RESILIENT CAPE TOWN

Preliminary Resilience Assessment

Resilient Cape Town: Preliminary Resilience Assessment

Resilient Cape Town: Preliminary Resilience Assessment is published by the Resilience Department in the Directorate of Corporate Services, City of Cape Town. It has been prepared after consultation with numerous stakeholders across the city. This document is prepared for discussion purposes only. It marks the completion of Phase I of the journey towards the creation of Cape Town's first Resilience Strategy.

The City of Cape Town is appreciative to 100 Resilient Cities, pioneered by the Rockefeller Foundation, for its ongoing support in development of the Resilience Strategy.

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1 Developing a Resilience Strategy for Cape Town

In May 2016, Cape Town was selected by 100 Resilient Cities (100RC), pioneered by the Rockefeller Foundation, to join a global network of cities committed to building urban resilience in the 21st century. Cape Town joins several other African cities in this community of member cities, including Accra, Addis Ababa, Dakar, Durban, Kigali, Lagos, Nairobi and Paynesville, in this community of member cities. These cities, and others around the world, may have many differences but they are united in striving to ensure that they have the ability to adapt, survive and thrive no matter what acute shocks or chronic stresses they may experience.

Cape Town was admitted into this global network not because it is not resilient, but because it aspires to increase its resilience, knowing that the challenges of the future may be increasingly unfamiliar. Climate change is a major stress and Cape Town is particularly vulnerable to its impacts, which are expected to become more frequent and intense. The city, as well as the surrounding provincial region, is currently confronted with a severe drought, with recent annual rainfall levels being among the lowest in recorded history. The people of Cape Town have responded to the possibility of what has come to be known as 'Day Zero' by curtailing water consumption by more than 50% compared with pre-drought consumptions levels. This is a remarkable achievement and is evidence of the resilient character of Capetonians.

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The people of Cape Town have responded to the possibility of what has come to be known as "Day Zero" by curtailing water consumption by more than 50% compared to pre-drought consumptions levels.

Cape Town is also grappling with the challenge of overcoming its divided past. Twenty-four years after the dawn of constitutional democracy and the defeat of apartheid, Cape Town – and South Africa as a whole – has made remarkable progress in certain aspects of human development, including access to water, electricity, basic education and healthcare. However, a large number of Capetonians still live with the legacy of apartheid on a daily basis through chronic stresses such as high unemployment, poverty, crime and lack of availability of affordable housing. The spatial legacy of apartheid remains particularly severe and difficult to overcome, but it has become a high priority for the City administration to transform the spatial landscape of Cape Town through the enablement of dense and transport-orientated development and the development of an efficient, integrated transport system.

The above stresses and others that are prioritised in this document are exacerbated by known shocks such as drought, fire, and storm surges. However, as a city we also need to be aware of and prepare for possible unknown shocks such as cyber-attacks.

Building a resilience strategy for Cape Town is not just about what actions the City administration must take. In this regard it is fundamentally different to the City's

Integrated Development Plan (IDP). Cape Town's resilience relies on a broader approach that requires individuals, communities, institutions, and all spheres of government, including the City of Cape Town, to play a variety of resilience-building roles. A comprehensive resilience strategy for Cape Town will form the basis of this new approach. At the same time, this strategy is not a a "fix all" – it does not cover every issue facing the city. Rather, the strategy will target specific gaps identified through rigorous data analysis and stakeholder engagement as described in this document, that present resilience challenges and opportunities for the city.

This document, the Preliminary Resilience Assessment (PRA) for Cape Town, marks the conclusion of Phase 1 of the resilience strategy process for the city. It documents and analyses the relevant information that has been accumulated and gathered through various processes in order to identify and understand Cape Town's resilience challenges. It identifies the 'Enablers' of Cape Town's resilience and the 'Discovery Areas' that guide further exploration in Phase 2, the phase during which the Cape Town Resilience Strategy will be developed.

There are different understandings of what 'resilience' means to different stakeholders. It is important that during the resilience strategy-building process the complexity of urban resilience is understood by all citizens.

While Cape Town has its own unique resilience-related challenges, they are likely to be wide ranging and hence 'resilience' cannot be a term related to only one or two thematic areas.

What is Resilience?

100RC defines resilience as "the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow no matter what kind of chronic stresses and acute shocks they experience."

What are acute shocks and chronic stresses?

Chronic stresses weaken the fabric of a city on a day-to-day or cyclical basis, for example, high unemployment and crime.

Acute shocks are sudden sharp events that threaten a city, for example, earthquakes and floods.

What are typically the qualities that resilient cities demonstrate?

The Cape Town Resilience Strategy will endeavour to build the seven qualities of resilience listed below into the various systems and initiatives it will deliver.

Reflective: Using past experiences to inform future decisions.

Resourceful: Recognizing alternative ways to use resources.

Robust: Well-conceived, constructed and managed systems.

Redundant: Spare capacity, purposefully created to accommodate disruption.

Flexible: Willingness and ability to adopt alternative strategies in response to changing circumstances.

Inclusive: Prioritize broad consultation to create a sense of shared ownership in decision-making.

Integrated: Bring together a range of distinct systems and institutions.

When we refer to 'city' and 'City' what are we talking about?

The Cape Town Resilience Strategy is concerned with Cape Town as a whole, made up of all of its people, communities, eco-systems, infrastructure, spheres of government and the economy. This is referred to as the 'city'.

The City of Cape Town, a municipality established by the City of Cape Town Establishment Notice No. 479 of 22 September 2000, issued in terms of the Local Government: Municipal Structures Act, Act 117 of 1998, is referred to as the 'City'. While the City is leading the development of the Cape Town Resilience Strategy, it is only one player in the complex structure that makes up the whole of the city.

1.2 The City Resilience Framework

The City Resilience Framework (CRF), see figure 1, is the prescribed lens through which Cape Town's resilience challenges and opportunities are assessed. The methodology, which includes four dimensions, 12 drivers and 50 sub-drivers, is a useful starting point for Cape Town's resilience journey. The CRF methodology is applied in a subsequent section to an actions inventory, a perceptions inventory and the City Resilience Index (CRI) for Cape Town.

City Resilience Framework

4 x Dimensions

The CRF is built on four essential dimensions of urban resilience.

12 x Drivers

Each dimension contains three drivers which reflect more specific characteristics of resilient cities can take to improve their resilience. The drivers form the core of the CRF, and when taken together they represent a city's resilience to a wide range of shocks and stresses.

50 x Sub-Drivers

Each driver comprises a number of sub-drivers which identify specific and more detailed actions to aid assessment.

CITY RESILIENCE FRAMEWORK

City Resilience Framework (CRF) comprises four dimensions and 12 drivers, which together describe the complex and interdependent issues that contribute to a resilient city.

What is the City Resilience Framework?

The City Resilience Framework provides a lens through which the complexity of cities and the numerous factors that contribute to a city's resilience can be understood.

It contains 12 drivers that describe the fundamental outcomes of a resilient city.

A resilient city is one that:

1. Meets basic needs
2. Supports livelihoods and employment
3. Ensures public health services
4. Promotes cohesive and engaged communities
5. Ensures social stability, security and justice
6. Fosters economic prosperity
7. Provides and enhances natural and manmade assets
8. Ensures continuity of critical services
9. Provides reliable communication and mobility
10. Promotes leadership and effective management
11. Empowers a broad range of stakeholders
12. Fosters long-term and integrated planning

1.3 The Resilience Strategy journey

The PRA documents Phase 1 of the development of Cape Town's Resilience Strategy. We have undertaken a holistic review of the city's state of resilience, engaging with stakeholders, critical voices, City decision-makers and experts in a range of disciplines.

Sections 2 and 3 provide an overview of the city profile and summarise the work that has been done to date to understand Cape Town's key resilience strengths and weaknesses, as well as identify opportunities where we can begin to build on existing good work and initiatives.

Section 4 identifies emerging resilience themes and translates these into cross-cutting Discovery Areas and Enablers to guide Phase 2 of our work, where we will undertake more detailed and targeted analysis.

Section 5 describes the next steps we will take to complete a comprehensive strategy that seeks to improve the resilience of our city through a programme of tangible, implementable and impactful initiatives.

2015

→ NOVEMBER 2015
Cape Town applies to be a member of 100RC

2016

→ MAY 2016

Cape Town is selected to join the 100RC network

2017

→ MARCH 2017

Cape Town's first Chief
Resilience Officer (CRO)
is appointed by Council

→ MAY 2017

Agenda Setting Workshop
Introducing the City of
Cape Town and our stakeholders
to the 100RC network

→ SEPTEMBER 2017-JUNE 2018

Preliminary Resilience Assessment
Identifying priorities and partners
for conducting more detailed
diagnostic work in Phase 2

→ JULY-SEPTEMBER 2018

Discovery Area Analysis
Connect with stakeholders in Cape Town
and explore agreed Discovery Areas
within working groups to advance
knowledge and test new opportunities.

2018

→ OCTOBER-NOVEMBER 2018

Opportunity Assessment
Organising and synthesising the
findings of the Discovery Area
analysis and diagnostic, together
with the PRA, to discuss with
stakeholders and identify and test
resilience-building options and
implementable initiatives.

→ DECEMBER 2018 -MARCH 2019

City Resilience Strategy
Identifying and validating Cape Town's
key resilience goals and initiatives.
Goals will be the high-level priorities
for action and the initiatives will be
specific activities that when
implemented fulfil the ambition of the
Resilience Strategy.

