40% of the geographical area of Ekurhuleni is underlain by dolomite and undermined areas for which existing and future development on areas underlain by dolomite creates demands on development and maintenance costs of services. The standard of services, both new and existing services, which EMM allows today, will have a bearing and lasting effect on the formation of sinkholes for future generations.

Ekurhuleni as a previous mining area, has open mine shafts, acid mine water and open holes which pose a serious risk to the community. During rainy seasons these open mine shafts and water sources are filled with water which can result in drownings. Open shafts and resultant sink holes poses a continuous risk for life, as a breeding area for vermin, and as a source to pollute underground water. In addition, the mining belt serves as a depository for illegal waste, which often burns with huge quantities of smoke and other toxic gasses.

#### **16.4.1 Intermediate Outcome**

Implement the EMM adopted policy for the management and control of the dolomitic and undermined land problems within the EMM.

#### **16.4.2 Activities**

- Manage development on dolomitic land, undermined areas and next to pollution sources and thus help reduce the incidence of people living in high risk areas
- Develop a management plan for undermined areas
- Suitable infrastructure in dolomitic areas with a view to minimizing potential triggering mechanisms which may result in the development of dolomite related subsidence
- Proper planning and management to reduce medium to long term expenditure on crisis service repairs and sinkhole rehabilitation, Identify and priorities areas where infrastructure requires repair or upgrading
- Appropriate areas for future development, resulting from proper planning and management to minimise the risk to life and property in existing areas

- Reduce the likelihood of permanent pollution of the underlying dolomite aquifer
- Proper planning to reduce water loss from water bearing services

## 16.5 Economic Development

The economy plays a crucial role in sustainable development. A growing economy provides employment and income for the area. The economic development of the city is important for social equity and environmental sustainability. Positive economic activity can enhance the quality of people's lives by funding goods and services, such as sustainable housing, safe energy, healthy water supply, sanitation, waste management and education. Economic activity, wealth and poverty all have an impact on the environment and, therefore, must be considered in environmental management.

### 16.5.1 Intermediate Outcome

Ensure that environmental sustainability influences economic development in the EMM and promotes global competitiveness, provides jobs, aids in reducing poverty and improves living and business environments while avoiding unsustainable consumption patterns.

### 16.5.2 Activities

- Increase engagement in economic activities and infrastructure that enhances the quality of the environment, specifically the green economy
- Develop post compliance incentives for business, industry and parastatals to improve their environmental performance, including green buildings and procurement

## 16.6 Municipal Health Services

In order to prevent communicable disease and to reduce the negative impact on the health of communities, it is important that an integrated municipal health service strategy be developed and implemented.

### 16.6.1 Intermediate Outcome

Mitigate environmental impacts in order to provide an environment that does not impact negatively on human health and well being.

### 16.6.2 Activities

- Identify diseases linked to the environmental factors and providing intervention to mitigate them;
- Investigation of environmental related notifiable medical conditions;
- Promotion of clean in door air quality and ambient air quality management;
- Education and intervention to control vectors;
- Ensure safe food supply to the communities;
- Surveillance of premises to ensure health and safety;
- Inter-sectoral collaboration with other environmental management disciplines on issues of waste management, chemical safety and disposal of the dead; and
- Promotion and implementation of environmental health education programmes linked to health issues.

## 16.7 Disaster and Emergency Management Services

Though the role of disaster management and emergency services is not directly related to environmental management, both functions have direct responsibility in environmental sustainability as they are expected to reduce and respond to incidents that may lead to emergencies and/or disasters. The principle of sustainable disaster management is "protecting the present state, (i.e. environment), for the benefit of future generations".

### **16.7.1 Intermediate Outcome**

The Disaster and Emergency management services vision is “The Safe City”. In relation to the environment, this implies that disaster management and emergency services has to support the environmental management principles that foster environmental sustainability and discourage human activities that may expose the communities to environmental hazards and vulnerabilities in future.

### **16.7.2 Activities**

- Minimise diseases linked to environmental factors and provide intervention to mitigate them
- Surveillance of environmental related notifiable medical conditions
- Reduce the spread of disease vectors in EMM
- Inter-sectoral collaboration with other environmental management disciplines on issues of waste management, chemical safety and disposal of the dead
- Scientific disaster risk and vulnerability assessments must be conducted to expose the vulnerabilities as well as capacities
- Principles of the multi-sectoral and multi-disciplinary approach to issues of disaster management including furtherance of a sustainable environment in the EMM
- Increase the community awareness and training on issues of disaster management
- All stakeholders inside and outside the municipality to take actions to prepare, prevent and mitigate natural and human-induced disasters and emergency incidents
- Environmental disaster risks assessments to be conducted and develop response plans in conjunction with stakeholders