ENVIRONMENT
STATUS QUO TECHNICAL NOTE:
KWAMASHU A (TEMBALILHE & DUFFS ROAD)
This report represents a working draft report for the:

Environment Status Quo:
Technical Node

Prepared on 13 March 2015 for:
Thekwini Municipality
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1 Introduction

1.1 Objective

This objective of this technical note is to provide an overview of the environmental status quo of the study area by means of various indicators. Environmental assets or in more general terms, ‘green spaces’ play an important role in improving and maintaining people’s quality of life. The right to an environment that is not harmful to one’s health and the right to have that environment protected for the benefit of future generations are principles that are enshrined in the Constitution of the Republic of South Africa; and as such must be considered at the outset of any planning process.

1.2 The Study Area

The study area is located within KwaMashu and is bounded by Queen Nandi Drive, Dumisani Makhaya Road, Curnick Ndlovu (KwaMashu) Highway and the Malandela Highway including the Crossroads development (Figure 1). At the local government level, the study area is situated within the eThekwini Municipality (EM), one of eight metropolitan municipalities in South Africa. The EM is one of 34 global biodiversity hotspots, and owes this to its location at the centre of the Maputaland-Pondoland-Albany Region (eThekwini Municipality, 2013). The EM is characterised by diverse topography, from steep escarpments in the west to a relatively flat coastal plain in the east. The landform incorporates 98 km of coastline, 18 major catchments and 16 estuaries, 4000 km of river, and nearly 75 000 hectares of land identified as part of the Durban Metropolitan Open Space System (D’MOSS, see Section 2.2, eThekwini Municipality, 2013).
1.3 Ecosystem Goods and Services

This assessment is undertaken within the concept of ecosystem goods and services, which is a framework used to understand the role of the natural environment in the functioning of human societies. Figure 2 shows examples of ecosystem goods and services that natural areas can provide.

Figure 2: Examples of Ecosystem Goods and Services [eThekwini Municipality, 2013]

The following ‘resource user’ categories exist within the study area which demand various ecosystem goods and services (after Mander, Diederichs, & Markewicz, 2000):
- Formal residential - low density
- Formal residential - high density
- Informal residential - low density
- Informal residential - high density
- Commercial and institutional
- Industrial
- Transport

1.4 Methodology

This study is informed predominantly by desktop sources of spatial data, previous reports and assessments, as well as a preliminary comment from the eThekwini Environment Department. To an extent, primary sources in the form of photographs from a historical site visit were utilised in order to gain a sense of the landscape and identify some of the pertinent environmental issues.
2 Legislation and Policy Environment

2.1 National Policy

The legislative and policy environment pertinent to environmental factors is diverse. Table 1 summarises the overarching Acts that inform environmental governance in South Africa.

Table 1: Legislative Overview

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Overview</th>
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<tbody>
<tr>
<td>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</td>
<td>Under the Constitution, Local Government is mandated to “carry out a number of developmental duties”. Chapter 7 articulates this mandate as:</td>
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<td>• Provide democratic and accountable government for local communities</td>
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<td>• Ensure the provision of services to communities in a sustainable manner</td>
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<td>• Promote social and economic development</td>
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<td></td>
<td>• Promote a safe and healthy environment</td>
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<td></td>
<td>• Encourage the involvement of communities and community organisations in the matters of local government</td>
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<td></td>
<td>The promotion of the Bill of Rights, which reflects the nation’s values about human dignity, equality and freedom, is also a responsibility of local government.</td>
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<tr>
<td>National Environmental Management Act, 1998 (Act No. 24 of 1998), and associated Acts and Regulations, 1998-2009</td>
<td>The National Environmental Management Act (NEMA) is the fundamental and overarching legal instrument for environmental management in South Africa. The NEMA is underpinned by the Constitutional right of all South Africans to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (section 24 of the Constitution of the Republic of South Africa). More specifically, the NEMA has been established in order to provide for: “cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith”.</td>
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<td></td>
<td>The NEMA provides the legal basis for the preparation of Environmental Management Frameworks, which must be taken into account in decision making by authorities. According to the NEMA, activities that may impact on areas of high biodiversity value are subject to Environmental Impact Assessment (EIA) and authorisation by environmental authorities before land transformation or development may take place. In KZN, EIA applications accompanying development proposals are generally submitted to the KZN Department of Agriculture and Environmental Affairs (DAEA).</td>
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<tr>
<td>Environment Conservation Act, 1989 (Act No. 73 of 1989)</td>
<td>The Environment Conservation Act (ECA) is intended to provide for the effective protection and controlled utilisation of the environment. Part five of the Act refers to the control of activities that may have a detrimental effect on the environment. Section 21 of the Act refers to the Minister being permitted to identify those activities, which in his opinion have substantially detrimental effects on the environment, whether in general or in respect of certain areas. Any change in land use from agriculture, or undetermined use, to any other land use, and any use for nature conservation or zoned open space to any other land use, is subject to a mandatory EIA (Environmental Impact Assessment).</td>
</tr>
<tr>
<td>National Heritage Resources Act, 1999 (Act No. 25 of 1999)</td>
<td>The National Heritage Resources Act (NHRA) established the South African Heritage Resources Agency (SAHRA) in 1999. SAHRA is tasked with protecting heritage resources of national significance. Under Section 38 of this Act, all new developments with a site exceeding 5 000m², are subject to assessment by SAHRA. A heritage impact assessment must be carried out by a heritage specialist approved by SAHRA to enable them to make an informed decision. Section 27(1) of the Act requires such an assessment in case of certain categories of development.</td>
</tr>
<tr>
<td>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)</td>
<td>The Conservation of Agricultural Resources Act (CARA) is a national act that, under the auspices of the National Department of Agriculture, makes provision for the conservation of the natural agricultural resources of South Africa through:</td>
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<td>• Maintaining the production potential of land;</td>
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<td>• Combating and preventing erosion;</td>
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<td>• Preventing the weakening or destruction of the water sources;</td>
</tr>
</tbody>
</table>
### Legislation Overview