→ APRIL 2019 ONWARDS

Implementation
Implementing, monitoring and evaluating the Resilience
Strategy. The Resilience Strategy is not an outcome or endpoint
but a catalyst for long term continuous resilience building.

2019
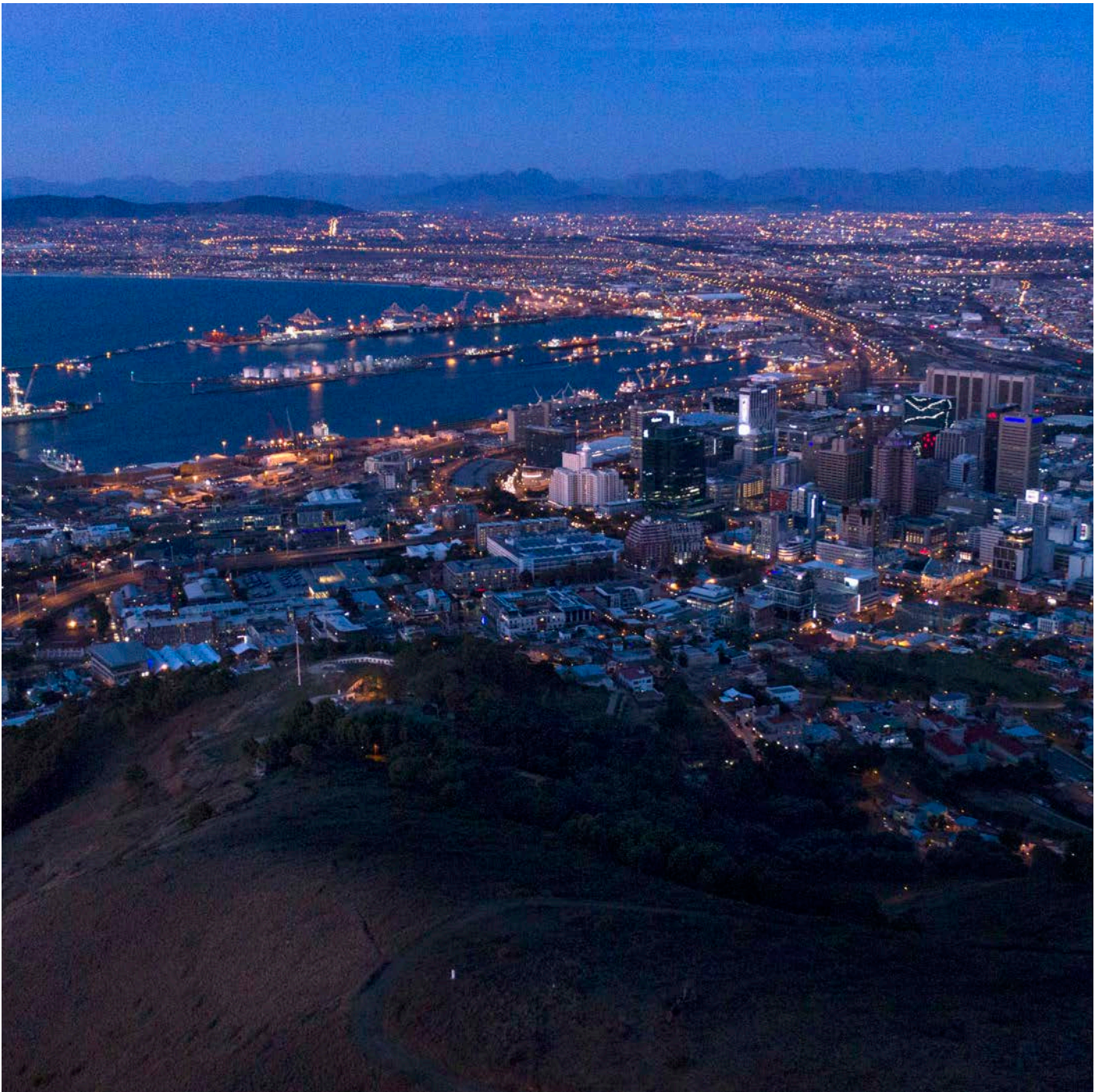
2 City Profile

This section presents Cape Town's city profile. It summarises information and data necessary to understand the challenges and opportunities that the city faces. The profile is an important counterpart to the inventory of resilience actions, the assessment of perceptions and the CRI.

Cape Town, located in the Western Cape, is the legislative capital of South Africa and is the location of the Parliament of South Africa.

World renowned for its stunning natural beauty and biodiversity, it is one of the most popular tourist destinations in the world. It is the location of the iconic Table Mountain, one of the New7Wonders of Nature[1] and the location of two UNESCO World Heritage sites, the Cape Floral Region and Robben Island.[2]

It is the second most populous city in South Africa and the 10th most populous city in Africa[3]. In 2016 the population of Cape Town was 4 004 793, an increase of 7,1% since 2011 and of 56,2% since 1996[4]. This repr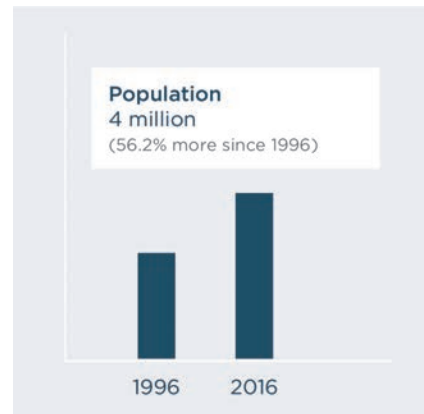esents roughly a 1.5 - 2% population increase per annum at present. From 2011 to 2016, Cape Town had the fourth highest annual population growth rate of all the metropolitan municipalities in South Africa, increasing from 1,5% between 2011 and 2012 to 1,6% between 2015 and 2016[5]. This rapid urbanisation is largely the result of high inward migration of South Africans, particularly from the Eastern Cape and other parts of the Western Cape. A significant number of new migrants to Cape Town find residence in one of the city's many informal settlements.

Cape Town's continued growth will intensify the range of challenges it already faces including high levels of unemployment, substance abuse and crime. Simultaneously, Cape Town needs to overcome its inequitability, which is a legacy of the former apartheid system. Hence Cape Town will require a major focus on physical and economic infrastructure as well as human capital development to manage these challenges.

Population
4 million
(56.2% more since 1996)

1996   2016

Geography	
Total area 2016	2456 sq. km.
Length of coastline including Table Mountain National Park	307 km

City budget	
Total (ZAR '000) 2017/2018	44 286 175
Operating (ZAR '000)	37 322 109
Capital (ZAR '000)	6 964 066

Governance	
Number of registered voters 2016	1 977 690
Voter turnout actual 2016	1 271 923
Voter turnout %	64,21%

Economy	
Economic contribution to South Africa's GDP 2016	9,9%
Average economic growth per annum 2016	1%
Gini coefficient for Cape Town 2015	0,62
Unemployment rate (strict definition) 2017	22,7%
Percentage employment per sector 2016	
Formal sector	82,90%
Informal sector	10,70%
Private households	6,30%
Real GDP per capita 2016	R73 811

Health	
Tuberculosis incidence for 1 000 population 2015	606
Infant mortality rate per 1 000 live births 2012	16.4

Population and Demography	
Population total 2016	4 004 793
Gender 2016	
Female	2 034 040 (50,8%)
Male	1 970 753 (49,2%)
Population group 2016	
Black African	1 704 232 (42,55%)
Coloured[6]	1 597 841 (39,9%)
Asian	43 593 (1,09%)
White	659 127 (16,46%)
Gross population density 2017	1 700 ppl per sq km
Provincial life expectancy at birth 2017	
Female	71,8
Male	66,8
Number of households 2016	1 264 849
Household size 2016	3,17

Natural environment	
Percentage of land conserved 2015	20,82%
Number of public open spaces: 2016	
Community parks	3 526
District parks	12
Greenbelts	364
Average annual rainfall 2016	382mm

Transport	
Percentage of citizens using public or private transport 2015	
Public	52%
Private	48%
Length of tarred roads 2015	11 894km

2.1 The legislative context of different spheres of government

The Constitution of the Republic of South Africa, 1996, provides for three spheres of government namely national, provincial and local (municipal). The Constitution describes the spheres of government as distinctive, interdependent and interrelated. The City of Cape Town is a metropolitan municipality, and hence is the relevant local government authority in this regard. The Western Cape Government is the relevant provincial government. See figure 2 for a graphical representation of the three spheres of government and their competencies.

Through Schedules 4 and 5, the Constitution provides for shared or concurrent competencies (or mandates) between these spheres as well as areas of exclusive competence and functions. Examples of functional areas of concurrent national and provincial legislative competencies include agriculture, health services, housing, tourism, disaster management, regional planning and development, trade and education at all levels, excluding tertiary.

Examples of local government competencies include building regulations, municipal planning, municipal public transport, firefighting services, childcare facilities, street trading and water and sanitation services limited to potable water supply systems and domestic waste-water and sewage-disposal systems.

National government has sole authority to pass and implement legislation on any matter not listed in Schedules 4 and 5 of the Constitution.[7]

FIGURE 2
The three spheres of government

SOURCE: 'THE PEOPLE'S GUIDE', PUBLISHED BY THE SOUTH AFRICAN CITIES NETWORK

Each of these spheres of government is made up of executive and administrative components. The executive components consist of the elected government for that specific sphere of government.

