Environmental Sustainability Strategy and Action Plan
For the City of Johannesburg

Final Draft

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<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AMD</td>
<td>Acid Mine Drainage</td>
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<td>AP</td>
<td>Action Plan</td>
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<td>MRA</td>
<td>Mine Residual Area</td>
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<td>CoJ</td>
<td>City of Johannesburg</td>
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<tr>
<td>DPSIR</td>
<td>Drivers, Pressures, State, Impact and Response Framework</td>
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<td>ENABLE</td>
<td>Enabling Green and Blue Infrastructure Potential in Complex Social-Ecological Regions</td>
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<td>EISD</td>
<td>Environment and Infrastructure Services Department</td>
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<td>ES</td>
<td>Ecosystem Service</td>
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<td>ESS</td>
<td>Environmental sustainability Strategy</td>
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<td>ESS&amp;AP</td>
<td>Environmental sustainability Strategy &amp; Action Plan</td>
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<td>GCAP</td>
<td>Green City Action Plan</td>
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<td>GDS</td>
<td>Growth and Development Strategy</td>
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<td>GI</td>
<td>Green Infrastructure</td>
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<td>GSPCR</td>
<td>Group/Head Strategy Policy Coordination and Relations</td>
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<td>IDP</td>
<td>Integrated Development Plan</td>
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<td>INR</td>
<td>Institute of Natural Resources</td>
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<td>IPBES</td>
<td>Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services</td>
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<td>IUDF</td>
<td>Integrated Urban Development Framework</td>
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<td>JMOS</td>
<td>Johannesburg Metropolitan Open Space System</td>
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<td>KPA</td>
<td>Key Performance Area</td>
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<tr>
<td>LULUCF</td>
<td>land use, land use change and forestry</td>
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<td>ME</td>
<td>Municipal Entity</td>
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<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<td>PMT</td>
<td>Project Management Team</td>
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<td>ProGIreg</td>
<td>Productive Green Infrastructure for post-industrial urban regeneration</td>
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<td>South African Cities Network</td>
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<td>Sustainable Development Goal</td>
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<td>SEMA</td>
<td>Specific Environmental Management Act</td>
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<td>SMART</td>
<td>Specific, Measurable, Attainable, Relevant and Timely</td>
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<td>SoCR</td>
<td>State of Cities Report</td>
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<td>TUMI</td>
<td>Transformative Urban Mobility Initiative</td>
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<td>World Bank Urban Sustainability Framework</td>
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FOREWORD

Foreword [by the Executive Director]
1. INTRODUCTION

Over the past decade, the centrality of cities in the political economy has become a global phenomenon. Dramatic headlines, such as “rise of cities”, “urban world” and “planet of cities”, are prominent in literature and business terminology [State of South African Cities Report – SoCR, 2016]. The City is at the core of change globally, nationally and locally, as what happens globally interfaces with local events and dynamics [GDS, 2040]. Cities are being acknowledged as the key to growth, development and stability. They are however experiencing unprecedented change due to drivers of which rapid urbanisation1 and climate change are significant examples. This rapid urbanisation and the critical economic, social and environmental imperatives have necessitated heightened attention on urban issues [SoCR, 2016].

“The 21st century will not be dominated by America or China, Brazil or India, but by The City. In a world that increasingly appears ungovernable, cities — not states — are the islands of governance on which the future world order will be built.”


In addressing Sustainable Development Goal [SDG] 11: “Make cities and human settlements inclusive, safe, resilient and sustainable”, it is acknowledged that the pace of urban growth is unparalleled. Cities are growing and informalising at rates that makes it almost impossible to plan and meet demands for job, services and infrastructure [The SDG Report, 2017].

South Africa’s cities have struggled to keep pace with recent urban growth and [like in other countries2] face considerable challenges of urban inequality and non-sustainable growth paths [SoCR, 2016]. South African urban areas are profoundly resource intensive, highly polluted, and wasteful. The typical metropolitan area has a very high ecological footprint [Integrated Urban Development Framework – IUDF]. With mounting job losses and the economic downturn affecting both the rich and the poor, attention is increasingly focused on the role that cities play in stimulating and supporting economic development. This is leading to several socio-economic aspects of exclusion3, but critically the typical South African city has followed a resource-intensive growth path, and suffers from inefficiencies across sectors such as energy, water, waste, food, and transport. The energy mix is unsustainable, landfill sites are fast running out of airspace, freshwater resources are constrained, and greenhouse gas emissions are increasing [mainly from electricity generation and vehicles that run on fossil fuels]. Cities must therefore develop sustainable city growth paths and priorities and put in place systems to monitor their performance [SoCR, 2016].

As a member of the United Nations General Assembly, South Africa is a signatory to the SDGs and is required to implement the sustainable development agenda and report on progress towards the targets. Furthermore, as a signatory to various international conventions including the Paris Agreement4 [April 2016] and the Convention of Biological Diversity5 [November 1995], South Africa is committed to responding to these environmental sustainability challenges which are concentrated in cities.

1 The population change total for the 20 top places cities spanning 1996–2011 showed the highest population increase in Johannesburg far exceeding all others, reaching 1.8million, followed by Cape Town at 1.2million [SoCR, 2016]]
2 Such as BRICS – Britain, Russia, India, China and [South Africa]
3 These socio-economic exclusions refer to people being excluded from economic opportunity, which in turn lead to collective violence and population vulnerability [SoCR, 2016]. However, with this being an Environmental sustainability Strategy, these are not contextualised in detail at national level, but are considered further in the ESS in terms of socio-economic impact.
4 The Paris Agreement is universally regarded as a seminal point in the development of the international climate change regime under the UNFCCC. The Agreement is a comprehensive framework which will guide international efforts to reduce greenhouse gas emissions in order to limit increases in global temperature increase to 1.5 degrees.
5 Signed by South Africa on 2 November 1995. The CBD is anchored on three key objectives namely: The conservation, sustainable use of biological diversity, and the fair and equitable sharing of benefits arising from the utilisation of resources.
The concept of sustainability, environmental management, biodiversity conservation and national responsibilities established through international conventions are translated to all levels of government through the Constitution and the comprehensive policy and legal framework. Local Government is therefore accountable for developing sustainably and contributing to the achievement of national goals and targets, and for reporting on their performance against these.

In view of the above context, the City of Johannesburg (CoJ) has a responsibility to the citizens of CoJ, Johannesburg and South Africa, to secure their constitutional right to a safe and healthy environment, but also the contribution of the City to the cumulative environmental issues and trends occurring at broader scales. The CoJ is going through profound changes. These changes are not unique, instead they mark a period of global volatility and massive change that cities all over the world in the 21st century, are experiencing. These include unprecedented environmental change, exacerbated by socio-economic drivers of which rapid urbanisation and climate change are significant examples. The City is at the core of change globally, nationally and locally, as what happens globally interfaces with local events and dynamics [GDS, 2040].

This Environmental sustainability Strategy [ESS] seeks to define and prioritize the key environmental sustainability issues facing the CoJ, develop understanding of the drivers of the current situation, and unpack the implications of the status quo for the well-being of citizens and the economy, with the intention to lay the foreground towards a sustainable city. Environmental sustainability is a collective responsibility across Municipal Departments, the private sector, individual citizens, civil society and other levels of government. The ESS therefore also serves as an important governance tool by directing and galvanizing responses through partnerships between these role-players to address not only the symptoms, but importantly also the cause of the environmental sustainability challenges.

The strategic understanding and direction provided by the ESS is translated into action via the supporting Action Plan [AP]. The ESS also locates these two instruments in the broader CoJ governance system and defines how they relate to other Municipal policy and plans. The document is structured as follows:

Section 1 Introduction [this section] which frames the ‘City’ context in the 21st century as motivation for the ESS.

Section 2 Defines the Purpose of the ESS and Action Plan, the specific outcomes and their role within the CoJ broader policy framework.

Section 3 Establishes the Context and Motivation for the ESS by detailing the global, national and local perspectives for urban sustainability or sustainable cities, highlighting the common, existing and emerging challenges faced by cities.

Section 4 Presents the guiding principles underpinning the ESS and Action Plan.

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A SUSTAINABLE CITY is defined as: “A city that meets its developmental responsibility [social justice and urban safety] in a sustainable, spatially transformed and resource-efficient way [natural and economic resources, and human capacity] that takes into account the limited biophysical planetary boundaries [environmental thresholds]. Living sustainably means grappling with the “perfect storm” associated with the inseparability of water, food, energy and climate change”


The population change total for the 20 top places cities spanning 1996–2011 showed the highest population increase in Johannesburg far exceeding all others, reaching 1.8million, followed by Cape Town at 1.2million [SoCR, 2016]]
Section 5 Documents the “State of Environmental sustainability in CoJ in 2019”. This section unpacks the key environmental sustainability issues [ESIs] faced by the CoJ presented within the Drivers, Pressures, State, Impacts and Response [DPSIR] framework.

Section 6 Defines the Environmental sustainability Vision and Sustainability Objectives for eight identified key ESIs.

Section 7 The final section provides guidance on implementing the ESS and the role of the Action Plan in the practical application of the ESS and monitoring success towards the ESS Vision and objectives

Section Summary: The introduction highlights the global centrality of cities and emphasises a resource intensive trend, which challenges sustainability and must therefore be addressed. The section further defines the sustainable city and what it means for the CoJ

2. PURPOSE OF THE ENVIRONMENTAL SUSTAINABILITY STRATEGY

2.1 Understanding the Need

The Group Strategy, Policy Coordination and Relations [GSPCR] reported that there are 867 policies in CoJ and that the policy making process in CoJ is fragmented and uncoordinated. Of these 241 align with sustainable development. The internal review undertaken to inform this ESS confirmed the findings of the GSPCR in relation to environmental sustainability due to the variation in the way it is understood and reflected in terminology, objectives, targets and responses across the CoJ hierarchy of policy instruments. Therefore, while this ESS does not replace any existing policy, it serves to provide coherence across the hierarchy of policy and inform the appropriate application and revision thereof [in relation to environmental sustainability]. The way existing policy integrates or addresses environmental sustainability is summarized below as a basis for understanding the role of the ESS in influencing the policy framework.

2.1.1 Growth and Development Strategy 2040 – Setting the Sustainability Agenda

The founding principle for the concept of Sustainability is that long term implications are considered in current decision making. At a policy level, the CoJ’s strategic agenda is guided and informed by the Cities’ Growth and Development Strategy [GDS] which sets the long-term vision and objectives for 2040. The GDS aims to achieve this through the development model defined below.

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The model recognises that there are tensions between the five main drivers, but these tensions simultaneously provide opportunities for change, innovation, and the introduction of new ways of managing complexity and uncertainty. This then serves as a lens through which the CoJ aims to view, conceptualise and enhance its approach to development issues.

The key elements of the GDS are summarised in Figure 2 below. While environmentally sustainability is not clear in the 2040 vision, Outcome 3 does express the term ‘Environmental sustainability’ and recognises the concepts of risk and the need to address the causes of environmental impacts. It also highlights the importance of environmental sustainability for the wellbeing of citizens and city’s overall sustainability and that the “value of ecological goods and services is undervalued” in this respect. Importantly it also recognises the need to ‘make bold choices’ and ‘consider new ways’ to protect and manage natural resources and address the risk of environmental change. Outcome 3 further establishes the environmental issues as a priority for the long-term future of the city and identifies six focus areas: Water Security; Energy Efficiency; Waste Reduction; Eco-mobility; Sustainable human settlements and Climate change resilience and environmental protection. Several of these have been confirmed as key Environmental sustainability Issues [ESI’s] in this ESS [Refer to Section 6.2.]
2.1.2 The Integrated Development Plan – Translating Vision into Action

The term ‘economic’ and ‘services’ are firmly at the core of the mission expressed in the IDP. There is no mention of environment or sustainability, even in the broader sense of the word. ‘Preserve our resources for future generations’ is the last of the nine identified priorities. The term ‘environmental sustainability’ is buried at lower levels in the IDP structure. The ‘environmental component’ of the 2018/19 CoJ IDP is Outcome 3: “Enhanced, quality services and sustainable environmental practices”, which have the following mission: “To deliver better, high quality services to the people of Joburg. This will make a concrete difference in our resident’s quality of life and the opportunities they have open to them”. The priority programmes in section 3 includes Priority 3.3: Preserve out Natural Resources. This in turn includes Programme 3.3.1: Environmental sustainability [the first time the term is mentioned in the IDP]. The indicators for this are, however, all related to infrastructure [e.g. % waste diverted from landfill, kilometres of road resurfaced etc.,]. These have little bearing on the existing Environmental sustainability issues.