- Protecting the vegetation; and
- Combating weeds and invader plants.

#### National Water Act (Act No. 36 of 1998)

The National Water Act (NWA) ensures the protection of South Africa’s water resources and aquatic ecosystems, which includes estuaries, through the development of policies to facilitate sound management of water resources, provide protection of water resources and regulate water use. In Section 21 of the NWA, all freshwater water uses are defined and will require authorisation from the Department of Water Affairs (DWA) before the water use can commence.

#### National Forest Act (Act No. 84 of 1998)

The National Forest Act (NFA) provides for, inter alia, the protection of certain forests and trees and sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. Authorisation will be required for any interactions with these specific areas.

Pertinent to this study is the overarching objective of protecting and enhancing environmental assets not so much for their intrinsic value; but for the benefits of human populations. Our legislative landscape seeks to achieve this objective through regulation and administrative coordination, entailing authorisation processes for various areas of competency such as water, air quality and agricultural resources. The NEMA is the umbrella Act under which the specific environmental management Acts (SEMAs) are nested.

### 2.2 Durban Metropolitan Open Space System

The Durban Metropolitan Open Space System (D’MOSS) is an interconnected system of open spaces with high biodiversity value that have been identified for protection and management by eThekwini Municipality. This includes terrestrial, freshwater and marine environments that deliver ecosystem goods and services to the residents in eThekwini in order to retain linkages between these areas, maintain/strengthen their ecological functioning and deliver ecosystem goods and services. D’MOSS has been incorporated into the city’s IDP, SDF and regional SDPs. Figure 3 shows DMOSS in relation to the study area. With the exception of a small portion in the north, there is no DMOSS located within the study area.

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![Figure 3: DMOSS](image-url)
3 Assessment

3.1 Geology

In geological terms, the study area is dominated by Pietermaritzburg Shale (81.7%), followed by Vryheid Shale (10.7%) and Karoo Dolerite (5.8%). Figure 4 also shows intrusions of Alluvium and Vryheid Sandstone at 1.7% and 0.2% respectively. The implications of the underlying geology of the study area are discussed in Section 3.5.

3.2 Land Cover and Transformation

Figure 5, Figure 6 and Figure 7 show 2008 land cover, and are useful general indicators of the type of activities that occur within the study area; i.e. how the resource of land has been taken up and utilised in the study area over time.

Unsurprisingly, the study area is dominated by the high-density settlement (85%), followed by road and rail transportation networks which together accounted for approximately 8% of the land cover in 2008. Natural areas (including degraded natural areas) accounted for the remaining 7%, with the exception of a small percentage of low-density settlement that represented 2.6% of the total land cover in 2008. These ratios are shown spatially in Figure 5 and graphically in Figure 6.
3.3 Threatened Ecosystems

The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) provides for the listing of threatened or protected terrestrial ecosystems in one of four categories: critically endangered, endangered, vulnerable or protected. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction, including sites of exceptionally high conservation value by preventing further degradation and loss of structure, function and composition of these threatened ecosystems (SANBI, 2011). Figure 8 shows the occurrence of threatened ecosystems within the study area, highlighting the potential occurrence of fragmented portions of Durban Metropole North Coast Grassland in undeveloped areas and around riparian areas. From a national threat status perspective, Durban Metropole North Coast Grassland is critically endangered.
3.4 Hydrology

Rivers within EM have been found to be facing extreme pressure including spills and illegal discharges, solid waste dumping, wastewater treatment works not operating to specification or licence conditions, sand mining, realignment of watercourses, flow reduction through dams, removal of riparian flora, and infestation by alien flora and fauna [eThekwini Municipality, 2013]. Figure 9 highlights the hydrology of the study area, showing the occurrence of tributaries and valley lines within the confines of the study boundary, while the KwaMashu and Avoca Hills streams are the major rivers in close proximity. No significant wetlands are indicated in the study area, although it is unlikely that ground-truthing has taken place in this area.