Relations between the three spheres of government are governed by the principles of co-operative government and intergovernmental relations. These include, among others, respect for the constitutional status, institutions, powers and functions of governments in other spheres and exercising powers and performing functions in a manner that does not encroach on the geographical, functional or institutional integrity of government in another sphere. At the same time, there is inherent overlap in terms of impact of the actions of one sphere of government on the other, and in many instances there are shared competencies. From a resilience perspective, this means that cooperation and coordination between spheres is crucial.

As is noted on various occasions in this document, there is room for improvement in the intergovernmental relations between the City and national government. The City has found itself at odds with the national government on a number of occasions in recent times, whether it be on the functioning of and developmental plans for Metrorail, an entity of national government[8], or over the supply of bulk water, in the context of the drought.[9] In some instances there is also a need for greater cooperation and coordination between the City and provincial government as well.

In some cases intergovernmental disputes have been declared. For example in 2011, the City declared an intergovernmental dispute with the South African National Roads Agency over its plans to toll certain national roads in the city. More recently, in July 2017, the City took the national Minister of Energy to court to attempt to force the Minister to allow the City to procure renewable energy from independent power producers. The City has set itself a target of sourcing at least 20% of its energy from renewable energy by 2020, but this will not be possible unless the City can purchase this energy from an independent source.[10]

Notwithstanding the different functions and mandates of each sphere of government, if Cape Town is to improve its resilience across a number of thematic areas, it will require the cooperation of both provincial and national government.

2.2 The spatial context of Cape Town

Apartheid urban planning and the racially divisive policies of the country's past have negatively affected the spatial form, social fabric and structure of the economy, and resulted in urban management inefficiencies and expensive operating costs. As a result, the poorer population largely resides further away from economic and employment hubs, with uneven access to basic services as well as affordable housing, health, education, transport, social, cultural and recreational facilities.

The reality of this spatial context is clearly depicted by the City's Transport Development Index which has shown that the low-income segment of Cape Town's population spends on average 43% of their household income on commuting costs, more than four times the acceptable international average.[11] See figure 3 for a snapshot of Cape Town's transport network.

One of the main transport-related stresses experienced by Capetonians includes the duration of peak-hour travel on the city's public roads. Cape Town is South Africa's most congested city and is ranked 48th in the world out of 390 cities on the TomTom Traffic Index Report.[12] Another key transport-related stress is regular failure of the public transport system, particularly of the Metrorail service, which is outside the City's jurisdiction. Failure of Metrorail is typically due to vandalism and incidents of crime and violence. For example, at the start of 2018 the busy Central Line had to be shut down for six weeks after a security guard was murdered at Chris Hani station in Khayelitsha, which resulted in rail staff refusing to work due to safety concerns. When attempts were made to restart the service, vandalism through cable theft prevented it.[13] A further transport-related stress is the lack of integration between the different public transport modes to function as a cohesive whole.[14] This example brings to the fore the challenge of intergovernmental relations from a resilience perspective.

The City has adopted the use of transit-orientated development to address urban inefficiencies and substantial transport costs, both relics of the apartheid era that have been further exacerbated by urban growth and urbanisation. Through a bold spatial transformation process, a more productive, liveable and resource-efficient city is the intended outcome.

Following the approval of the City's Organisational Development and Transformation Plan (ODTP) in 2016, the Transport and Urban Development Authority was established, which includes the co-location of the City's transport, urban development and human settlements elements, allowing for improved transversal management.

Going forward, the strategic intent is to prioritise bulk infrastructure within, or to the benefit of, the existing urban footprint, framed by three integration zones. Further, high-density, high-intensity, mixed-use development will be prioritised along bus rapid transport trunk routes and rail station precincts. Also, there will increasingly be integrated and innovative inclusionary housing solutions in the inner city urban cores, such as Khayelitsha, Cape Town CBD, Claremont, Mitchell's Plain, Wynberg and Bellville.

Various transport-related projects are included in the Integrated Public Transport Network, which describes the public transport routes that are expected to be in place by 2032.[15] These include further expansion of the MyCiti system to, among others, link Khayelitsha and Mitchells Plain to Claremont and Wynberg, and the Blue Downs rail corridor project, which will be implemented in conjunction with PRASA, to connect the Metro South East with the Northern Suburbs.

FIGURE 3
Cape Town's Transport Picture 2016

Cape Town is South Africa's most congested city and is ranked 48th in the world

9%
Walking
or cycling

% of the population's main mode of transport

Metered Taxis
1,585
services operating

Cycle Lanes
440km
of cycle lanes

53%
Private Transport
95%
car ownership in high to middle-income communities

8%
Contracted Bus Service
GABS, Sibanye and MyCiTi

250,000+
passengers a day

1,400+
bus registrations

12%
Minibus Taxis
SANTACO Western Cape

6
regional bodies

119
associations

1,350
routes

12,000
licensed minibus taxis

300,000+
passengers

18%
Passenger Rail

2.7%
of trains are cancelled

25%
of trains are delayed

23
routes on 4 corridors

72
operating train sets

125
stations

1,014
km of rail network

454,000
passenger trips

Bus Rapid Transit
32km
of dedicated red road

LAUNCHED 2010

SOURCE: CITY OF CAPE TOWN, CITY OF CAPE TOWN TRANSPORT DEVELOPMENT INDEX. TRANSPORT FOR CAPE TOWN, 2016.

There are at least 204 informal settlements in Cape Town that have been established in response to rapid inward migration and urbanisation. These informal settlements accommodate approximately 145 000 households.[16] They are mostly located on City-owned land. The reality is that the challenges of daily stresses and intermittent shocks are exponentially higher for individuals living in these settlements. Informal settlements are characterised by a lack of formal tenure, insufficient public space and facilities, inadequate access to municipal services, poor access ways, and non-compliance with planning and building regulations.[17] In addition, informal settlements also confront health threats due to the lack of disposal of greywater, the prevalence of rodents and other environmental health risks.

Informal settlements are at a greater risk from the effects of disasters. Some informal areas are built on dangerous sites such as unplanned landfills, wetlands or depressions which intensifies the likelihood of disasters such as flooding.[18] From a social point of view, these areas often overlap with high social vulnerability such as poverty, unemployment and high crime rates (see Section 2.4 for more information in this regard).

The City has various initiatives to re-block informal settlements that will, among other things, aim to create a safer public realm, access for emergency vehicles, safe and convenient paths for movement on foot and, where possible, open space for essential community facilities that may precede formal upgrading processes.

2.3   The economic context of Cape Town

The Cape Town economy contributes 9,4% to the national employment figure and is the second-largest employer of all the South African metropolitan areas. See figure 4. Cape Town's economy has progressively shifted towards a predominantly service-driven economy with growth in tertiary sector industries outpacing growth in both primary and secondary sector industries in the past 10 years.[19] The local economy has recently grown faster than the country's, primarily because it is not heavily dependent on the mineral sector, which has experienced a recent downturn.

Industries that have grown quickly and have emerged as comparative advantages for Cape Town include information and communication technology, renewable energy, film and media, and tourism and business services, especially business-process outsourcing. Accompanying this shift is the continuing decline of employment opportunities for low- and semi-skilled workers in the city.[20]

Cape Town's unemployment rate as of mid-2017 stood at 22,7% on the narrow definition, and 24,2% on the broad definition of unemployment.[21] While the strict unemployment rate is one of the lowest in South Africa and the broad unemployment

rate is the lowest of all metropolitan areas in the country, the hard truth is that 448 312 Capetonians who want to work are unemployed. Furthermore, 26,5% of young people between

FIGURE 4
Employment contributions per metro

JOHANNESBURG 12.5%
CAPE TOWN 9.4%
TSHWANE 7.9%
EKURHULENI 7.6%
ETHEKWINI 5.4%
NELSON MANDELA BAY 2.2%
BUFFALO CITY 1.5%
MANGAUNG 1.5%
REST OF SOUTH AFRICA 50.4%
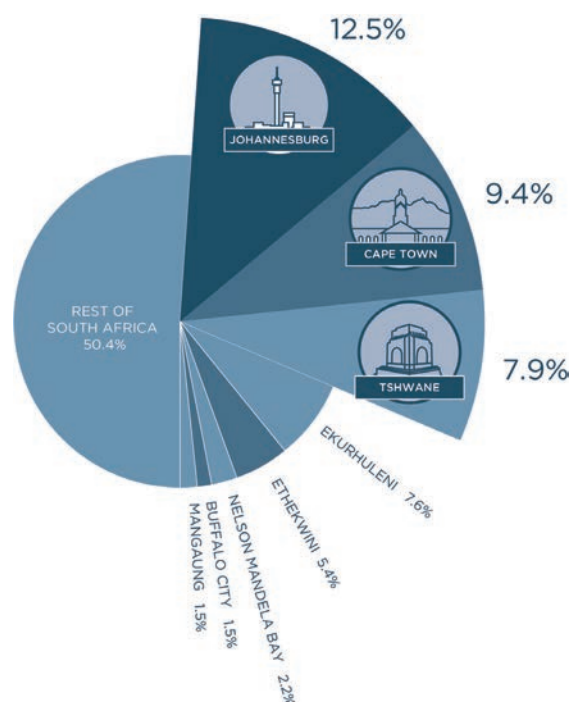
SOURCE: CITY OF CAPE TOWN EPIC 2017 Q2

the ages of 18 and 25 are not in employment, education or training (NEET rate).[22] See figure 5 for an explanation of the unemployment statistics.