2.1.3 Specific Environmental Policy

The Environment and Infrastructure Services Department [EISD] established in 2011/2012 is responsible for the oversight of the City’s ability to create sustainable human environments, whilst reducing the ecological footprint in the delivery of basic services and ensuring effective environmental policy, strategy, regulation and standards are implemented across the City in the supply of such services. The EISD has developed numerous environmental sector or departmental specific policies. This list is extensive and responds to many of the ESI’s in this ESS. Elements of environmental sustainability are therefore being dealt with but in a ‘piece meal manner’. The City however lacks a single policy instrument that documents the priority issues and provides consistent direction and guidance for environmental planning and decision-making within the City and across all city operations. The ESS aims to fill this gap.

2.1.4 Departmental and Sector Policy and Plans

Environmental sustainability is collective responsibility not just that of the EISD. All CoJ Departments have an impact on the state of natural resources and, or environmental quality, or the ability to influence the level of impact. Environmental sustainability needs to be foregrounded or mainstreamed in the departments responsible for influencing and managing the drivers of environmental sustainability issues and directly influence their planning, operations and relationships with external partners through its operations. It is the role of this ESS to document the priority sustainability issues and which internal role-players have a key role to play in addressing the drivers and associated pressures or responding to the impacts thereof. For a list of sector policies reviewed, refer to Annexure A.

The above overview provides context for understanding the purpose and role of the ESS in the CoJ policy framework.

2.2 Purpose and Role of the ESS and Action Plan

The omission of environmental sustainability in strategic City vision and mission statements limits the ability to mainstream it as a collective responsibility across Municipal departments. This is further complicated by the variation in terms used and their interpretation across policy instruments, which complicates and confuses the ability to carry through a common definition and understanding of a concept or issue, particularly cross cutting issues such as environmental sustainability. Even when the same term is used across policy instruments, the specifics like targets differ. The confusion in terminology and definition at higher levels in the policy i.e. mission and objectives complicate the process of defining key performance areas [KPAs] and targets against which accountability can be
defined and performance measured as part of a monitoring and evaluation system. Furthermore, there are examples of different targets being set for specific issues in different policy instruments. This limits the ability of CoJ to monitor success towards the goals and outcomes.

2.2.1 Purpose of the Strategy

This ESS addresses the need outlined in Section 2.1, and responds directly to the global, national and local context outlined in Section 3. Refer to with the defined purpose and key outcomes summarised below. There are specific needs that need to be met to achieve this broad purpose. The way in which the ESS and the supporting Action Plan achieve these specific needs are listed in following graphic.

**Figure 3: Purpose and outcomes of the ESS**
2.2.2 Role of the ESS&AP in the Policy Framework

The relationship between the ESS and Action Plan, and the way in which they interface with other policy instruments is summarised in Figure 4.

ESS addresses gaps in the GDS in the scope and way in which it expresses the City’s environmental sustainability challenges.

ESS provides coherent guidance by confirming the City’s commitment to becoming resilient, liveable and sustainable. This is achieved by:
- Establishing an ‘Environmental sustainability Vision’
- Defining the key ESIs.
- Setting sustainability objectives for each ESI.
- Defining strategic responses and responsibility [accountability] for these.

Action Plan supports the ESS in the achievement of the Sustainability Vision and goals by:
- Refining the strategic actions in the ESS,
- Providing a monitoring and evaluation [M&E] framework to assess progress of all City interventions against sustainability objectives and long-term targets for each ESI.

Sectors all report progress against sustainability objectives via Action Plan.

Review of actions against targets fed through into sector reporting against KPAs.

The ESS and Action Plan are located adjacent to and give effect to the GDS, IDP and wide range of sector policies, plans and programmes. This location in the CoJ policy framework allows the ESS to be vertically effective and influential, critically evaluating the impetus of the GDS through a sustainability lens while guiding specific sector policy and plans. This allows these tools in combination to:

- Address gaps in the GDS in the scope and way it expresses the City’s environmental sustainability challenges.
- Inform the revision of sector policies and plans to take on board responsibility in addressing the sustainability challenges. The aim is that this will influence the programmes and thereby the projects that are then approved in the IDP as this is the mechanism to secure funding.
Monitor the performance of sector departments in the implementation of actions that are their contribution to addressing the sustainability objectives across the spectrum environmental sustainability issue drivers, pressures or impacts. This ensures that the City is not responding only to the impact but also tackling the drivers. The inclusion of indicators and influence on Key Performance areas allows for the tracking of success towards the achievement of the goals by all sector departments.

The ESS and Action Plan will be reviewed on a 5-yearly basis in line with the review timeframes for the GDS and the IDP. It is appropriate that the ESS is reviewed a year in advance of the GDS so that the GDS revision responds directly the latest understanding of the Cities’ progress to implementing the ESS and achieving the stated objectives.

### 3. CONTEXT AND MOTIVATION FOR THE ESS

An understanding of global environmental issues, their local relevance, and how the City is organised and responding to both the drivers and the impacts thereof establishes the context and motivation for the development of an ESS, and the supporting Action Plan.

#### 3.1 Global Perspectives for Urban Sustainability

South Africa’s cities are neither incidents nor islands – nor are they only the consequence of globalised trends, though these are certainly a factor. They are also defined by the country’s particular context and history, referring to demographic changes, relative strength of metro economies; basic service provisions; cities and towns being the backbone of regional and rural economic networks; secondary cities and small towns fast growth; moving populations [migration trends]; concentration of population in city cores and economic nodes; significant densification through back-yarding8; localised effects and implications as a result of increased densities and demand [SoCR, 2016].

Leveraging the potential of global networks [e.g. UN Habitat, Cities Alliance etc.], which provide an international platform for urban issues, is partly about city marketing. These urban tensions provide the “backdrop” or institutional context, and support required. They emphasise the need for cities to find a balance between global and domestic concerns to ensure a more resilient and more sustainable urban future. The need to find a balance between “thinking globally but acting locally9” are most pronounced in large cities because of their high population concentrations and connectedness to global financial and economic systems [SoCR, 2016], such as the CoJ.

An external review of sustainability policies and strategies has identified that many of the key issues focused on internationally are common/similar [water, climate change and risk reduction, biodiversity

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8 A useful way to explore the form of densification that is taking place is to look for patterns in settlement formation and change over time. Analysis illustrate the changes along a transect line extending from Lenasia to the north-eastern tip of Tshwane. Following this transect line, are the points of growth between 1996 and 2015 of Hillbrow, Alexandria, Tembisa. Infill, densification and vast new developments are particularly observable in Tembisa [SoCR, 2016].

9 A specific consideration of “acting locally is recognising the apartheid and colonial legacies of spatial distortion, entrenched inequities, social divisions and the uneven distribution of capacity required to meet the needs and aspirations of local communities in a new, free and democratic South Africa. What this legacy has meant for the largest cities over the past 15 years is a double-edged mission: one of dealing with the past and its consequences for today’s realities, while imaging and evolving towards a better future [SoCR, 2016].
as natural assets, air, energy, waste, circular economy etc.), but that environmental sustainability often taken up into overarching ‘master’ plan. An ESS such as this document, is therefore unique and it warrants the need to be clear on what the desired outcome is [i.e. change behaviour, set priorities, coordinate actions and decisions within/across sectors], refer to graphic 1 [page 4] of this ESS which outlines the purpose and outcomes.

The New Urban Agenda, a universal call to action, reaffirms global commitment to sustainable urban development as a critical step for realizing sustainable development in an integrated and coordinated manner at the global, regional, national, subnational and local levels, with the participation of all relevant actors. The implementation of the New Urban Agenda contributes to the implementation and localization of the 2030 Agenda for Sustainable Development in an integrated manner, and to the achievement of the SDG and targets, including Goal 11. The New Urban Agenda acknowledges that culture and cultural diversity are sources of enrichment for humankind and provide an important contribution to the sustainable development of cities, human settlements and citizens, empowering them to play an active and unique role in development initiatives. It further recognizes that culture should be taken into account in the promotion and implementation of new sustainable consumption and production patterns that contribute to the responsible use of resources and address the adverse impact of climate change [United Nations – UN – New Urban Agenda, Habitat III, 2017]. As a signatory to various international conventions, South Africa is committed to responding to this change and the associated impacts. The list includes the Kyoto Protocol, Paris Agreement [April 2016] and the Convention of Biological Diversity [November 1995].

Figure 5: Leveraging the transition to sustainability, source: SoCR, 2016, Chapter Five.

The SDG Report [2017] identified the following remaining challenges against the achievement of SDG 11 [worldwide]:

- The proportion of the urban population living in slums worldwide fell from 28% in 2000 to 23% in 2014. However, in sub-Saharan Africa, more than half [56%] of urban dwellers lived in slum conditions.
- From 2000 to 2015, in all regions of the world, the expansion of urban land outpaced the growth of urban populations, resulting in urban sprawl.
• According to data from cities in 101 countries from 2009 to 2013, approximately 65 per cent of the population was served by municipal waste collection.
• In 2014, 9 in 10 people living in urban areas breathed air that did not meet the World Health Organization’s air quality guidelines value for particulate matter [PM 2.5].
• As of May 2017, 149 countries had fully or partially implemented national-level urban policies, most of which are aligned with priority areas identified in the SDGs.

All of the above are key environmental sustainability issues [ESI’s] in the CoJ context, among others identified during the ESS process.

The World Bank Environmental and Social Framework [ESF] sets out the World Bank’s commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers’ projects, with the aim of ending extreme poverty and promoting shared prosperity. The World Bank Group is globally committed to environmental sustainability, including stronger collective action to support climate change mitigation and adaptation, recognizing this as essential in a world of finite natural resources [The World Bank, 2017].

The recent “Global Warming of 1.5°C Special Report of the Intergovernmental Panel on Climate Change [IPCC]” and the “Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [IPBES] Regional Assessment Report on Biodiversity and Ecosystem Services for Africa, 2018” highlighted a number of climate related risks to human and natural systems [e.g. water stress, increases in heavy precipitation events, drought, temperature extremes, sea level rise, ecosystem impacts, land use and food security]. According to a 2018 special report of the IPCC, global anthropogenic emissions will need to drop to net zero by 2050 to limit the global temperature increase to less than 1.5°C above the pre-industrial level. The energy system contributes two-thirds of global emissions and lies at the heart of this challenge. Disadvantaged and vulnerable populations will be at disproportionately higher risk of these adverse impacts. Given that some impacts may be irreversible, the report:
• Highlights the fact that dramatic, transformative, systemic change will be needed, at an unprecedented rate and scale, if global warming is to be kept within 1.5°C,
• That this will require the up-scaling and acceleration of far-reaching, multi-level and cross-sectoral climate mitigation and adaptation initiatives.
• Emphasizes the need to act now to reduce the risks associated with cost escalation, lock-in impacts and infrastructure, and reduced flexibility in terms of future response options, particularly in a context where many of the technological response options and their associated risks are not well understood. Delayed action also exacerbates the risks associated with crossing possible climate ‘tipping points’, beyond which the possible impacts are not well understood.

The need to adapt and adopt a “business-unusual” approach has never before been this warranted and necessitates the City of Johannesburg’s [CoJ’s] attention to effecting such change.