![Hydrology](image)

Figure 9: Hydrology of the Study Area

3.5 Environmental Risk

Environmental risk is a key factor to consider when planning for both greenfield and brownfield developments. Issues to consider relate inter alia to hydrology, geology, and topography. In a more general sense, an assessment of environmental risk would be remiss in not considering the projected impact of long-term climate change on communities.

Climate change research indicates that the eThekwini Municipal Area (EMA) is likely to experience the following changes [eThekwini Municipality Environmental Management Department, 2007]:

- **Temperature**: Daily maximum temperatures are likely to increase by 2-3°C and daily minimum temperatures by 3-4°C in all seasons. Heat waves with temperatures over 30°C will increase in the period of October to March.
- **Rain**: Rainfall patterns will become more concentrated into heavy falls or floods and longer dry periods.
- **Sea Levels**: Average sea levels are likely to rise by roughly 2.5 cm every 10 years.

These changes will have negative impacts such as:

- Increased health problems due to heat stress, a serious problem for the very young, very old, and those who work outdoors, and an increase in the area that will be susceptible to vector-borne diseases like malaria and waterborne diseases like cholera.
- Decreased water availability due to decreased recharge of dams that supply the water supply systems.
- Changing water resource and habitats due to climatic and rainfall changes.
- Adverse agricultural impacts in terms of crop production due to more variable rainfall patterns.
- Increased incidence, severity and unpredictability of flooding and storm water damage to property and potentially human life.

Adaptation measures will be required to respond to and manage climate change impacts, including protection and strengthening of existing open space assets and ecological systems, avoidance of flood risk areas, introduction of sustainable drainage systems, landscaping and buildings to address micro-climatic issues, etc.

More immediately, Figure 10 shows potential environmental risk factors within the study area. Of concern is the presence of erodible and active soils, which has implications for human health and safety when developed. Steep and/or unstable slopes are further risk factors that detract from development potential.
From a hydrological perspective, areas along draining lines within the study area are at risk to flooding as indicated by the extent of the 1:100 year floodplain in Figure 10.
4 Key Findings and Implications

As a whole, the environmental system within the study area is severely compromised due to high levels of transformation, pollution and probable lack of meaningful intervention. It should be noted that the study area should not be viewed in isolation, but rather as part of an interconnected and dynamic larger system. As such, catchment level impacts are often the drivers of local environmental conditions.

Environmental resilience (i.e. the ability to sustain and recover from detrimental effects such as pollution) is likely to be low, perhaps even approaching critical thresholds where the system will degrade further without intervention. This has the added effect of increasing risk levels (see Section 3.5).

From anthropogenic perspective, indigent persons are likely to have both the lowest levels of resilience to environmental risk and the greatest exposure (consider informal settlements within floodplains, which are often the only undeveloped areas left within high-density urban settings).

Despite this, there is without doubt a level of ecosystem goods and services being supplied (waste assimilation, minor flood attenuation, some open/green space, etc) within the study area, which needs to be consolidated and protected. To this end, linkages to other environmental assets beyond the study area is crucial, as is the need to improve what goes downstream to the remainder of the catchment from a waste and pollution management perspective.

Opportunities exist to dovetail the enhancement of ecosystems goods and services with local economic development initiatives such as Working for Water, Working for Wetlands, the Expanded Public Works Programme, etc. Activities such as rehabilitation and restoration of degraded areas have potential to impact positively on environmental assets and communities.

Best-practice in environmental planning directs us to recognise and expand the role of urban green and open spaces by integrating them into the urban fabric more explicitly with a focus on improving ecosystem goods and services for human wellbeing. To this end, a preliminary identification and consolidation of open space environmental assets is indicated by Figure 11, which was developed by applying buffers to riparian areas (in line with current environmental legislation) and including existing open space layers as identified by the DUT study and eThekwini GIS layers. This results in approximately 58 ha of open space system, or roughly 22% of the study area. This open space system will be refined during the planning process, but at the Status Quo phase represents the starting point for the incorporation of ecosystem goods and services into the broader planning process.

Figure 11: Potential Open Space within the study area
5 Study Limitations

While this assessment has made use of the best available information, it should be noted that ground-truthing is unlikely to have occurred in this area for various reasons. While pertinent regional studies are common, few localised or site-specific studies would allow for extrapolation of those conditions. The accuracy of data and information is therefore dependent on factors beyond the control of the authors.

6 Literary References