High unemployment is a significant stress in Cape Town and is a contributing factor to high levels of poverty and economic inequality. South Africa ranks among the most unequal countries globally with regards to the income gap between rich and poor. Cape Town's Gini coefficient, like that of South Africa's, remains high (above 0,5) and is currently 0,62.[23]

Notwithstanding significant efforts by both the City of Cape Town and the Western Cape Government to create an enabling environment for job creation, unemployment levels are stubbornly stuck in a narrow band, not displaying any consistent downward trend. See figure 5 for an explanation of the narrow band of change between 2010 and 2017. A wide range of issues continue to constrain the current ability of Cape Town's economy to absorb larger numbers of low-skilled, unskilled and semi-skilled workers. These include productivity improvements in labour intensive sectors leading to lower demand for labour, red-tape constraints,

particularly in respect to starting new businesses, high labour costs by international standards, and low levels of entrepreneurship.

While the local economy has outperformed the national economy, it is still inextricably linked to the national economy and international investor sentiment. Policy and political uncertainty at the national level and the weakening of state institutions have been sighted in recent times by ratings agencies for declining credit ratings. There was however some early evidence at the beginning of 2018 that investor confidence in South Africa may be returning.[24]

For Cape Town, the key challenges include the creation of a cross-section of jobs from highly skilled to semi-skilled and unskilled; addressing the skills mismatch and high youth unemployment; establishing infrastructure for a knowledge economy; attracting foreign direct investment; and supporting small, medium and micro enterprises within the local economy. A variety of initiatives to address these challenges are contained in the City's Economic Growth Strategy and in the Western Cape Government's Project Khulisa, but more needs to be done.

FIGURE 5
Unemployment in Cape Town

24.2% BROAD RATE
22.7% STRICT RATE
Unemployment
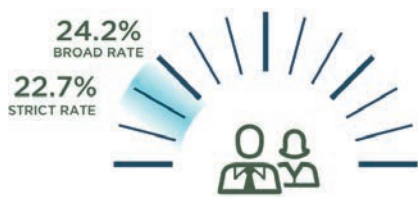
26.5%
Youth NEET
Some unemployed youth are meaningfully engaged in education or training. The NEET (Not in Employment, Education or Training) indicator captures those youth not actively participating in the economy in any way
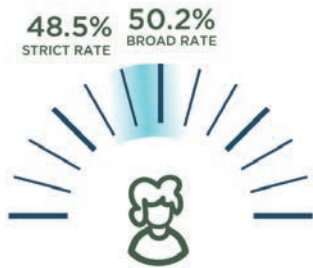
48.5% STRICT RATE   50.2% BROAD RATE
Youth Unemployment
The youth unemployment rate refers to people between the ages of 15 and 24 who are not employed, despite being willing and able to work

BROAD RATE:
Searching + non-searching unemployed
—
Broad labour fource (employed + searching + non-searching)

STRICT RATE:
Searching unemployed
—
Labour fource (employed + searching)

Strict vs broad unemployment rates for Cape Town

UNEMPLOYMENT RATE (%)

- ● SA BROAD RATE
- ● SA STRICT RATE
- ● CAPE TOWN BROAD RATE
- ● CAPE TOWN STRICT RATE
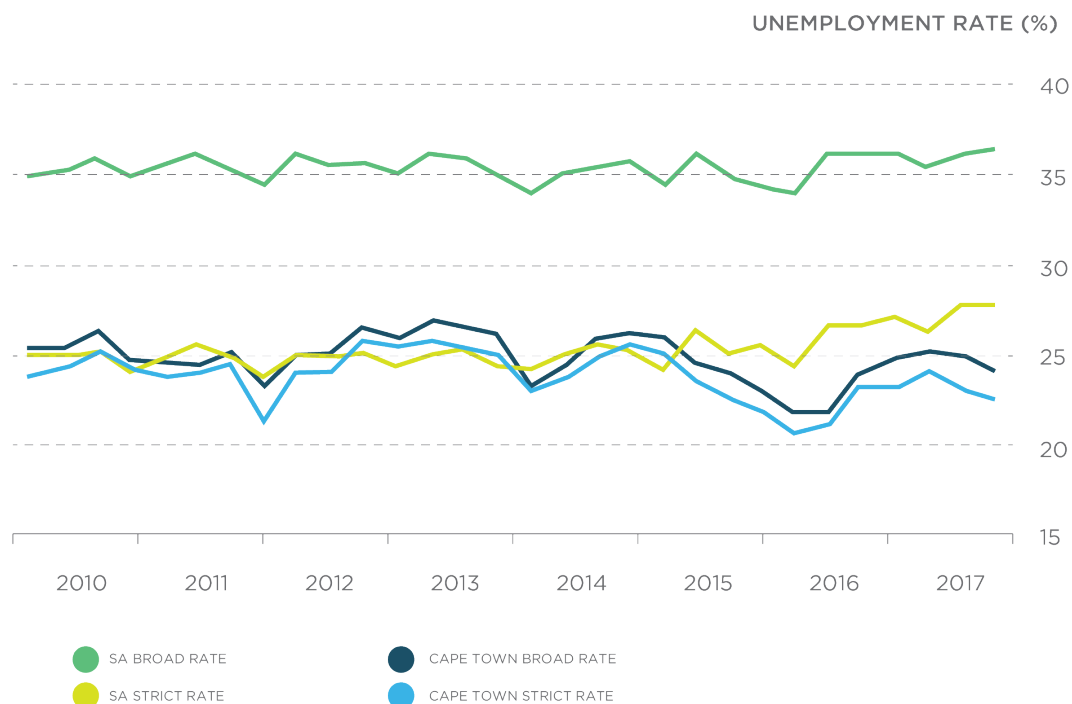
SOURCE: CITY OF CAPE TOWN, 2017, EPIC 2017 Q3.

Also key is encouraging a closer alignment between the spatial location of employment opportunities and residential areas, and improving the ability of Capetonians to easily traverse the city to seek economic opportunities.

The informal economy in Cape Town, while relatively small compared with other metropolitan areas in South Africa,[25] is responsible for employing approximately 6% of the working age population. As of mid-2017 this translated into employment for 172 000 Capetonians.[26]

The main group participating in the informal economy are classified as African (49%), male (60%) and unskilled (43% without matric).[27]

The informal economy, for its size, makes a disproportionately large contribution towards taking people out of poverty. Wages in the sector are low, but they tend to accrue predominantly to poorer households. It is estimated that the activity in the informal economy reduces the poverty rate in Cape Town by 4,5 percentage points. This equates to a safety net for an estimated 186 000 Capetonians.[28]

The informal economy is incredibly diverse in terms of sectors present in Cape Town. The greatest sector employer within the informal economy is retail and wholesale trade, accounting for 40% of all informal economy workers. [29]

Nearly 450,000 Capetonians who want to work are unemployed

There is significant untapped potential in enabling the growth of the informal economy in Cape Town, particularly as a means to absorb unskilled workers. There needs to be much more research conducted to understand the dynamics of the informal economy, particularly in understanding value chains.

Above all, there needs to be an increased acknowledgement of the importance of the informal economy in building a resilient Cape Town. Some areas of possible focus include adopting flexible and responsive regulation and management approaches;
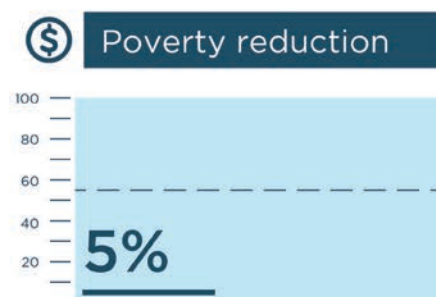
The informal economy

GDP

100 — 80 — 60 — 40 — 20 —

10.5%

The informal economy contributes up to **10.5%** of Cape Town's GDP

Employment

100 — 80 — 60 — 40 — 20 —

6%

The informal economy employs 6% of Cape Town's working age population

Poverty reduction

100 — 80 — 60 — 40 — 20 —

5%

The informal economy reduces poverty in Cape Town by 5%.

SOURCE: INFOGRAPHIC ON INFORMAL ECONOMY PREPARED FOR CITY OF CAPE TOWN BY SUSTAINABLE LIVELIHOODS FOUNDATION

The current drought in Cape Town, a significant shock event, has laid bare the vulnerabilities of the economy to constrained water supply. While households, the largest water consumer group, have responded well to restrictions, many economic sectors have found the restrictions considerably more challenging. The drought has also attracted considerable adverse international attention, which may dull investor confidence for a period.

The Cape Town economy will recover from the drought, and will emerge more water-resilient; however, the impacts of climate change, which includes drought, rainfall flooding, and heat waves among others, is expected to be more frequent and intense in the future. In addition, the international imperatives to build a low-carbon economy as a contribution to mitigating climate change will add further challenges. For this reason, it is important to make a concerted effort to further enable the growth of the green economy in Cape Town, which means expanded economic opportunities through the provision of goods and services and the use of production processes that are more resource-efficient, enhance environmental resilience, optimise the use of natural assets and promote social inclusivity.

moving from restrictive approaches to supportive approaches; and supporting businesses to meet regulatory obligations.[30]

A resilient Cape Town economy needs to keep on top of international trends. In a globalised world, the local economy is inextricably linked to the world economy. Further, the impacts of climate change pose significant resource constraints on the economy, while also offering significant opportunities for innovation.

Lastly, the Cape Town economy needs to build resilience in response to the 'Fourth Industrial Revolution'. According to Klaus Schwab, Executive Chairman of the World Economic Forum, the scale, scope and complexity of the 'Fourth Industrial Revolution' will be a 'transformation unlike anything humankind as experienced before'. It is advancing at an exponential rather than linear pace and it is disrupting almost every industry in every

What is the Fourth Industrial Revolution?