The latest IPBES regional report emphasises the critical role played by biodiversity in providing flows of goods and services that contribute to the continent’s food, water, energy, health, livelihoods and cultural needs. This is particularly important given that the city’s biodiversity does not enjoy sufficient protection and conservation, and it’s threatened by a range of drivers, both direct and indirect. Cities are developing so fast, unplanned and unregulated change is particularly problematic. Given that Africa is one of the fastest growing continents, these threats will likely increase. The CoJ is
still developing and therefore provides an opportunity for development based on principles of more sustainable resource use. The window of opportunity is however closing fast.

Global trends support the fact that **there can no longer be a trade-off mentality, and that the only way forward is placing the environment at the forefront** and recognising the opportunity it presents for the social and economic well-being of the planet as well. **Mainstreaming environmental sustainability requires amongst various things appropriate governance structures, systems and tools** that confirm the need, define responsibility and ensure accountability for acting through appropriate partnerships. Since the adoption of the 2030 Agenda for Sustainable Development, the United Nations system has further intensified its effort to mainstream the economic, social and environmental dimensions of sustainable development throughout its work. In their efforts to advance the implementation of the 2030 Agenda and progress towards the SDGs, United Nations system entities are increasingly moving away from silos to seeking interlinkages among the Goals. There is also a clear willingness to enhance collaboration within the system as well as with business and civil society stakeholders, building on comparative advantages and focusing on adding value to efforts at the country level towards achieving the Goals. Mainstreaming sustainable development is essential to achieving the vision and aspirations of the 2030 Agenda for Sustainable Development and its 17 SDGs. Such mainstreaming embodies the transformative nature of the 2030 Agenda and the Goals, with the emphasis on linkages and nexuses, the imperative of moving from silos to integration and synergies, and the spirit of partnerships, none of which will materialize in the absence of progress in the mainstreaming environmental sustainability as a collective responsibility.

### 3.2 National Perspectives for Urban Sustainability

Like most of Africa and other developing countries, South Africa is experiencing continuing urbanisation. Nearly two-thirds [64%] of South Africa’s youth live in urban areas, whereas the aged [no longer economically active] population tend to migrate to more rural settlements and secondary cities in other provinces [Integrated Urban Development Framework - IUDF, Draft]. In South Africa, apartheid spatial design produced inefficient cities that suffer from sprawl and spatially entrenched segregation. Poorer communities live on the edge of the city, away from economic, social and educational opportunities, and therefore spend a disproportionately high share of their disposable income [and time] on transport [Urban LandMark, 2012, cited in SoCR, 2016]. More than 1.3 million commuters spend over two hours a day travelling to and from their places of residence [Stats SA, 2013, cited in SoCR, 2016], and private car usage is high: if 10% of private car uses shifted to daily public transport, energy consumption in the city would reduce by 8% [CoJ, 2011, cited in SoCR, 2016].

South Africa’s cities and towns are shaped by the apartheid legacy of racial segregation, poverty, and exclusion from social and economic opportunities. High levels of inefficiency and wasteful use of scarce resources [especially land and infrastructure networks] characterise the country’s cities and towns. Despite significant service delivery and development gains since 1994, these spatial patterns have largely not been reversed [IUDF, Draft]. The spatial form of South African cities, dependency on cars and suburban-lifestyle aspirations [across classes] produce a highly resource-intensive and inefficient form of settlement. This, combined with a coal-based energy system, is a recipe for unsustainable urban development and, arguably, is in direct contravention of the post-1994 constitutional and legal provisions [IUDF, Draft].

Sustainability needs to be understood broadly and holistically, and environmental sustainability should become the foundation to anchor the other pillars concerned with the productivity, inclusivity and well-being of citizens. South Africa’s developmental challenges can still be fulfilled with certain levels of economic growth but pursuing development in a non-integrated way that ignores the environmental thresholds could threaten the local and national economies. This situation could be costly for cities to reverse. Current city transitions towards sustainable development are inadequate, as shown by intensive consumption of resources, infrastructure backlog, youth unemployment and
urban safety challenges. This presents an opportunity to do things differently to effect pro-poor spatial transformation of the current urban form where low-to-middle income households live in outer suburbs and townships. Efficient and inclusive public transport networks will reduce transport-related emissions and help achieve socioeconomic inclusion. However, to function optimally, such public transport networks require high-density developments, as public transport use is greater in areas of higher density. The sanitation, water, electricity and housing infrastructure backlogs present an opportunity for innovation that could catalyse small enterprise development [SoCR, 2016].

Since 1994, the government has clearly positioned South Africa as a country on a sustainable path. The South African Constitution requires local government to “secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”. In support of this constitutional objective, the National Environmental Management Act [NEMA] [No. 107 of 1998] established cooperative governance principles, institutional mechanisms and sustainable development tools needed to promote environmental sustainability. These include environmental impact assessments, environmental management frameworks, environmental management cooperation agreements, environmental management plans, environmental implementation plans and regular State of the Environment reports. In 2008, the National Framework for Sustainable Development was adopted. It became the National Strategy for Sustainable Development [NSSD] in 2011 [SoCR, 2016]. South Africa’s Nationally Determined Contribution [NDC] contains a target to limit greenhouse gas (GHG) emissions including land use, land use change and forestry (LULUCF) to between 398 and 614 MtCO2e over the period 2025–2030.

### 3.3 Local Implications and Lessons

The global issues described above are manifesting locally with significant implications for people’s well-being and the economy as highlighted below in recent examples from South African cities. Given that Local Government responds at the scale of impact municipalities are central to integrating resilience in their planning, development and operations. Several provinces have been declared drought disaster areas since 2015 [Essop, 2016, cited in CoJ Adaptation Framework, 2017]. Responding, CoJ implemented water restrictions. Impacts are manifesting through events such as flooding, flash flooding, heat waves and droughts.

An impact assessment on the 2015 drought in Johannesburg found a number of clinics, hospitals, old age homes and schools in Johannesburg had been without tap water for days. These institutions had no alternative water sources. The schools were forced to close, but the hospitals, clinics and old-age homes cannot close down and so had to continue operating without water. This poses considerable health risks. Reliable potable water is a vital need among marginalised people in the CoJ. Shortages in this commodity could have severe social and political consequences.

Drought presents considerable challenges to a city in general, but it is the economically marginalised, the food insecure, the ill and the elderly who are usually the most at risk to the impacts of droughts. At times droughts can escalate into extreme droughts such as the recent drought of the past few years.
The situation in the Western Cape offers insights into conditions that can develop during an extreme drought situation [CoJ Adaptation Framework, 2017]. Consequently, the lessons were predominantly on governance, leadership and partnerships. An important starting point is to document the current shortcomings in such governance systems. This ESS serves as a key point of departure because it defines the priority environmental sustainability issues which and shortcomings in how the City is responding to these.

4. GUIDING PRINCIPLES

The following principles underpin the ESS. As the ESS is developed in support of the GDS, Outcome 3 [Refer to Figure 1] of the GDS is considered in defining the principles that contextualize what environmental sustainability means for the CoJ. The highlighted aspects of the Outcome are referenced in defining the various principles.
Figure 6: The underpinning principles of the ESS

Section Summary: Section four outlines the principles which underpin the ESS such as having a long-term perspective and being bold in decision-making. The principles have been selected based on global trends and the requirements for driving change.
5. STATE OF ENVIRONMENTAL SUSTAINABILITY IN CoJ – AT A GLANCE IN 2019

A comprehensive understanding of the Environmental Sustainability Issues [ESI’s] facing the City is required to inform appropriate responses. The state of environmental sustainability in CoJ is therefore the point of departure for the development of the specific Sustainability Objectives from which flow strategic actions which inform specific actions.

This section is framed in terms of the Drivers-Pressure-State-Impact-Response framework [defined in Figure 8]. The value of this framework is that it links cause with effect and impact, and highlights where responses are inappropriate, lacking in nature or scale, and so on.

An example of such a thread is the increasing urbanisation which creates pressure on land, escalating the rates of land transformation. This leads to impacts of land fragmentation and a loss and degradation of habitat and compromises the provision of ecosystem services. Furthermore, increased urbanisation leads to urban sprawl and settlements outside of town planning schemes, most notably along waterbodies, which in the absence of formal services is used for sanitation purposes and waste removal [pollution of rivers]. This exacerbates the poor quality of water in Johannesburg, which in turn exacerbates the prevailing water scarcity that the city faces.

A detailed summary of the DPSIR findings during the ESS process is provided in Annexure B. These correlate with the key issues highlighted in Figure 8.

Figure 7: Sustainability Indicator for Johannesburg, Source: SoCR, 2016
Figure 8: City of Johannesburg Environmental sustainability at a glance in 2019

**CITY OF JOHANNESBURG ENVIRONMENTAL SUSTAINABILITY**

**At a glance / Where do we find ourselves in 2019?**

**DRIVER**
- Human influences & natural conditions driving environmental change.

**PRESSURE**
- Escalating GHGs increasing climate variability
- Increasing intensity & variability in climate events (Extreme storms in CoJ & drought, increasing water supply areas)
- Escalating demand for resources & services (Housing, Water, Energy, Land, Sanitation, Water, Transport infrastructure)
- Reduced capacity to meet growing informal demand generating increased pollution

**STATE**
- Most environmental aspects are beyond sustainability thresholds across majority of the city
  - Water scarcity: Demand will exceed supply in the short term & CoJ has no control over primary supply from KZN & Lesotho.
  - High polluted water resources: All rivers in CoJ are a health risk & groundwater is impacted by AMD.
  - Harmful & declining air quality: Particulate matter and ozone concentrations exceed health standards at most sites within the City & are highest in low income areas.
  - Critical terrestrial biodiversity poorly protected: Only 33% of CoJ is in natural state, of which 16% is Critical Biodiversity & only 1% is protected.
  - Poor & declining wetland habitat & health: All wetland types are threatened, & majority are in poor condition.

**RESOURCES**
- Majority of rivers have Health score of F (Extensively modified - loss of natural habitat, biota & basic ecosystem functions).

**UNHEALTHY RIVERS**
- Loss & degradation of habitat (transformation & pollution) is impacting high conservation value species & the provision of ecosystem services.
  - High-value species under threat: The high % of rare & threatened species in JHB is under threat from habitat loss.

**IMPACT**
- Food security - under threat due to decreased availability of land, and water.
- Increased vulnerability of urban poor - at risk from flooding, water related disease, due to lack of services/infrastructure.
- Increased risk to water intensive sectors (industry, mining): uncertain supply & increased cost.
- Increased damage to infrastructure & property from storms and floods.
- Lack of clean, safe natural systems & open space reduce options for recreation.
- Loss of ecosystem function & capacity to supply services (flood attenuation, water treatment) increase cost of and risk of damage to hard infrastructure.

**RESPONSES**
- Responses by government, the private sector & society to the drivers, pressures & state of the environment.
  - Policy: large number & range of environmental & sector policies that respond to drivers but environmental sustainability is not consistently articulated. There is limited accountability for environmental sustainability & no framework for tracking progress.
  - Regulation: lack of resources to undertake monitoring & compliance at adequate scale to drive improved response.
  - Projects: large variety of projects addressing issues across DPSIR but not at adequate scale to alter negative trends. Opportunities exist for improved collaboration with Private Sector & Civil Society.
The value of the graphic above is that it allows various elements of the DPSIR context for CoJ to be viewed at once and to consider the linkages within and between elements in what is a complex socio-ecological and governance system. Where there are various arrows linked to a particular element this highlights the importance of that element in the broader environmental sustainability context. For example, water supply and quality are influenced by various drivers and pressures, and in turn are in a very poor state. The state of water resources is consequently resulting in several negative impacts on the receiving socio-economic system. This message i.e. the importance of water resources on the CoJ and the need to reverse current pressures on these systems emerged strongly through the consultation process that informed the drafting of the ESS.

The ESS, therefore, must be a “living tool”; integrative, over-arching, inclusive, well institutionalised and championed, and must therefore be innovative in its Monitoring and Evaluation [M&E] recommendations which must consider transversal management. To create a vertically, horizontally, internal and external, integrated shift in thinking to mainstream sustainability, the CoJ must avert silo operations.

Section Summary: This section summarises the key drivers, pressures, state, impacts and responses which define the status quo of sustainability for the CoJ at a point in time [2019]. It is the result of an internal review of the CoJ policy and research conducted through literature review and stakeholder engagement to develop and understanding of what sustainability means for the CoJ. These findings have led to the development of the ESI’s presented in the ESS.
The City of Johannesburg Environmental Sustainability Strategy and Action Plan
6. ENVIRONMENTAL SUSTAINABILITY STRATEGY

In response to the State of Environmental sustainability for the CoJ and the key drivers of change faced by the CoJ, the CoJ requires a tailored response which will root environmental sustainability and achieving this in the very core of the city and across all functions.

6.1 Sustainability Vision

“Secure and protect natural systems and build resilience towards environmental sustainability for human wellbeing and economic prosperity”

6.2 Environmental sustainability Issues and Objectives

The achievement of the environmental sustainability vision requires that there is a proactive response to the key environmental sustainability issues [ESI’s] documented below via acknowledgement of the issues and the proactive integration of the strategic issues into specific programmes and plans across the municipality. Targeted interventions or actions are proposed for achieving the sustainability objectives. Several interventions will be listed for more than one objective, thereby highlighting their importance in addressing several issues and suggesting they warrant additional resources.

The eight ESI’s summarised in Figure 9 below are in Section 7.1. They were identified based on the assessment of challenges faced by the CoJ in achieving the aim of being a sustainable city [refer to figure 5]. The issues are not listed in terms of priority but rather across the DPSIR framework. Table 1 provides some context on the selection of the ESI’s.

Table 1: Context for selection of ESI’s

<table>
<thead>
<tr>
<th>Environmental Sustainability Issue</th>
<th>Context for selection</th>
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<tbody>
<tr>
<td>ESI 1: Urbanisation and informality is placing an unprecedented increasing pressure on infrastructure and services</td>
<td>Of the three drivers, rapid urbanisation is probably resulting in the most significant pressure for limited resources (land and water), demand for infrastructure and services, and generating increased levels of pollution. The CoJ is one of leading contributors to Greenhouse Gas (GHG) emission attributed mainly to the energy and transport sectors. Johannesburg’s economy is dependent on coal powered generation. Johannesburg is a carbon intense economy delivering 66.7% of total Green House Gas Emissions (GHGs) from electricity. CoJ has consequently not achieved the annual target of reducing GHG by 2% between 2007 and 2014. This exacerbates the changes brought about by Climate Change (extreme storms, floods, droughts, heat waves) and the impacts on society which are numerous and felt most by the large proportion of poor and vulnerable communities in informal settlements which are increasing due to the significant rates of urbanisation. Waste is a significant problem for CoJ, both in terms of service delivery and control of pollution caused by waste. Landfill sites are unable to cope with the levels of waste disposal and illegal dumping and littering is a serious problem for the CoJ.</td>
</tr>
<tr>
<td>ESI 2: The City is a major generator of Green House Gases and highly vulnerable to climate hazards - CoJ is a carbon intensive economy due primarily to industrial and transport sectors and needs to build resilience to climate change.</td>
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</tr>
<tr>
<td>ESI 3: Solid waste is a significant contributor to pollution of land, air and water systems. As rapid urbanisation generates greater pollution, the demand for waste disposal services exceeds the capacity of existing infrastructure and services, with solid waste concentrated in water resources due to informal settlements concentrated nearby rivers.</td>
<td></td>
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</tbody>
</table>
ESI 4: The value of natural areas, open space and the ecosystem services they generate are not adequately valued - they are inadequately accounted for in municipal planning, operations and management.

ESI 5: Water Quality has significantly exceeded legal & ecological thresholds in all catchments and is impacting human life, aquatic ecology, and economic activity.

ESI 6: Water scarcity is a reality for the CoJ - having no control over supply which is obtained from KwaZulu-Natal and Lesotho and at risk from climate change influence - droughts.

ESI 7: The unique, high value biodiversity in CoJ is inadequately protected and managed.

ESI 8: There is inadequate accountability in the City and citizen responsibility for addressing the causes of and responses to environmental sustainability issues.

One of the key issues emerging is that the loss of biodiversity can be attributed to the fact that the value of natural spaces and ecosystem services are not valued nor protected.

Water pollution, both low riverine health status and the dumping of waste into rivers, as well as water scarcity [and the former contribution to the latter] were identified as one of the most crucial and immediate threats facing the CoJ. This emerged as prioritised concern from both the policy review as well as the stakeholder engagements.

One of the key issues emerging is that the loss of biodiversity can be attributed to the fact that the value of natural spaces and ecosystem services are not valued nor protected.

Underlying all of these issues is the issue or challenges around governance, particularly the lack of accountability, responsibility and leadership. As a concluding observation, it is important to note that according to the GCRO QoL 2018/19 survey, “the people of the GCR value a sense of place, belonging, and safety [associated with being accepted in their community and a safe and healthy environment free of pollution] more than monetary wealth”. This highlights the significance and the importance for CoJ to turn around the current situation via the guidance provided in this ESS.

Figure 9: Summary of the key environmental sustainability issues
7. IMPLEMENTATION

The following is proposed for institutionalising this strategy, which is essential for effecting the change it seeks to achieve in mainstreaming environmental sustainability in CoJ.

7.1 ACTION PLAN

The Action Plan prescribes achieving of the ESS Principles and ESI’s through implementation tools. The ESS provides the basis for the institutionalisation of environmental sustainability and good governance across CoJ, whilst the Action Plan will be developed to be flexible, to allow for updating and amendment as and when required – the two documents should be read in tandem.

The implementation of the ESS will likely be complex; to be successfully implemented it will need a collaborative approach with internal and external stakeholders. The City can and should play a coordinating role and will rely on its stakeholders for support.

The Action Plan which gives effect to the ESS includes an M&E framework which:

- Integrated partnerships and collaborative approaches the City can establish and take to enable the realisation of the goals of the Action Plan;
- Encompass CoJ’s relevant policies and in particular the ESS;
  Identifies the prioritised goals and focus areas that are Specific, Measurable, Attainable, Relevant and Timely (SMART); and
- Specifies roles and responsibilities, internal and external.

The following tables constitutes the Action Plan and presents the eight selected ESI’s, their objectives, desired state [by 2040], strategic responses. Targeted interventions and indicators to measure these.
**ESI 1**  
*Urbanisation is placing unprecedented increasing pressure on infrastructure and services - which is translated into large scale transformation, fragmentation and degradation of natural assets and generating declining environmental [air and water] quality.*

**OBJECTIVE**  
Build an inclusive, resource efficient, circular economy and redress spatial and environmental inequality.

**DESIRED STATE IN 2040**  
- Resilient infrastructure  
- Adequate service delivery  
- Integrated human settlements

<table>
<thead>
<tr>
<th>STRATEGIC RESPONSE</th>
<th>KEY TARGETED INTERVENTIONS</th>
<th>INDICATORS</th>
</tr>
</thead>
</table>
| Redress/Improve spatial and land use planning to guide and inform future development | 1. Implement *Key Result Area 5: Informal settlements and urbanisation* of the Climate Action Plan.  
2. Integrate environmental sustainability requirements in conditions of planning approval.  
3. Capacitate, incentivise and involve communities in developing sustainable living environments. | Percentage increase in number of sustainable development applications approved per annum |
| Reduce reliance on built infrastructure / Improve integrity of ecological infrastructure | 1. Implement *Key Result Area 6: Infrastructure* of the Climate Action Plan.  
2. Secure key ecological infrastructure (wetlands, open spaces) towards building climate resilience.  
3. Drive urban green/eco-friendly initiatives such as rain water harvesting and urban agriculture in the City. | Percentage decrease in failing infrastructure |
ESI 2: The City is a major generator of Green House Gases and highly vulnerable to climate hazards - CoJ is a carbon intensive economy due primarily to industrial and transport sectors and needs to build resilience to climate change.

**OBJECTIVE**
Reduce the City’s contribution to GHGs and increase its adaptive capacity.

**DESIRED STATE IN 2040**
- Towards a carbon neutral and resilient city

<table>
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<tr>
<th>STRATEGIC RESPONSE</th>
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<tbody>
<tr>
<td>Reduce GHG emissions city wide.</td>
<td>1. Regular updates of the GHG Inventory for the City.</td>
<td>Tonnes of CO2 emission reduction</td>
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<td>2. Develop and implement a mitigation climate action plan for the City.</td>
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<tr>
<td>Reduce the City’s climate risk exposure and build resilience.</td>
<td>1. Regular update of the City climate vulnerability and risk assessment plan.</td>
<td>Percentage reduction in climate risk zones (land area)</td>
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<td></td>
<td>2. Develop and implement an adaptation climate action plan for the City.</td>
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</tbody>
</table>
ESI 3  *Solid waste is a significant contributor to pollution of land, air and water systems. As rapid urbanisation generates greater pollution, the demand for waste disposal services exceeds the capacity of existing infrastructure and services, with solid waste concentrated in water resources due to informal settlements concentrated nearby rivers.*

**OBJECTIVE**  
An integrated waste management system which meets service delivery demand, addresses waste generated pollution and capitalises on waste to energy opportunities.

**DESired STATE IN 2040**  
- Reduced waste to landfill  
- Increased recycling initiatives

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</table>
| **Reduce waste to landfill** | 1. Implement a new waste hierarchy; beginning with waste avoidance and reduction, to re-use, recycle, recovery, and lastly treatment and disposal  
2. Review and implement the City’s Integrated Waste Management Policy and Plan.  
3. Adopt alternative waste treatment technologies. | Tonnes of municipal solid waste diverted from landfill |
| **Increase recycling initiatives** | 1. Implement alternative waste management activities that promote a recycling culture.  
2. Establish an enabling environment for partnerships with recycling industry, informal traders and waste pickers to promote recycling.  
3. Adopt programmes to re-use and recycle waste to create jobs, reduce illegal dumping and littering. | |
| **Increase compliance monitoring and enforcement of polluters.** | 1. Ensure stringent compliance and enforcement of the CoJ relevant By-laws and Standard Operating Procedures  
2. Strengthen and streamline CoJ Regulatory capacity.  
3. Implement adequate service provision to address challenges associated with illegal dumping and littering. | Number of incidents escalated to EMI & JMPD as a % of total investigations per annum |
**ESI 4**  
*The value of natural areas, open space and the ecosystem services they generate are not adequately valued - they are inadequately accounted for in municipal planning, operations and management.*

**OBJECTIVE**  
Secure and improve the ecological functioning and value of natural systems and green/blue infrastructure.

**DESIRED STATE IN 2040**
- Equitable provision of recreational open spaces
- Integrated Open Space Systems
- Sustainable management of urban drainage to reduce damage to receiving environment

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</table>
| Apply existing and develop municipal planning instruments to:  
  - Integrate and secure ecological infrastructure into the urban fabric. | 1. Implement the Open Space Management Framework.  
  2. Rehabilitation and ongoing management of ecological infrastructure.  
  3. Incentivise landowners to secure and improve the condition of ecological infrastructure and natural assets. | Number of functional ecological areas and corridors secured. |
| Mainstream the natural resources as a key element in the green economic sector. | 1. Identify and create green economy jobs and initiatives to alleviate poverty.  
  2. Implement and drive the findings of the most recent GCRO State of Green Assets report and Green Infrastructure CityLAB initiatives.  
  3. Adopt a multi-sector approach and partner with relevant stakeholders to drive the green economy in the City. | Number of green jobs created city-wide |
**ESI 5**  
*Water Quality has significantly exceeded legal & ecological thresholds in all catchments and is impacting human life, aquatic ecology, and economic activity.*

**OBJECTIVE**  
Improvement of water quality to levels that support the needs of human and economic users, and the ecology.