It is a digital revolution that has been occurring since the middle of the last century. Occurring at an exponential rather than linear pace, it is characterized by a fusion of technologies that is blurring the lines between the physical, digital and biological spheres.

country. It is transforming entire systems of production, management and governance.[31]

On the positive side it will bring gains in efficiency and productivity, and decreased costs of transport, communications and trade. However, it could yield greater inequality, particularly in its potential to disrupt labour markets as automation increasingly substitutes labour. This is a significant risk to the Cape Town economy that already has high levels of unemployment and inequality.

The Cape Town economy needs to establish how it can capitalise on the 'Fourth Industrial Revolution' to harness the opportunities, while diminishing its possible negative impacts.

2.4 The social context of Cape Town

Cape Town consists of a dynamic and multicultural society that provides a number of opportunities. Precisely due to its diverse society, the City of Cape Town has highlighted the importance of social inclusion as a strategic priority. Cape Town is however also a city with numerous societal stresses, many overlaid on each other, with strong spatial agglomeration.

Quality-of-health levels in general have increased in Cape Town, with the city's infant mortality rate having dropped significantly in recent years.[32] The Western Cape, of which Cape Town has the largest population, had the highest average life expectancy at birth (64 years) in the country in 2017.[33] While people are living longer and healthier lives, the percentage of economically active working-age people (aged 15-64) has also increased. This has caused a drop in the total age dependency ratio[34] for Cape Town – an ongoing trend for Cape Town over the last two decades.

There has been an increase in the number of Capetonians living with HIV/Aids registering for antiretroviral treatment (ART) at the City's clinics, which means they are living longer lives. Although the HIV-prevalence rate increased in the

Western Cape between 2011 and 2014, it stabilised in Cape Town during the same timeframe.[35] Together with its national and provincial counterparts and the United States President's Emergency Plan For Aids Relief, the City Health Directorate is at the early stages of implementing the UNAIDS strategy of '90-90-90'.[36]

A downward trend in the incidence and number of cases of tuberculosis (TB) began to emerge between 2009 and 2014, and was linked to the increasing access to ARTs for HIV-positive people who are vulnerable to TB if not on the treatment regime. TB in Cape Town is exacerbated by poverty and urbanisation, which result in overcrowding, challenges with treatment adherence and substance abuse. Drug-resistant strains of TB (multidrug-resistant and extensively drug-resistant) present an ongoing challenge.[37]

Illiteracy levels among Cape Town's adult population more than halved in the period 1996 to 2016, dropping from 4,2% to 2% in 2016. The provision of basic education in Cape Town is a mandate of the Western Cape Government. Education outcomes in the city have generally been better than the rest of the country.[38]

The benefit of improving health and education levels as well as social development is that Cape Town residents will develop an increased capacity to withstand personal and community trials, which can in turn support efforts to build resilience in the city.

Key social stresses that Cape Town is still grappling with can be linked to the country's historical roots, including the legacy of apartheid, as well as ongoing high levels of unemployment and poverty. These stresses include crime, substance abuse, gang activity and gender-based violence,[39] with the youth and women being most at risk.

Social vulnerability has a distinct spatial form in Cape Town. Social vulnerability is the 'underlying state of conditions that makes people more likely to be negatively impacted by a shock or stress. It is often correlated with a lack of wealth, education, employment, access to services, health and assets.'[40]

In figure 8 the Social Vulnerability Index approach is applied to Cape Town, using 44 variables from the Census 2011 statistics.

Social vulnerability varies greatly thoughout Cape Town. According to UCT researcher, Alex Aspostos, 'the lack of wealth, income, education, asset ownership and employment appears to explain much of the variation in social vulnerability' while secondary factors include a lack of access to services and health problems. Demographic and household charateristics are also important in identifying vulnerability. As Aspostos goes on to note, 'areas with high, black female-headed and extended family households are often areas that also experience high social vulnerability.' [41]

Decreasing social vulnerability is important for increasing resilience at household and community levels. Continued investment in infrastructure, services and human capital is critically important in areas of high social vulnerability. Importantly, it needs to be understood that from a resilience perspective, areas of social vulnerability are particularly susceptible to the impacts of shocks. Hence there is a need to combine social vulnerability with physical hazard maps to identify areas of high overall vulnerability

for purposes of determining interventions. Crime affects the whole of Cape Town, but criminal activity in general and gang activity in particular occurs more often in areas of social vulnerability and poverty, and is linked to social problems such as substance abuse.[42]

The high number of murders in Cape Town is of particular concern, and along with other high levels of crime, such as assault with intent to do grievous bodily harm, robberies and sexual offenses, contributes to high levels of trauma in the city, which is itself a significant stress.

The murder rate in Cape Town per 100,000 people (see figure 9) is the highest out of any metropolitan municipality in South Africa, and is on an upward trend. It has increased by 40% between 2010/2011 and 2015/2016.[43]

Bringing down the high levels of crime, most notably murders, and improving community safety requires the intergovernmental cooperation of the following three spheres of government: the South African Police Service (SAPS), which is an entity of national government,

FIGURE 8
Social vulnerability in Cape Town
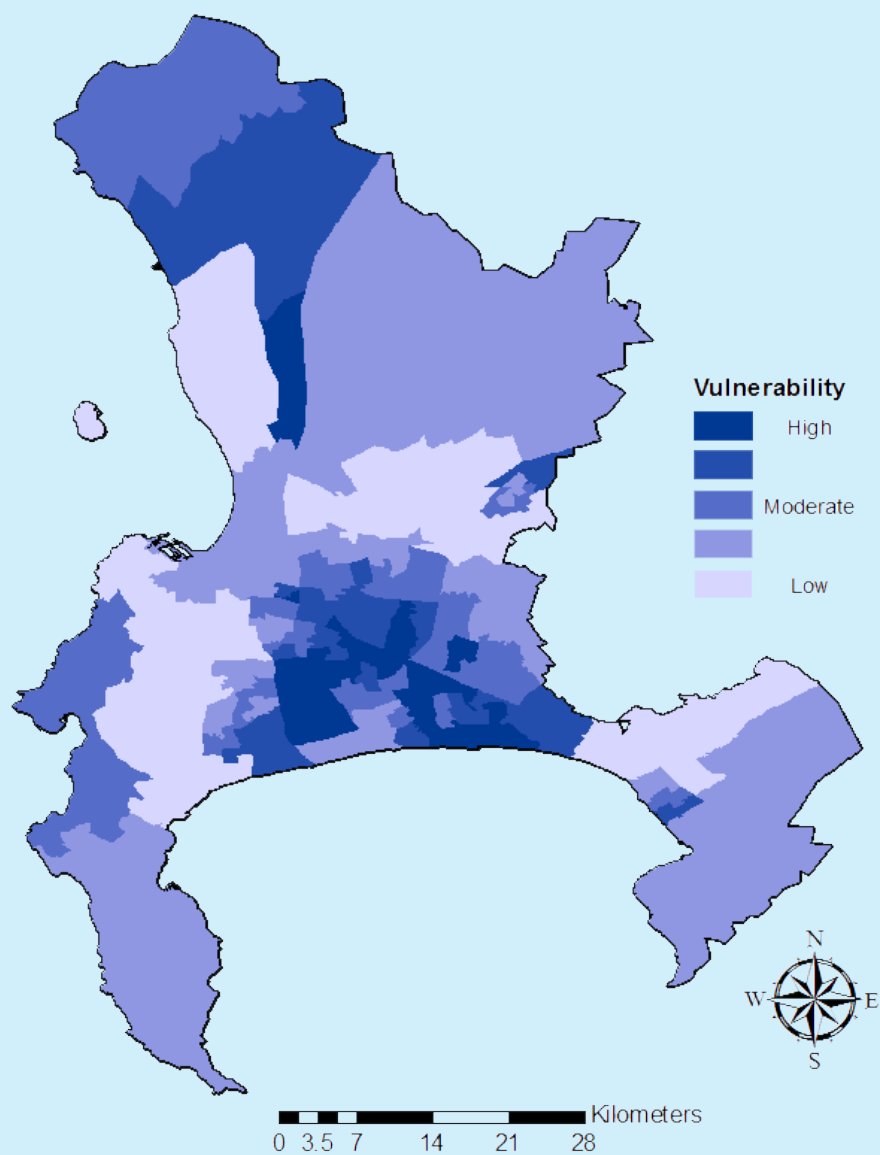
Vulnerability