**DESIRED STATE IN 2040**
- Improved and protected water courses
- Water conservation
- Demand reduction/Alternative sources
- Building a water sensitive city

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| Secure natural aquatic and terrestrial systems and the buffers required to maintain ecological integrity. | 1. Preserve and conserve aquatic ecosystems in a manner which links natural systems with the urban fabric.  
2. Facilitate partnerships with affected stakeholders to create a sense of value for the environment and the ecosystem services it provides.  
3. Participate in processes that address AMD pollution as AMD is not confined to underground tunnels, but may be in streams, dams, aquifers and wetlands.  
4. Allocate sufficient budget to projects dedicated to cleaning up of rivers, rehabilitation of water resources and to develop catchment management plans. | Number of aquatic ecosystems functioning and maintained |
| Increase compliance monitoring and enforcement of polluters. | 1. Ensure stringent compliance and enforcement of the CoJ relevant By-laws and Standard Operating Procedures.  
2. Strengthen and streamline CoJ regulatory capacity. | Number of successful remediation or corrective measures taken as % of total investigations per annum |
| Development, maintenance and monitoring of adequate sanitation systems | 1. Ensure there is adequate maintenance and upgrading done of the CoJ sanitation infrastructure system.  
2. Establish Task Team with different law enforcement agencies to develop a solution for infrastructure abuse problem.  
3. Explore options for decentralised sanitation systems for informal settlements. | Number of reported spillages reduced per annum |
ESI 6  *Water scarcity is a reality for the CoJ - having no control over supply which is obtained from KwaZulu-Natal and Lesotho and at risk from climate change influence - droughts.*

**OBJECTIVE**

Increase security of supply.

**DESIRED STATE IN 2040**

- Improved and protected water courses
- Water conservation
- Demand reduction/ Alternative sources
- Building a water sensitive city

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</table>
| Reduce water demand                 | 1. Implement effective demand-side management practices while exploring investment into smart infrastructure and alternative supplies to increase levels of net water savings.  
2. Establish Task Team with different law enforcement agencies to develop a solution for infrastructure abuse problem.  
3. Promote the implementation of Sustainable Urban Drainage System practice. | Percentage reduction on nonrevenue water  
Percentage reduction of Rand Water system input volume |
| Incentivise water saving interventions across domestic and economic sector users. | 1. Develop partnerships beyond the City to encourage water savings.  
2. Expand current CoJ drought policy to build greater resilience of the water system.  
3. Integrate water conservation requirements in conditions of planning approval.  
4. Develop an awareness and communications campaign using available technology. | Reduction in annual water consumption per capita |
**ESI 7**  *The unique, high value biodiversity in CoJ is inadequately protected and managed.*

**OBJECTIVE**  
Protect, conserve and manage all viable biodiversity areas and their linkages with the urban fabric.

**DESIRED STATE IN 2040**
- Adequately Protected and Secured Biological Diversity
- Alien and invasive species controlled
- Ecological functioning ecosystem

<table>
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<tbody>
<tr>
<td>Apply existing and develop municipal planning instruments to:</td>
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</table>
| - Secure and integrate biodiversity conservation into the urban fabric as the priority land-use. | 1. Implement biodiversity planning tools to identify potential areas that must be considered for formal protection.  
2. Integrate biodiversity conservation requirements in conditions of planning approval.  
3. Mainstream the Bioregional Plan into the Spatial Development Framework and associated planning instruments. | Percentage of biodiversity priority areas protected |

| Identify mechanisms for financing the sustainable management of high biodiversity value. | 1. Develop financial and non-financial incentives for the protection of biodiversity priority areas and the restoration of ecosystems and connectivity. | Number of incentives adopted by Council |

| Strengthen compliance and monitoring of impacts to priority high biodiversity value. | 1. Develop guidelines and regulatory tools for the protection of high biodiversity value areas.  
2. Improve compliance and enforcement to ensure protection of high biodiversity value. | Number of successful remediation or correction measures taken as % of total investigations per annum |
There is inadequate accountability in the City and citizen responsibility for addressing the causes of and responses to environmental sustainability issues.

**OBJECTIVE**

Improve awareness of and accountability for environmental sustainability across governance structures in the City that translate into improved environmental quality.

**DESIRED STATE IN 2040**

- Improved environmental awareness and accountability

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<tr>
<th>STRATEGIC RESPONSE</th>
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</table>
| Strengthen coordinated effort towards shared goal. | 1. The GSPCR Policy Forum must through regular consultation with each sector / directorate adjudicate on the institutionalisation of key policies, strategies and frameworks into the sectors [or numerous sectors] in which the targets will be best achieved and constructively direct the CoJ away from silo operations.  
2. Adoption of Transversal Management approach in matters pertaining to environmental sustainability.  
3. Develop and share technical knowledge within the City on best practice environmental sustainability. | Number of successful coordinated interventions between departments reported annually |
| Improve mechanisms to facilitate participation by and involvement of stakeholders. | 1. Strengthen the environmental sustainability messaging during IDP roadshows.  
2. Review and implement the Environmental Education and Awareness Strategy.  
3. Implement the Integrated Environmental Awareness Framework. | Increase in number of public comments related to environmental sustainability |
| Increase collective responsibility to secure environmental rights. | 1. Establish strategic partnerships with various stakeholders.  
2. Create capacity building and empowerment opportunities for vulnerable groups. | Increased number of participants in environmental campaigns |
7.2 Financing the ESS

The implementation of the ESS depends heavily on the availability of sufficient and adequate funding. The CoJ will need to explore avenues of funding, both internally, as well as externally to implement the policy. In addition, the mainstreaming of the ESS into the relevant municipal systems, particularly the integration into the IDP and other key instruments such as the GDS and sector plans, will be paramount to ensuring the objectives of the strategy are met. Linking the ESS holistically and comprehensively with existing initiatives, programmes and plans will go some way towards leveraging internal funding. The adoption of the ESS by Council and having the ESS as a sector plan to compliment the IDP especially, will allow the City, through its SDBIP to fund particular actions, although external funding sources need to be investigated too.

The CoJ will need to keep abreast of existing funding sources from international organisations and donors, national and provincial opportunities as well as build on partnerships to explore funding opportunities. The CoJ can also develop a “Resource Plan” which identifies and indicates the financial and non-financial resources required to implement the ESS and Action Plan. The purpose of the plan should be to ensure adequate resources are available to implement the ESS principles and ESI’s [linked to partnerships and collaborations].

7.3 Governance structures

The ESS aligns with key strategic documents of the CoJ particularly to the IDP and sector plans, GDP and other relevant instruments.

The National Strategy for Sustainable Development [NSSD] identifies [good] governance as the cornerstone towards achieving sustainability – linking ecological, social and economic elements through a regulatory framework. The CoJ as a government institution, has the responsibility, as per Section 24 of the Constitution of the Republic of South Africa, to ensure that all its inhabitants have access to an environment that is not harmful to their health and wellbeing, as well as have the environment protected through reasonable legislative measures. This forms the basis of the need for an ESS, in conjunction with the National Environmental Management Act [NEMA] and Specific EMA’s [SEMA’s] other international, national and provincial legislation, conventions and agreements and all the existing CoJ by-laws, policies, strategies and plans.

The ESS for the CoJ will form part of the overarching framework for sustainable development in the City, by contributing primarily to the environmental component(s) as such considerations of the political structures (e.g. Mayoral committees/ Clusters) and various departments and entities within the city will have to be considered; with the EISD being the anchor of the ESS.

7.4 Working with partners and stakeholders

For the success of the ESS, identifying and partnering with all relevant internal and external parties is important. Working and aligning with these stakeholders can be a catalyst, by building on existing initiatives that support the work of the City [and vice versa]. Partners frequently bring additional and much needed resources in terms of staff capacity, budget, knowledge and experience. It is therefore imperative that all stakeholders are identified, and their existing and potential contributions recognised. The ESS has included a basic stakeholder mapping exercise, which will be important when determining specific actions as well as roles and responsibilities towards the implementation of the ESS.

Key considerations and actions for identifying and mapping stakeholders include:
- Detail any relevant projects/programmes/initiatives currently underway, planned or completed: include links to the ESS Principles/ESI's, a brief description of project goals, timeframe and start/end dates, where the project is focusing;
- Linkages with international, national and/or regional initiatives, neighbouring municipalities or other spheres of government;
- Partnerships and stakeholders could include NGOs, national government departments, provincial government, parks boards, water boards, academic institutions, community groups, and private sector.

### 7.5 M&E framework

The M&E framework will identify indicators, frequency of monitoring, roles and responsibilities for collating and reporting on the indicators. In line with the principle of supporting existing mandates, programmes etc., and the M&E framework will draw on existing indicators and data sources. Factors such as scale, ease of collation and analysis, frequency of data collation will be considered in the development of the M&E framework. The indicators that will be used to assess the rate of success in meeting the objectives will be linked, but not limited to the indicators of Outcome 3 in the IDP 2018/19 review and the other source of indicators, as well as with this ESS.

**Section Summary:** The final section provides an outline of the next phase, the Action Plan, which is action focused. It summarises practical approaches towards sustainability, such as financing the Action Plan, governance, partnering with stakeholders and the monitoring and evaluation framework.
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# Annexure A:

## List of CoJ Policy Reviewed

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Existing and/or Under Review</th>
<th>In development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodiversity Conservation</td>
<td>• Biodiversity Strategy and Action Plan 2015 • Bio-regional Plan 2011 – Draft • Biodiversity Assessment Report</td>
<td>Invasive Species Monitoring, Control And Eradication Plan</td>
</tr>
<tr>
<td>Open Space Planning</td>
<td>• Stormwater Management By-Laws • Open Space Management Framework 2008 • Green Infrastructure Strategy, 2018 • Green Servitudes Tool • Stormwater Design Manual • Open Space Plan for Lanseria • Regional Attenuation Feasibility study • JMOSS I Report • JMOSS II Policy • JMOSS Management Strategy</td>
<td></td>
</tr>
<tr>
<td>Water Services</td>
<td>• Water Conservation and Demand Management Strategy • Water Services Bylaw – <em>under review</em> • Sanitation policy – <em>under review</em></td>
<td>Water Services Development Plan</td>
</tr>
<tr>
<td>Climate Change</td>
<td>• Climate Change Adaptation Plan 2009 – <em>under review</em> • Climate Adaptation Framework, 2018 • Climate Change Strategic Framework, 2015</td>
<td>Climate Action Plan</td>
</tr>
<tr>
<td>Air Quality Management</td>
<td>• Air Quality Management Plan 2003 – <em>under review</em>…going through Public Participation • Air Quality Monitoring Norms and Standards Manual • Air Pollution Control By-laws 2011 – <em>under review</em></td>
<td></td>
</tr>
<tr>
<td>Impact Management &amp; Compliance Monitoring</td>
<td>• High Density Requirements Guidelines • Compliance Indicator Guidelines</td>
<td></td>
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</tbody>
</table>
A more detailed reflection is provided on the various elements of the DPSIR:

- **Reflection on Drivers**
  The CoJ is one of leading contributors to Greenhouse Gas [GHG] emission attributed mainly to the energy and transport sectors. Johannesburg’s economy is dependent on coal powered generation. Johannesburg is a carbon intense economy delivering 66.7% of total Green House Gas Emissions [GHGs] from electricity. CoJ has consequently not achieved the annual target of reducing GHG by 2% between 2007 and 2014. This exacerbates the changes brought about by Climate Change [extreme storms, floods, droughts, heat waves] and the impacts on society which are numerous and felt most by the large proportion of poor and vulnerable communities in informal settlements which are increasing due to the significant rates of urbanisation.