High

Moderate

Low

Kilometers

0 3.5 7   14   21   28

Recorded murder rates per 100 000 by municipality
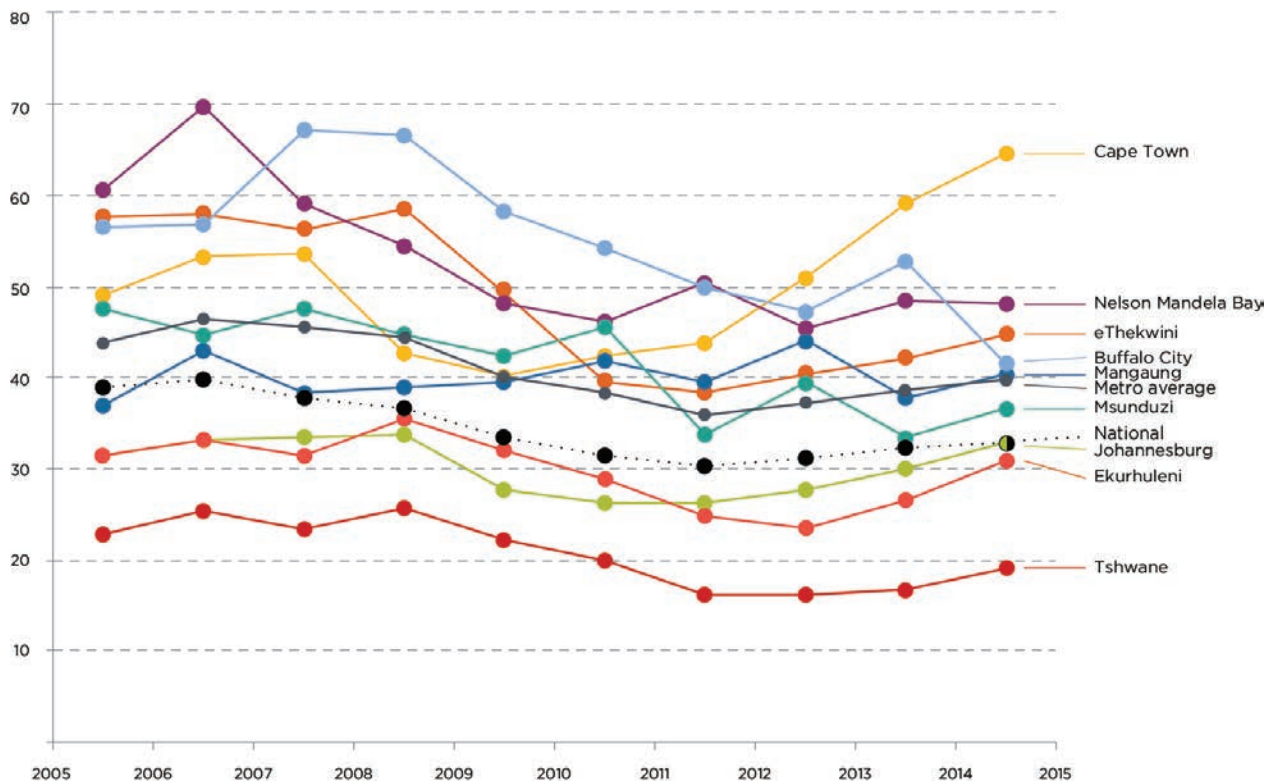
SOURCE: URBAN SAFETY REFERENCE GROUP, THE STATE OF URBAN SAFETY IN SOUTH AFRICA REPORT, 2017

and whose overall responsibility is achieving safe communities; the Western Cape Government's Department of Community Safety, which is responsible for police oversight and priority setting; and local government, in this case the City of Cape Town, which is responsible for municipal policing and by-law enforcement, local crime-prevention programmes and participation in community and/or policing and safety forums.

The Khayelitsha Commission, which examined allegations of police inefficiency in Khayelitsha and a breakdown in relations between the community and the police, delineates numerous recommendations for improving policing in that community, including roles for all spheres of government. These recommendations, whether in full or in part, are likely to be relevant to numerous other communities in Cape Town.[44]

Nevertheless, much like Cape Town requires improved action from national government in growing the local economy, it similarly needs improved action from the SAPS in reducing crime. While there are certainly more actions that can be taken by local stakeholders, including the City, improved resourcing, efficiency and professionalism of the SAPS is desperately required.

2.5 The environmental context of Cape Town

Cape Town's natural assets and biological diversity are part of what makes the city a unique and desirable place to live, work and visit. The city is, however, very vulnerable to the impact of climate change, notably to a likely increase in frequency and intensity of extreme weather events. Improving Cape Town's adaptive capacity to climate change is of critical importance, and is extensively covered in the City's new climate-change policy. The impact of climate change, which can manifest as shock events, have the ability to be multiplied by existing societal stresses such as poverty and food insecurity.

Climate change is globally understood to pose a significant risk to socio-economic stability and growth. Although the City has been taking steps to reduce its climate vulnerability and carbon emissions, these have been insufficient to address the pace of climate change impacts increasingly affecting Cape Town.[46] A new climate adaptation plan is currently in development and will be aligned with the Resilience Strategy.

The city is located within one of the world's six plant kingdoms, the Cape Floristic Region (CFR), which is a recognised UNESCO World Heritage site. The CFR has been identified as a global biodiversity hotspot that recognises it as one of the planet's most threatened ecosystems and places an international responsibility on all spheres of government to ensure its adequate protection.

Managing such threatened biodiversity in an urban context is a complex task. The network of conserved land is managed by various entities including the City, SANParks (national entity) and CapeNature (provincial entity). According to the 2012 State of the Environment Report, over two thirds of the natural vegetation types are classified as 'endangered' or 'critically endangered', and over 300 of Cape Town's plant species are threatened with global extinction.[48] See figure 10 for a representation of the ecosystem status.

Cape Town has six endemic vegetation types, which means that they can only be conserved within the boundaries of the city. Four of these

Climatic changes that Cape Town is facing include:

- a decrease in annual average rainfall and changed seasonality of rainfall
- an increase in mean annual temperature: higher maximum temperatures, more hot days, and more frequent and intense heat waves
- an increase in average wind and maximum wind strength
- an increase in both the intensity and frequency of storms: short, high-intensity rainfall events and increased size and duration of coastal storms

vegetation types are critically endangered and remnants are required to be conserved both within and outside the urban edge.[49]

Cape Town is a unique example of a city where biodiversity must be conserved as part of the urban fabric, and be fully integrated into present and future spatial planning. The City's conservation goals and targets are aligned with the national goals. These targets are used to determine the minimum sets of areas in the Biodiversity Network (BioNet). The BioNet is a fine-scale systemic biodiversity plan that identifies sites that need to be prioritised for conservation and protected from development and inappropriate management. The BioNet forms part of Cape Town's life-support system, as natural ecosystems provide many goods and services, as well as space for healthy recreation and spiritual and social upliftment.[50]

FIGURE 10
Ecosystem status

Ecosytem Status
- Critically Endangered
- Endangered
- Vulnerable
- Least Threatened

10 km

N
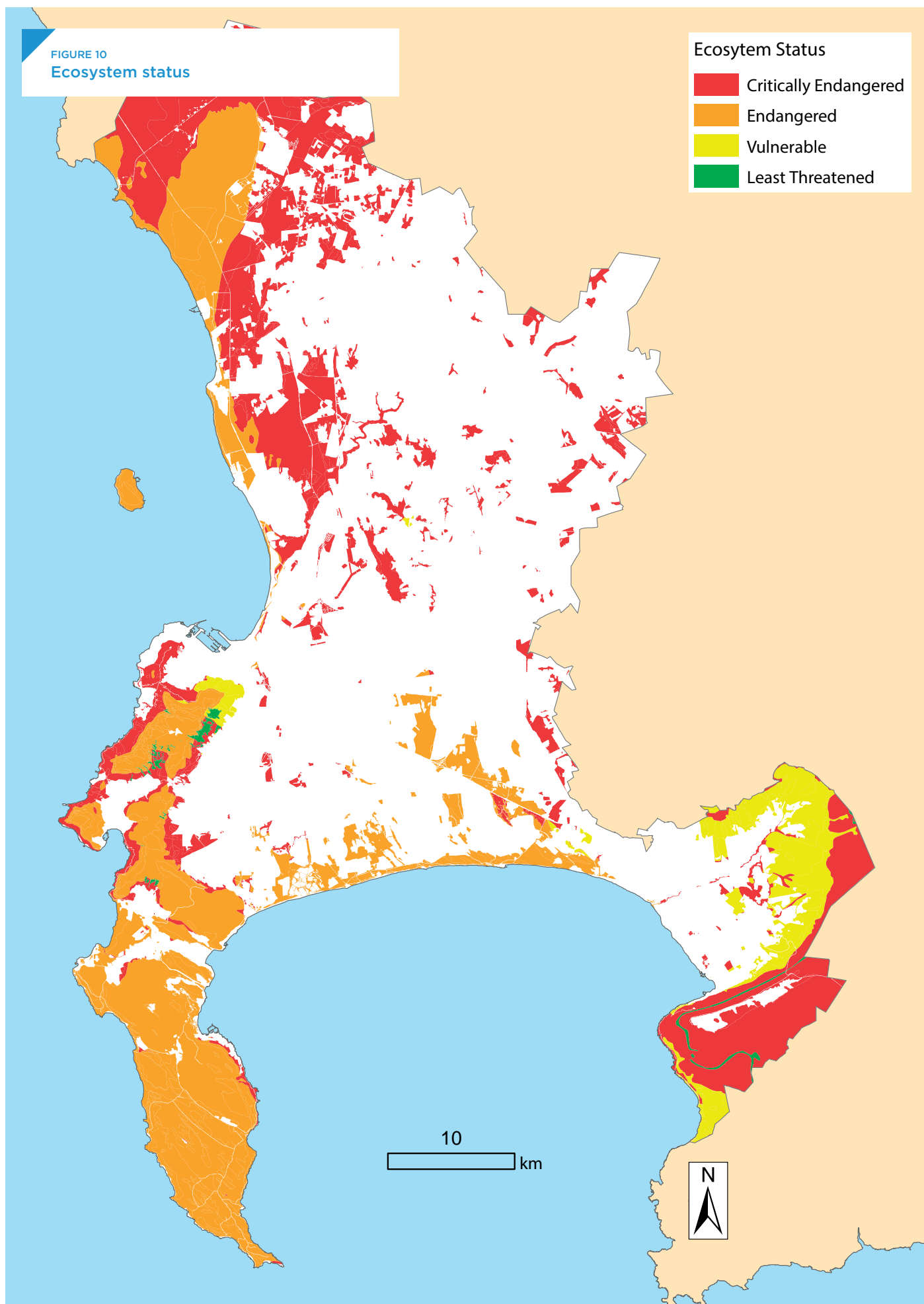
SOURCE: CITY OF CAPE TOWN 2012 STATE OF THE ENVIRONMENT REPORT

FIGURE 11
Effectiveness of WCWDM

FIGURE 11
Effectiveness of WCWDM

Resource constraints are becoming an increasingly important issue for the city. This is currently most evident in the drought shock, which is the most severe in recorded history. Rainfall responsible for f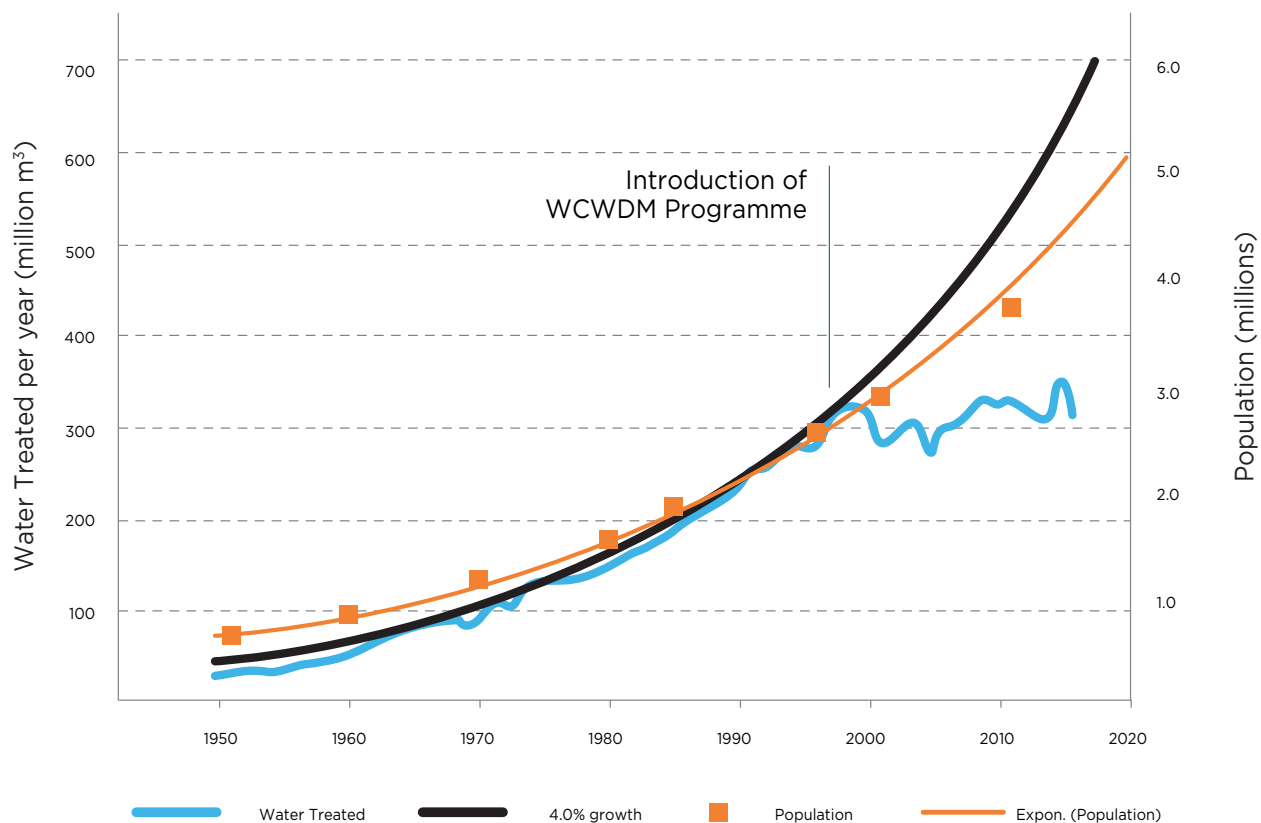illing the six large dams of the Western Cape Water Supply System (WCWSS) has been critically low for the period 2015 to 2017.[51] In order to meet nationally prescribed water restrictions, mandated consumption of water was restricted to 50 litres per person per day as of the beginning of 2018. While 'Day Zero' — the day dams reach 13,5% of capacity and reticulation to much of the city is turned off — will be avoided in 2018, the drought has laid bare the vulnerability of Cape Town to heightened drought conditions.[52]

Cape Town has had remarkable success in water management over many years, and is regarded as a global leader in water conservation and water-demand management (WCWDM).[53] Prior to the current drought, and hence before curtailments in consumption, Cape Town was consuming about the same amount of water as it was at the start of this century,

despite population growth of approximately 30% in the same period. See figure 11.

Hence, due to relatively high water-use efficiency in Cape Town over roughly the last two decades, curtailment in consumption under drought conditions has had to be particularly severe.

The drought has shone a spotlight on the lack of diversity in Cape Town's water supply. More than 90% of the city's water comes from the surface water in the six large dams.[54] There has thus been insufficient redundancy in the water supply system to provide extra capacity during this extreme shock event, which is beyond the modelled parameters of the water-supply system. The current drought is much more severe than a 1-in-50-year drought event. 'The best estimate of the return interval of the meteorological drought in the region of the Western Cape Water Supply System dams is 311 years, with 90% confidence that it actually falls between 105 and 1280 years'.[55]

While plans to augment water supply using alternative sources such as groundwater

abstraction, water re-use and desalination have existed on the long-term demand plan for Cape Town for some time, the drought has resulted in the advancement of the development of these alternative sources. Starting in mid-2018 and ramping up for the rest of the year into 2019, it is planned that close to 150 mega-litres of additional water from alternative sources will enter the system.[56]

Much like the issues of the economy and safety discussed earlier, the water system also has different competencies assigned to different spheres of government, particularly local and national government. National government through the Department of Water and Sanitation is primarily responsible for provision of bulk water supplies, while local government is responsible for the treatment and reticulation of water to consumers. During the current drought there has been conflict between regional and national decision makers about roles and responsibilities for water supply and there has been little support from national government for disaster preparedness.[57] The City of Cape Town and the

people of the city have had to shoulder the burden of decreased consumption, the associated loss in revenue to the City and the cost of augmenting supply under emergency conditions. Water provision is another area that requires stronger intergovernmental cooperation in the future.

Cape Town is becoming a more water-resilient city, but there is a considerable journey still ahead. The resilience of Capetonians has been remarkable. There is a need at the appropriate time to capture the learnings from this drought so that they can be used to prepare for other shock events in the future.

2.6 The City budgetary context

The City has a R44,3 billion budget for the financial year 2017/2018. Of this, R6,8 billion is for capital and R37,5 billion is for operating expenditure. Figure 12 shows the budget for each Directorate as at the date of Council approval. It is clear from this information that the largest portion of the City's budget, by virtue of the allocations to the energy directorate and the informal settlements, water and waste services directorate, is allocated to providing basic services as well as to providing infrastructure for the poor.

The City's principal sources of revenue include property rates, electricity tariffs, refuse tariffs, water tariffs, sanitation tariffs and housing rental charges.

Other income includes an equitable share grant from national government, which is used to subsidise the provision of free basic water, electricity, sanitation and refuse removal services for the poor, and a fuel levy allocation from national government based on fuel sale figures within the municipal jurisdiction.

At the time of the passing of the 2017/2018 budget, revenue from electricity sales was expected to shrink by 1% over the course of the year, attributed to an increased uptake in efficiency and conservation interventions by consumers. The IDP highlights the need for a project to implement a revenue model that reduces the City's reliance on electricity sales.[58] It is acknowledged that as consumers become more energy-efficient and adopt more small-scale embedded generation, the electricity distribution model needs to change to keep the City's rates account affordable and financially sustainable.

At the time of the passing of the budget it was also projected that there would be negative growth in revenue earned from water and sanitation due to the physical reduction in water usage due to water restrictions during the drought shock event. It was also foreseen that there would be permanent reductions in water usage after the drought due to actions taken by consumers during the drought. However, the projections in negative growth were heavily

FIGURE 12
Budget for each City directorate for 2017/2018

Informal Settlements, Water & Waste Services	**34,4%** 2,35 billion
Transport & Urban Development Authority	**26,8%** 1,83 billion
Energy	**19%** 1,29 billion
Assets & Facilities Management	**6,7%** 459,8 million
Corporate Services	**5,2%** 351,7 million
Social Services	**4%** 269,4 million
Safety & Security	**2,7%** 184 million
Directorate of the Mayor	**0,3%** 17,1 million
Finance	**0,2%** 17,1 million
City Manager	**0%** 222,360

SOURCE: CITY OF CAPE TOWN PRESENTATION ON 201/2018 – 2019/2020 BUDGET

underestimated. Due to more stringent water restrictions issued after the passing of the budget as the true extent of the drought shock became known, it was reported to Council in December 2017 that the projected water budget would incur a deficit in the region of R1,7 billion for the 2017/2018 financial year.[59]

The current drought has put significant pressure on the budget, with some adjustments having to be made within the financial year to fund emergency water-augmentation projects. It has shone a spotlight on the sensitivity of the existing revenue model of the City during shock events and highlighted the difficulty of funding projects in emergency circumstances that were not foreseen when the budget was approved. Responding to shock events is not easily done off the balance sheet as it stands.