  In terms of economic growth, the absorption of semi-skilled workers in the informal sector is a key consideration for the CoJ and is beyond by-law mitigation or control. No services are allocated to this sector and therefore this sector places a greater impact on natural resources and space. Mining is in decline; however, the negative environmental legacy is still a priority for the CoJ due to its impact on land and water resources. Crucially, AMD has a significant impact on water supply and on the health of people living in Mine Residual Areas [MRAs]. Of more immediate concern, is the threat of mining dumps which are an immediate threat to aquatic systems and this is not limited to groundwater. Of the three drivers, rapid urbanisation is probably resulting in the most significant pressure for limited resources [land and water], demand for infrastructure and services, and generating increased levels of pollution.

- **Reflection on Pressures**
  The pressures on infrastructure and services from urbanisation and economic growth will only increase as the poor state of the economy sees people flock to urban centres. This is resulting in increased pollution [solid waste and water quality] as demand exceeds the capacity of existing infrastructure and services to cope. The current state of the environment as suggests that existing responses are inadequate and so alternative options for reducing pollution will need to be identified as the decline in state needs to not only be halted but reversed. The other major influence is the transformation and fragmentation of open space and natural systems through formal land-use change and informal land settlements. These changes further reduce the already limited natural area available to support critical biodiversity and the capacity of ecological infrastructure to deliver important ecosystem services.

- **Reflection on State**
  Natural systems in CoJ are highly fragmented and transformed. The remaining terrestrial system still supports important biodiversity\(^{10}\). The lack of protection for these systems [currently only 1%] means that they remain under threat from rampant urbanisation. The lack

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\(^{10}\) All five grasslands and three bushveld systems are threatened. 20% of river types are threatened and the majority of rivers have a river health score of E. All 21 wetland types are threatened and 13 are critically endangered. There are 12 threatened plant species and 10 threatened animal species in the CoJ.
of formal protection and management, notably of aquatic resources, means their condition is largely compromised and the capacity to deliver ecosystem goods and services is diminished. The primary pressures are land transformation and pollution. Air quality in the CoJ is poor with Particulate Matter [PM] and ozone concentrations exceeding standards. Aquatic health of river and wetland systems is very poor. This is due transformation for other land uses, altered flow regimes from urban development of catchments and poor water quality which is a key influence.

- **Reflection on Impacts**
  Decreased water security and rising costs impact domestic and economic sectors, particularly mining and water intensive industry. Citizens and business alike are also increasingly impacted by storm events and associated flooding. All surface water systems in the CoJ present a health risk due to the poor water quality. Air quality issues arising from the burning of fossil fuels in informal settlements and rising traffic also threaten human health. The lack of high-quality open space limits access to such areas for recreational use. In a sustainable human environment, which minimises its ecological footprint whilst providing services to its people, leisure time; limited stress; good health; a clean environment; access to services; employment opportunities and access to resources; housing and information are valued as contributing to a life of good quality. According to the GCRO QoL 2017/18 survey, “the people of the GCR value a sense of place, belonging, and safety [associated with being accepted in their community and a safe and healthy environment free of pollution] more than monetary wealth.” The state of natural systems and environmental quality is clearly limiting access to the safe environment entrenched as a constitutional right and highly valued according to the GCRO survey. The City has been facing a number of climate-related hazards including flooding, drought and heat waves. Such climate stresses can add to the burden of the City both economically and in terms of impacting on the livelihoods of the City’s citizens but can also provide opportunities for more robust development planning.

- **Reflection on Responses**
  As established through the internal policy review and promoted and discussed in the GDS and the policy review process, CoJ have numerous policies in place that respond to the ES challenges noted and seek to give effect to certain of the ES principles established in this policy. These include for example:
  - The policy framework on sustainable human settlements supports the creation of liveable places of work and rest that address spaces in a holistic manner – focusing on issues of accommodation, services, the built environment and the natural environment, alongside issues of cultural identity. In this area, the CoJ has faced many challenges.
  - In terms of water security, CoJ’s focus on safeguarding water-security entails effective demand-side management processes and sustainable water-catchment management practices, as well as investments in smart infrastructure and alternative supplies to increase levels of net water savings. CoJ aims to optimize its water conservation and demand side management to reduce overall demand.
  - There is policy to develop new green spaces to manage the threat of urban flooding and to reduce the heat reflected by hard surfaces.
  - The City also seeks to promote food security and encourage a more compact urban form to protect the natural life of Johannesburg [GDS, 2018].
  - Looking forward, the City is also pursuing a closed-loop and sustainable alternatives [green / circular economy].
  - In terms of climate change, the City aims to reduce green-house gas emissions by improving public transport, reducing congestion, and ensuring improved fuel
efficiency and compliance with emissions standards. The relevant policies plan for investment in utilities, transport and housing that uses less coal-generated electricity and fossil fuels and support to businesses to produce solar energy panels, insulation and more efficient appliances. The City will achieve this by developing a Climate Action Plan [CAP] that will respond to climate change in the following ways:

- Developing a pathway to deliver an emissions neutral city by 2050 at the latest and set an interim ambitious target in compliance with the Paris Agreement.
- Demonstrating how the city will adapt and improve its resilience to climate hazards that may impact the city now and in future climate change scenarios.
- Outlining the social, environmental and economic benefits [co-benefits] expected from implementing the plan and improve the accessibility of these benefits by the city's population.
- Outlining how the city will approach implementation of the plan, using available powers, resources and partners.
- Building on the work already undertaken, detail the city's governance, powers and the partners who need to be engaged to accelerate the delivery of the city's mitigation targets and resilience goals.

Despite these policy statements, evidence is that environmental quality is in decline and the intended outcomes are not being achieved. What seems to be missing is the recognition that new thinking is required, reactive planning falls far too short, and radical change, new schools of thought and implementation and business unusual is required. This is acknowledged in the GDS 2040 [2018] and identified as necessary to be taken forward in implementing the ESS as the tool for elevating the need to respond collectively and innovatively and at appropriate scales using new approaches and technologies.

The city is the sole shareholder in Municipal Owned Entities such as PikitUp, City Power, Joburg Water, Johannesburg Social Housing Company, Johannesburg Development Agency, etc. It therefore has influence over the strategic agenda of these companies, which could enable the CoJ to measure the achievement of sustainability targets. This policy instrument should inform the planning and operations of all these and other entities by confirming objectives for these key sustainability issues and through a transversal management approach, move from a vertical-only management to vertical and horizontal ownership, collaboration and contribution to the collective responds to the problem statement. Achieving a response, which has power and effect, requires a deep-rooted shift, where measurement is taken at the Key Performance Indicator [KPI] level of the City.

A policy response that institutionalises environmental sustainability as a strategic issue requiring collective action i.e. main-streamed is essential given the limitations in the way it is currently profiled in the policy framework.

To achieve this, there is recognition of the need to integrate and conserve natural systems into the urban fabric in a positive way that requires increased understanding of their value to society. This elevates the role of certain mandates in achieving this, notably municipal land-use planning. The opportunity exists through planning instruments to secure natural systems and open space and integrate requirements for improved management of natural systems into development controls as part of planning approvals.

It was noted in the engagement process that in many instances the political will exists to adopt innovative responses, it is merely providing evidence from available examples that they work
and are beneficial in the long term i.e. awareness and capacity building are key to facilitating fundamental change in approach. Partnerships with sector role players will support this - the Green Building Council South Africa in the case of sustainable building options and the integration of these into Municipal policy and planning requirements.
Annexure C: Detailed Targeted Interventions for the eight Environmental Sustainability Issues [for future consideration.]

The eight ESI’s summarised in Figure 9 and unpacked in the tables of the ESS&AP were identified based on the assessment of challenges faced by the CoJ in achieving the aim of being a sustainable. These tables present the initial list of Targeted Interventions which are maintained for future use, as the ESS&AP is reviewed and targets are achieved. Where text is presented in different colours, these are explained with an asterix at the end of the section, linking the specific targeted intervention to another ESI [hence having a cross-cutting aim]. Therefore, ESI’s which have numerous different coloured texts may be considered the “low hanging fruit” or those for which prioritisation will enable several issues to be addressed, to some degree. The issues are not listed in terms of priority but rather across the DPSIR framework.

**ESI 1: Urbanisation is placing unprecedented increasing pressure on infrastructure and services** - which is translated into large scale transformation, fragmentation and degradation of natural assets and generating declining environmental [air and water] quality.

<table>
<thead>
<tr>
<th>Targeted Interventions</th>
<th>1. Implement and champion the GDS 2040 directive that “environment shall drive the development agenda” as well be the informing and influencing layer on the SDF [GDS 2040].</th>
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<tbody>
<tr>
<td></td>
<td>2. Give effect to the “Environmental and Resource Sustainability: economic growth and sustainability are not mutually exclusive concepts, and through implementation of targeted measures, the City of Johannesburg must be a responsible global citizen. By opening up opportunities in the form of infrastructure greening, water consumption reduction measures and environmental citizenship, sustainability targets can be unlocked to become drivers of economic growth” Action in the Economic Growth Strategy by incorporating it into the currently highly financially focused priorities of the IDP.</td>
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<td></td>
<td>3. Investigate and integrate the informal economy into a controlled system under by-laws [workshop feedback]</td>
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<td></td>
<td>4. Re-dress spatial planning, land use management and the densification strategy to ensure that people reside close to work and abide by the environment being at the forefront and the development of sustainable human settlements [combined PSC feedback and GDS principle 3]. *</td>
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<tr>
<td></td>
<td>5. Invest in the maintenance of infrastructure [feedback from workshops] and addressing service backlogs [from Problem Statement].</td>
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<td></td>
<td>6. Innovatively address the debt incurred by the CoJ through the inheritance on old mining land through a commissioned study, requesting that it investigate the use of such land for suitable housing typologies to address the housing backlog as well [feedback from PSC].</td>
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<tr>
<td></td>
<td>7. Diversify the economy with green initiatives such as urban agriculture [feedback from PSC].</td>
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<tr>
<td></td>
<td>8. Identify innovative less water reliant industrial processes [from problem statement].</td>
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<td></td>
<td>9. Development in sensitive areas must be guarded against through the development of development guidelines which hold protection of biodiversity at the forefront [from problem statement].</td>
</tr>
</tbody>
</table>
ESI 1: **Urbanisation is placing unprecedented increasing pressure on infrastructure and services** - which is translated into large scale transformation, fragmentation and degradation of natural assets and generating declining environmental [air and water] quality.

10. Establish partnerships such as one with street cleaners and promote recycling, because currently this sector is the greatest contributor to landfills [workshop]
11. Define, in clear and unambiguous terms, a series of spatial reconfiguration projects that pay careful attention to the form, morphology and structure of the city [GDS]
12. Diversify energy sources for the city, and to identify approaches through which to minimise loss [e.g. securing sub-stations, to prevent easy access to cables; using smart technologies] [GDS]
13. Radical change, new schools of thought and implementation and business unusual is required [GDS]
14. Implement and dedicate resources to the realisation of the activities outlined in the Energy and Climate Change Strategy and Action Plan*
15. Ensure that the MTEF allocation 2019/20 to Energy Efficiency Projects is spent on key projects which will lead to the realisation of the responses on energy efficiency set out herein.
16. Involve communities in waste recycling programmes and penalise littering by citizens and businesses.
18. Implement and allocate budget to the realisation of the nine targets of the Transport Sector Plan which addresses restructuring the city, Non-motorised Transport and Green Jobs, as well as the nine thrusts of the Strategic integrated transport plan framework.
19. Improve the working partnership of personnel responsible for air quality management at all levels of government [Air Quality Management Plan] and with the City’s contributors to poor air quality and together develop a shared responsibility to address air pollution and achieving the Actions of the Air Quality Management Plan 2017. In so doing, apply the Air Quality Monitoring Norms and Standards Manual and Air Pollution Control By-laws.

*Also, a response to ESI 7  *Also, a response to ESI 2  *Also, a response to ESI 2  *Also, a response to ESI 2  *Also a response to ESI 2  *Also a response to ESI 3  *Also a response to ESI 3  *Also a response to ESI 3

ESI 2: **The City is a major generator of Green House Gases** - CoJ is a carbon intensive economy due primarily to industrial and transport sectors and needs to build resilience to climate change.

<table>
<thead>
<tr>
<th>Targeted Interventions:</th>
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<tbody>
<tr>
<td>1. Implement the Climate Action Plan that will prioritize evidence-based transformational actions with the aim of transitioning towards an emission neutral, climate resilience city.</td>
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<tr>
<td>2. Partner with the National Department of Environmental Affairs and Treasury to develop and implement Carbon Taxes [PSC feedback]</td>
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<tr>
<td>3. Allocate budget for the implementation of the City’s integrated Climate Action Plan [CAP] particularly in the Post 2020 period. The CAP is a strategic document that addresses both climate change mitigation and adaptation in an integrated manner*</td>
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<tr>
<td>4. Recognise and amend the current Environmental sustainability Strategy in the IDP to place environmental sustainability at the forefront. [current: The City can no longer manage its natural environment as a pristine resource, due to existing and planned demand for development. Instead the City has an obligation to ensure the impact on its built and natural environment is minimised, both from the City’s own operations, private developments and from communities at large.]</td>
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<tr>
<td><strong>ESI 2: The City is a major generator of Green House Gases</strong> - CoJ is a carbon intensive economy due primarily to industrial and transport sectors and needs to build resilience to climate change.</td>
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<tr>
<td>5.</td>
<td>Implement Climate Adaptation as a requirement to be addressed in all sector plans.</td>
</tr>
<tr>
<td>6.</td>
<td>Re-dress spatial planning, land use management and the densification strategy to ensure that people reside close to work and abide by the environment being at the forefront and the development of sustainable human settlements [combined PSC feedback and GDS principle 3].</td>
</tr>
<tr>
<td>7.</td>
<td>The work of the GCRO and Greater Kayalami Conservancy [GEKCO] must be used to develop and prove viability and create a level of confidence in what can be achieved in terms of climate adaptation and to secure funding for initiatives.</td>
</tr>
<tr>
<td>8.</td>
<td>Improve public transport and NMT, reduce congestion, and ensure improved fuel efficiency and compliance with emissions standards [GDS].</td>
</tr>
<tr>
<td>9.</td>
<td>The City must invest in utilities, transport and housing that uses less coal-generated electricity and fossil fuels. [GDS, 2018].</td>
</tr>
<tr>
<td>10.</td>
<td>Encourage/incentivise businesses to produce solar energy panels, insulation and more efficient appliances. [GDS, 2018].</td>
</tr>
<tr>
<td>11.</td>
<td>Develop new green spaces to manage the threat of urban flooding and to reduce the heat reflected by hard surfaces. [GDS, 2018].</td>
</tr>
<tr>
<td>12.</td>
<td>Promote food security and encourage a more compact urban form to protect the natural life of Johannesburg [GDS, 2018].</td>
</tr>
<tr>
<td>13.</td>
<td>The CoJ must influence the strategic agenda of the municipal owned entities and companies, to enable the City to measure the achievement of sustainability targets of these companies.</td>
</tr>
<tr>
<td>14.</td>
<td>Afford resources to find an energy mix that is not dependant on coal, such as mine gas from landfills, extract energy from waste, and use energy from renewable sources such as solar energy [GDS].</td>
</tr>
<tr>
<td>15.</td>
<td>The CoJ must incentivise and drive industry and businesses toward the use of renewable energies [GDS] and closed loop designs.</td>
</tr>
<tr>
<td>16.</td>
<td>Give effect to the Climate Change Adaptation Framework, and Climate Change Strategic Framework, and Climate Change Adaptation Plan by allocating resources and highlighting these in the IDP.</td>
</tr>
<tr>
<td>17.</td>
<td>Ensure that the MTEF allocation 2019/20 to Energy Efficiency Projects is spent on key projects which will lead to the realisation of the responses on energy efficiency set out herein*.</td>
</tr>
</tbody>
</table>
| 18. | Implement and dedicate resources to the realisation of the activities outlined in the Energy and Climate Change Strategy and Action Plan:  
- Track and Reduce GHG emissions.  
- Facilitate Energy Efficiency and the use of alternatives such as renewable resources.  
- Facilitate initiatives that will contribute to the growth of the green economy.  
- Mainstream climate change issues in the City’s IDP and programmes.  
- Adapt to the impacts of climate change in the city, this will include measures the promotion of environmentally friendly travel and transportation, water resource management, minimization of waste generation, management and disposal, building management, flood risk and storm water management, disaster risk reduction, improvement of the climate resilience of the CoJ communities, green procurement of goods and services, and heightened public awareness. |

*Also, a response to ESI 1.  *Also, a response to ESI 1  *Also a response to ESI 1  *Also a response to ESI 1
**ESI 3: Solid waste is a significant contributor to pollution of land, air and water systems.** As rapid urbanisation generates greater pollution, the demand for waste disposal services exceeds the capacity of existing infrastructure and services, with solid waste concentrated in water resources due to informal settlements concentrated nearby rivers.

**Targeted Interventions:**

1. Invest in increased education and awareness to reduce littering;
2. Allocate enough budget to projects dedicated to cleaning up of rivers, rehabilitation of water resources and catchment management plans [taken from existing expenditure]
3. Establish partnerships such as one with street cleaners and promote recycling, because currently this sector is the greatest contributor to landfills [workshop]
4. Involve communities in waste recycling programmes and penalise littering by citizens and businesses [workshop]
6. Take steps toward fostering a new hierarchy; beginning with waste avoidance and reduction, to re-use, recycle, recovery, and mostly treatment and disposal [GDS]
7. Existing dumps should be mined for methane gas, transforming waste into a useable resource. [GDS]
8. The City should lead programmes to re-use and recycle waste in ways that create jobs, ensure that the streets are cleaner, and improve public health. [GDS]
9. The City should enable alternative waste management activities that prioritise a recycling culture. [GDS]
10. The CoJ must encourage and incentivise residents and businesses to separate waste at source, will re-use and will recycle. [GDS], to this effect, by-laws must be strengthened to make this is a legal requirement
11. Compliance and enforcement must be strengthened to ensure that residents and businesses stop littering, dumping illegally, and engaging in other activities that negatively affect Johannesburg. They will develop more positive pro-city attitudes that protect the environment. [GDS], to this effect, by-laws must be strengthened to make this a legal requirement
12. Invest in technologically enhanced waste composition and disposal, using an interconnected approach to waste minimisation by adapting to new waste streams as demands shift globally [GDS] [Give effect to the Inclusionary housing incentives, regulations and mechanisms]

**ESI 4: The value of natural areas, open space and the ecosystem services they generate are not adequately valued - they are inadequately accounted for in municipal planning, operations and management.**

**Targeted Interventions:**

1. Develop a set of criteria for a decision-making and support tool applicable to all CoJ sectors, which ensures that natural resources are used sustainably [amended from NSSD principle]
2. Identify and create green economy jobs and initiatives targeted for the indigent as a mechanism to alleviate poverty [linked to GDS principle 1].
3. Use education and awareness campaigns to teach all role-players the value of natural ecosystems
4. Improve compliance and enforcement to ensure protection of high biodiversity value*
5. Implement and dedicate resources to achieving the targets of the Biodiversity Strategy and Action Plan 2015:
   - Profile, advocate and promote the importance of urban biodiversity worldwide.
   - Raise the status of local government’s management of urban biodiversity.
**ESI 4: The value of natural areas, open space and the ecosystem services they generate are not adequately valued - they are inadequately accounted for in municipal planning, operations and management.**

- Actively mainstream biodiversity into all decision-making and planning processes at local level.
- Facilitate lesson-sharing among local authorities across the globe.
- Produce and disseminate good practice biodiversity case examples.
- Lead the way for the next generation of participating cities in future ICLEI / LAB initiatives.
- Cooperate and network globally with a wide range of stakeholders.

6. Radically re-think the habitual choices that underpin daily lives and the way the CoJ functions, such as, how people commute, the homes and offices are powered, what the people of CoJ consume, how the CoJ deal with waste, and how city spaces are used [Melbourne policy].

7. Prioritise Ecosystem Services. Using international guidelines for valuing ES does not necessarily assist with prioritising ES in municipal planning, management and finance systems. Research is required to understand how – in what format or capacity – ES valuation can be used to address key challenges in the city-region [GCRO Green Assets Report].

8. The uptake of alternative infrastructure approaches requires a detailed understanding of public revenue, expenditure and accounting processes. At present, there are limited incentives to shift toward GI alternatives, and no avenue for the value of ES to guide municipal decision-making and expenditure. Future work should explore and define the requirements and opportunities for including GI in these processes [GCRO Green Assets Report].

9. Develop integrated data inventories. The availability of green asset data is limited, and the quality of digital spatial data is not consistent across municipalities in Gauteng. [GCRO Green Assets Report]

10. Implement and drive the findings of the GCRO State of Green Assets reports and Green Infrastructure CityLAB initiatives leading to the realisation of a Green Infrastructure Plan, which draws on the lessons from New York and other compatible example cities.

11. Invest in projects aimed at achieving a deeper grasp on the city-region’s green assets [GCRO State of Green Infrastructure Report].

12. Adopt a multi-sector approach and partner with the Department of Environmental Affairs [DEA] and National treasury for climate responsiveness in grants for indicators [Inception meeting discussions].

*Also, a response to ESI 7.

**ESI 5: Water Quality has significantly exceeded legal & ecological thresholds in all catchments and is impacting human life, aquatic ecology, and economic activity.**

<table>
<thead>
<tr>
<th>Targeted Interventions</th>
<th>2. Preserve and conserve aquatic ecosystems in a manner which links natural systems with the urban fabric [workshop feedback] *</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>4. Create awareness and education and having a two-way flow of engagement with the people [communities] of the CoJ, to create a sense of value for the environment and the ecosystem services it provides [GDS]*</td>
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<td></td>
<td>5. Ensure stringent compliance and enforcement of the CoJ Storm water Management By-laws, and all other relevant by-laws.</td>
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<td>6. Allocate sufficient budget to projects dedicated to cleaning up of rivers, rehabilitation of water resources and catchment management plans [taken from existing expenditure]</td>
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<td>7. Participate in the mitigation of AMD pollution as AMD is not confined to underground tunnels, but may be in streams, dams, aquifers, wetlands and even oceans [West Mining Belt Study]. This must be treated with the many technologies for the treatment of AMD from traditional high cost water treatment plants to simple in situ water treatment reagent dosing methods [lime Neutralisation;</td>
</tr>
</tbody>
</table>
**ESI 5: Water Quality has significantly exceeded legal & ecological thresholds in all catchments and is impacting human life, aquatic ecology, and economic activity.**

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<tr>
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<th>Carbonate Neutralisation; Ion Exchange; Constructed Wetlands and Precipitation of Metal Sulfides [West Mining Belt Study].</th>
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<td><em>Also, a response to ESI 6</em></td>
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</table>

**ESI 6: Water scarcity is a reality for the CoJ - having no control over supply which is obtained from KwaZulu-Natal and Lesotho and at risk from climate change influence - droughts.**

| Targeted Interventions: | 1. Preserve and conserve aquatic ecosystems in a manner which links natural systems with the urban fabric*  
2. Create awareness and education and having a two-way flow of engagement with the people [communities] of the CoJ, to create a sense of value for the environment and the ecosystem services it provides*  
3. Capacitate the CoJ with human resources who hold key expertise and can manage change and build resilience, with the understanding that climatic pressures of Climate Change are extreme storms, floods, droughts, heat waves which impacts the supply of water and subsequently the costs thereof, which thereby has a negative impact on water intensive industry, [GDS Paradigm Shift / Development Model].*  
4. Create effective demand-side management processes and sustainable water-catchment management practices, as well as investments in smart infrastructure and alternative supplies to increase levels of net water savings. The City would have to optimize its water conservation and demand side management to reduce overall demand [GDS].  
5. Educate and create awareness around water conservation in communities [GDS]  
6. Participate in the mitigation of AMD and the pollution is causes to groundwater and surface water.  
7. Aim for the City to achieve a high level of nett water savings, by investing in alternative schemes such as water reclamation, rainwater harvesting and appropriate grey water use, to ensure alternative supplies [GDS].  
8. Build systems and relationships of mutual accountability for effective water management between spheres of government [CT drought lessons]  
9. Data must be developed and managed on the classification of water resources [potable etc.]  
10. Strengthen horizontal management between municipal departments and entities [CT drought lessons].  
11. Strengthen leadership and the capacity to enable flexible, adaptive decision-making [CT drought lessons]  
12. Invest in partnerships beyond the City [CT drought lessons]  
13. Develop and understanding of who the CoJ high water users are, the type of water they are using and identify ways to work with them to reduce water consumption [CT drought lessons]  
14. Assess the availability of data and implement plans to improve data availability and analysis [such as partnering with local universities and engaging with regional Department of Water and Sanitation offices].  
15. Develop technologically based communication tools which are understandable to the layman, to ensure that communication takes place clearly and transparently. |
### ESI 6: Water scarcity is a reality for the CoJ - having no control over supply which is obtained from KwaZulu-Natal and Lesotho and at risk from climate change influence - droughts.

Such knowledge is education which creates the willingness to cooperate in a crisis without panic or fear [adapted from CT lessons].

16. Expand the current CoJ drought policy to build resilience of the water system, adopt a systems approach which considers the environmental, social, economic and political aspects of the water system. This approach is likely to expand thinking from reliance on bulk surface water to diversified water sources, alongside effectively managing ecological infrastructure to support its role in water provision, managed by the City and others [CT lessons].

17. Invest in projects to develop and understanding of the CoJ water balance to develop effective management of ecological function, across all functions of the CoJ. This must align with the Climate Action Plan [CAP] [PSC, 16.04.2019]

18. Develop a vision and long-term strategy for a water sensitive city in the CoJ context, along with associated resources [CT lessons].

*Also, a response to ESI 5
*Also, a response to ESI 8.

### ESI 7: The unique, high value biodiversity in CoJ is inadequately protected and managed.

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<td>2. Develop a proactive open space development and decision-making support tool [Open Space Management Framework] [either updated EMF or an SEA] which gazettes a set of criteria for development applications in order to protect high value biodiversity areas [Bioregional plan – Draft 2011].</td>
<td>2. Develop a proactive open space development and decision-making support tool [Open Space Management Framework] [either updated EMF or an SEA] which gazettes a set of criteria for development applications in order to protect high value biodiversity areas [Bioregional plan – Draft 2011].</td>
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<td>3. Create incentives for preserving CoJ's natural assets [PS]</td>
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<td></td>
<td>4. Set up trusts to which donations from corporates can be received to facilitate achieving the strategic responses.</td>
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<td></td>
<td>5. Improve compliance and enforcement to ensure protection of high biodiversity value [PS]</td>
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<td>6. Development in sensitive areas must be guarded against through the development of development guidelines which hold protection of biodiversity at the forefront [from problem statement]. *</td>
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<td>7. Develop an accurate data set of natural assets, from which performance indicators can be determined and measured over time.</td>
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<td>8. Implement the targets and objectives of the Open Space Management Framework and regional open space plans</td>
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<td>9. Implement the responses of the Open Space Management Framework:</td>
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<td>- The focus of the JCP should shift from reactive development and maintenance of open spaces, to focus on the creation of Public-Private Partnerships.</td>
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<td>- All Open Space management actions [planning and design, capital development and maintenance] within the JCP must be clearly designated and aligned to ensure optimum and appropriate actions and utilisation of resources and ensure that resources will be targeted to minimise duplication and waste.</td>
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<td>- Open Space Maintenance must clearly differentiate between conservation practices [for purposes of ecological functioning, environmental goods and service rendering] and horticultural practices to ensure an appropriate response to the functional requirements of Open Space.</td>
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<td>- Effective and efficient in-house and external institutional arrangements should be established to ensure that the aims and objectives as stated in this report are</td>
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**ESI 7: The unique, high value biodiversity in CoJ is inadequately protected and managed.**

- integrated into the plans and frameworks of all other sectoral departments integration within the IDP to inform the budgeting process; integration into Metropolitan, regional and Local Spatial Development Frameworks and the development guidelines contained therein.
- Updating of open space database.
- Negotiations with Departments of Planning and Housing to ensure that guidelines are included.
- Negotiations with Department of roads and Stormwater with regards to street trees.
- Negotiations with JPC with regards to sale of open space.

*Also, a response to ESI 4.
*Also, a response to ESI 1.

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**ESI 8: There is inadequate accountability in the City and citizen responsibility for addressing the causes of and responses to environmental sustainability issues.**

<table>
<thead>
<tr>
<th>Targeted Interventions:</th>
<th>1. Develop and sustain two-way engagement with communities [feedback from workshops] which can be facilitated through the IDP roadshows.</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2. Recognise and address the disparities between the IDP, GDS and sector specific mission and visions, to create consistency and a common goal which places the environment at the forefront.</td>
</tr>
<tr>
<td></td>
<td>3. Develop the Policy Forum and Institutionalise the policy coordination function in the GSPCR unit as outlined in the Policy Coordination Progress Report [2019] to facilitate inclusivity, collaboration and continual reflection and improvement. This institutionalisation of this function will avoid contradicting directives and identify gaps. This function must maintain a policy database and ensue that priority policies are included in function streams and that quarterly progress is reported on.</td>
</tr>
<tr>
<td></td>
<td>4. The GSPCR Policy Forum must through regular consultation with each sector / directorate adjudicate on the institutionalisation of key policies, strategies and frameworks into the sectors [or numerous sectors] in which the targets will be best achieved and constructively direct the CoJ away from silo operations.</td>
</tr>
<tr>
<td></td>
<td>5. The Policy Forum must address the development, review and accessibility of policy in order to engender progressive policy development which dovetails present policy and averts a piecemeal approach. The CoJ is still dominated by conventional infrastructure and engineering and must now learn to work differently and even &quot;backwards&quot; i.e. engineer for predicted impact with the intention to avoid such impact.</td>
</tr>
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<td></td>
<td>6. Participate in the climate change forum [CAF] and the high-level Climate Action Planning Steering Committee as these are the overall climate action coordination platform of the City.</td>
</tr>
<tr>
<td></td>
<td>7. Utilise the work of the GCRO to understand the regional scale bigger picture of cross-boundary issues and the development trajectory of neighbouring municipalities A transversal operation is required.</td>
</tr>
<tr>
<td></td>
<td>8. Add to the Agenda of the Policy Forum that annual expenditure on actions [implementation] which align with GDS 2040 Outcome 3, five outputs, must be reviewed as frequently as policy development is [feedback from PSC and arising from internal review].</td>
</tr>
<tr>
<td></td>
<td>9. Capacitate the CoJ with human resources who hold key expertise and can manage change and build resilience [GDS Paradigm Shift / Development Model]. *</td>
</tr>
<tr>
<td></td>
<td>10. Create a systemic change in urban governance, which promotes accountability, responsibility, partnerships, Awareness and education, Compliance and enforcement and incentives - show returns on sustainability investment/approaches.</td>
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</table>
### ESI 8: There is inadequate accountability in the City and citizen responsibility for addressing the causes of and responses to environmental sustainability issues.

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<tbody>
<tr>
<td><strong>11.</strong></td>
<td>The city must move away from silo operations by the application of Transversal Management</td>
</tr>
<tr>
<td><strong>12.</strong></td>
<td>Implement the Environmental Education and Awareness Strategy 2011 across all sectors of the CoJ.</td>
</tr>
<tr>
<td><strong>13.</strong></td>
<td>In recognising that sustainability is transboundary, partnerships must be established with key external role-players and contributors to the CoJ state of environment. Partnerships which can be leveraged on must be established and the identification of the mutual benefits understood.</td>
</tr>
<tr>
<td><strong>14.</strong></td>
<td>Make environmental sustainability the basis of all plans, policies and goals for the CoJ.</td>
</tr>
<tr>
<td><strong>15.</strong></td>
<td>Addressing and affecting a shift in thinking is entrenched in the generation of awareness and education. This should be extended through a partnership with tertiary education institutions to impact on the curricular of all disciplines. Educating the future generation is key to changing the way in which the people of CoJ think and understand sustainability, i.e. establish academic partnerships.</td>
</tr>
<tr>
<td><strong>16.</strong></td>
<td>Strengthen engagement between politicians and officials to develop a relationship of trust and technical knowledge sharing. Strengthening the engagement and understanding between the two groups is important for ensuring that crisis-related responses addresses citizens’ concerns as well as technical, resource and institutional imperatives and constraints. Support is needed to help technical officials make more convincing arguments and understand the political dynamics better. [CT lessons].</td>
</tr>
<tr>
<td><strong>17.</strong></td>
<td>Ensure databases of businesses, NGOs, vulnerable groups and others are up to date and mechanisms for engaging external constituents are clear [CT lessons].</td>
</tr>
<tr>
<td><strong>18.</strong></td>
<td>Develop good relations with intermediaries, such as NPOs, NGOs and researchers, that they can work with during crises to address gaps in municipal capacities [CT lessons].</td>
</tr>
<tr>
<td><strong>19.</strong></td>
<td>Assess leadership and adaptive capacity within the municipality before a crisis hits, so that resources can be mobilized quickly to address the gaps [CT lessons].</td>
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*Also, a response to ESI 6.*

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<tbody>
<tr>
<td><strong>1.</strong></td>
<td>Improve quality of life for CoJ citizens by providing basic services to all [from Problem Statement]</td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>Develop initiatives and programmes to create accessibility [convenience, close proximity] and reliability of employment opportunities, markets, resources, social activities, housing, communication, information and equity</td>
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<tr>
<td><strong>3.</strong></td>
<td>Redress spatial planning to accurately plan for poor communities to be safe from flood risk zones and high impact / sensitive areas</td>
</tr>
<tr>
<td><strong>4.</strong></td>
<td>Develop more stringent Disaster Management Plans</td>
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<td><strong>5.</strong></td>
<td>Participate in the mitigation of the impact of AMD has a significant impact on water supply and on the health of people living in MRAs</td>
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<tr>
<td><strong>6.</strong></td>
<td>Develop economic empowerment of the poor and disadvantaged which supports further transformation towards a fully inclusive society and economy [GDS 2018].</td>
</tr>
<tr>
<td><strong>7.</strong></td>
<td>Implement the policy framework on sustainable human settlements which supports the creation of liveable places of work and rest that address spaces in a holistic manner – focusing on issues of accommodation, services, the built environment and the natural environment, alongside issues of cultural identity.</td>
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<tr>
<td><strong>8.</strong></td>
<td>[Give effect to the Inclusionary housing incentives, regulations and mechanisms]</td>
</tr>
<tr>
<td><strong>9.</strong></td>
<td>Fund projects which align with the actions of the Food Resilience Policy</td>
</tr>
<tr>
<td><strong>10.</strong></td>
<td>Implement the Human Development Strategy</td>
</tr>
<tr>
<td><strong>11.</strong></td>
<td>Partner to create an environment that feels safe and minimises harm, including from alcohol and other drug use, and violence [issues raised in the GCRO QoL survey]</td>
</tr>
<tr>
<td><strong>12.</strong></td>
<td>Facilitate opportunities for all people to participate in the social, economic and civic life of the city, irrespective of ability, background, race and gender. [Melbourne policy]</td>
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<tr>
<td>ESI 8: There is inadequate accountability in the City and citizen responsibility for addressing the causes of and responses to environmental sustainability issues.</td>
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<td>13. Create a city that respects, celebrates and embraces human diversity. [Melbourne policy]</td>
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<tr>
<td>14. Re-dress land-use planning to be strategic and maximise efficiency. This will require CoJ to understand what role it needs to play in the spaces of agriculture, food security, bioenergy and biodiversity protection; prioritisation across these objectives; and then explore options for how to achieve these objectives in relevant and efficient ways [from keystone reports – IPCC]</td>
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