A selection of capital budget highlights for 2017/2018 as approved by Council in May 2017

Energy

R60,5m for electrification programme to provide subsidised connections to informal settlements and housing developments

R67,8m for streetlighting in various areas in aid of safe movement of pedestrian and vehicular traffic

R14,5m for resource and energy efficiency in large municipal buildings

Social Services

R16,2m for new early childhood development centres in Strand and Heideveld

R22,9m for new clinics in Fisantekraal and Pelican Park

R6,9m for replacement of clinics in Uitsig and Zakhele

R23,1m for new library in Dunoon

Transport & Urban Development Authority

R462m for ongoing rollout of IRT Project: Phase 2A linking Mitchells Plain and Khayelitsha to Wynberg and Claremont public transport hubs

R108,7m for development and upgrading of various public transport interchanges

R150m for rollout of pedestrian and cycle facilities across the city

R239,6m for various projects intended to relieve traffic congestion

R66m for provision of bulk infrastructure for housing projects in Greenville in Fisantekraal, and Imizamo Yethu

Finance

R7m for e-tendering system to speed up tender processes

Corporate Services

R260m for continued rollout of broadband to build the Metro Area Telecommunications Network

R3,5m for provision of internet access at all libraries

Area Based Service Delivery

R3,8m for upgrade of informal markets and facilities

Informal Settlements, Water and Waste Services

R44m for materials-recovery facility at Athlone and Coastal Park to divert waste from landfills

R60,5m for gas-management systems at various landfill sites

R38m and R35m for construction of civil and electrical infrastructure at Kalkfontein Informal Settlement and Seethomes, Philippi respectively

R22m for informal settlements' sanitation installation

R341m for extensions to various wastewater treatment plants

R13,1m for water network upgrading to ensure an uninterrupted supply of water and to prevent water losses

The City's borrowing is performed in terms of Chapter 6 of the Municipal Finance Management Act and the City's borrowing policy that stipulates a long-term loan will only be entered into if it is affordable and sustainable. It is influenced by the capital investment requirement over the 2017/18 Medium Term Revenue and Expenditure Framework. The City needs a credit rating to demonstrate its ability to meet its short- and long-term financial obligations. Potential lenders also use this to assess the City's credit risk, which in turn affects the pricing of any subsequent loans taken. Factors used to evaluate the creditworthiness of municipalities include the economy, debt, finances, politics, management and the institutional framework.

In March 2018 *Moody's Investors Service* (Moody's) gave the City of Cape Town a Baa3 rating with a 'negative outlook' due to what it termed 'the current challenges associated with the water crisis'. It went on to say that 'revenue from water and sanitation sales will be further impacted if [Day Zero] takes place, as well as the costs of operating and administrative costs of distributing emergency water supplies, which will place further pressure on the City's budget.'[60]

The City is nevertheless rated at the high end of the range of South African municipalities rated by Moody's. The City's relative position reflects debt levels that are lower than the median of other metropolitan cities. Cape Town also compares favourably with the other metropolitan cities in South Africa in terms of budgetary performance and management, and displays robust cash holdings.

2.7 The City organisational context

The Council of the City of Cape Town is made up of councillors elected during the local government elections that take place every five years. The most recent election was held in 2016, and the term of office will be concluded in 2021. From among the elected councillors, Council elects the Executive Mayor.

The Council is the highest structure of local government in Cape Town. It is the executive body of the City and is responsible for making top-level decisions about how Cape Town is governed. The Council is also the legislative body of the City and makes and implements by-laws, which are local laws specifically created for Cape Town. Council passes the annual budget, sets the City tariffs for rates and services, and enters into service-level agreements with private agencies that do business with the City.

The City also has portfolio committees created in terms of Section 79 of the Municipal Structures Act that provide input into policy and strategy development and oversee various functional areas. The committee most relevant to the development of the Cape Town Resilience Strategy is the Sustainability and Resilience Cluster Committee.

The City's executive structure comprises a political arm and an administrative arm. The Executive Mayor, who is supported by a Deputy Executive Mayor and a Mayoral Committee of 10 members, heads the political arm. The Mayoral Committee is a political advisory structure that is similar to a cabinet with each member overseeing a different area of municipal government.

The administrative component of the Executive structure is headed by the City Manager who is supported by 10 Executive Directors. The Executive Director of Corporate Services is also the Chief Resilience Officer, and within this Directorate is the Resilience Office, which is responsible for leading the resilience strategy process in Cape Town.

FIGURE 13
City of Cape Town Executive Structure
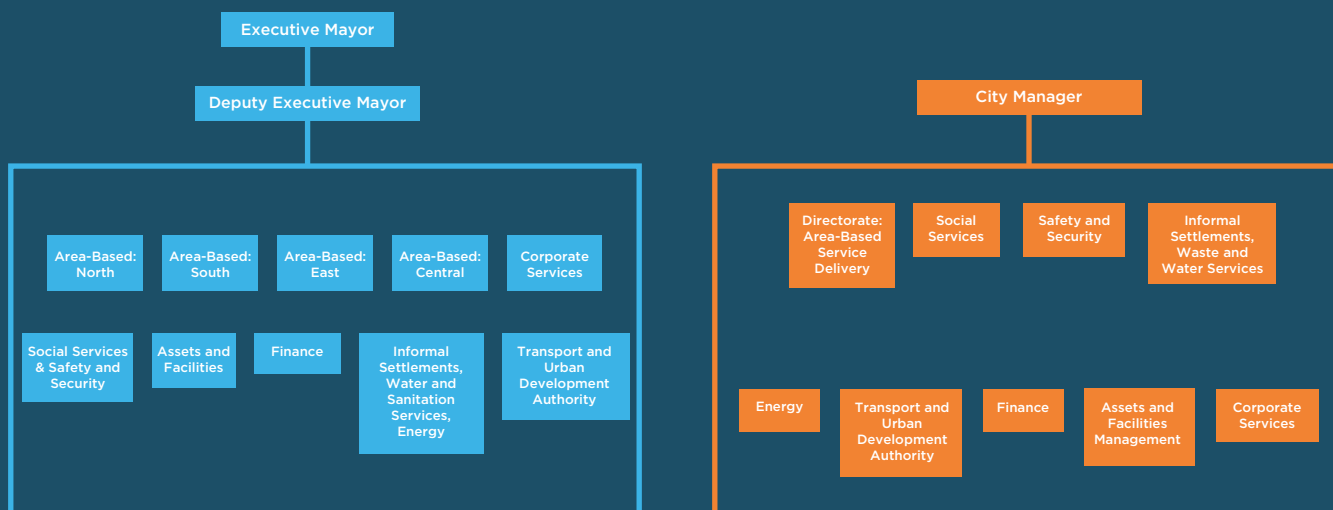
STRUCTURE CORRECT AS OF 30 JUNE 2018
SOURCE: CITY OF CAPE TOWN 2017, FIVE-YEAR INTEGRATED DEVELOPMENT PLAN 2017–2022

2.8 The City planning context

The City of Cape Town, like all other municipalities in South Africa, is required by legislation to produce an IDP. This occurs after each local government election. This plan is intended to guide all planning and executive decision-making as well as guide the municipal budget.

The City's IDP has six guiding principles of which 'resilience' is one. As noted in the IDP, 'the City views urban resilience as a core factor in achieving its strategic objectives of building a safe, caring, opportunity, inclusive and well-run city. Therefore, the City is committed to building resilience to urban challenges that leave households vulnerable to social, environmental and economic shocks.'[61] The other guiding principles include 'sustainability', 'transformation of the built environment through transit-orientated development', 'governance reform', 'customer-centricity' and a 'transversal approach'. These guiding principles are expected to be incorporated not only into the implementation of the programmes and projects identified in the IDP, but also into all the operations of the City. This will ensure that resilience is considered in the conceptualisation, planning and implementation of all projects in the City.

The 11 priorities of the IDP 2017-2022 are:

1. Positioning Cape Town as a forward-looking, globally competitive business city
2. Leveraging technology for progress
3. Developing economic inclusion
4. Growing resource efficiency and security
5. Building safe communities
6. Providing excellence in basic service delivery
7. Mainstreaming basic service delivery to informal settlements and backyard dwellers
8. Developing dense and transit-orientated urban growth and development
9. Providing an efficient, integrated transport system
10. Building integrated communities
11. Achieving operational sustainability

The IDP must, according to legislation, incorporate key operational and developmental strategies that the City will be focusing on implementing over the five-year term. Plans that are of specific significance include the

Disaster Management Plan and the Spatial Development Plan, which must ensure that the spatial/build development is aligned with the City's overall vision and objectives. Other key themes of the IDP originate from the approved ODTP as well as City's Economic Growth Strategy and Social Development Strategy.

The City has developed a Strategic Management Framework (SMF) that enables the co-ordination of different deliverables across a three-year time line that is linked to the budget cycle. One of the aims of the SMF is to enable better planning and alignment to the strategic objectives that the City wishes to achieve in pursuit of its vision. For the period ahead, key themes that govern planning and budgeting include strategy alignment, spatial consolidation, transit-orientated development, basic service infrastructure, integrated investment, socio-economic need, the enablement of economic growth, and impact. The SMF has an annual review process, as depicted in figure 14, to ensure that budget aligns with the approved strategy.

FIGURE 14
Strategic Management Framework Annual Review
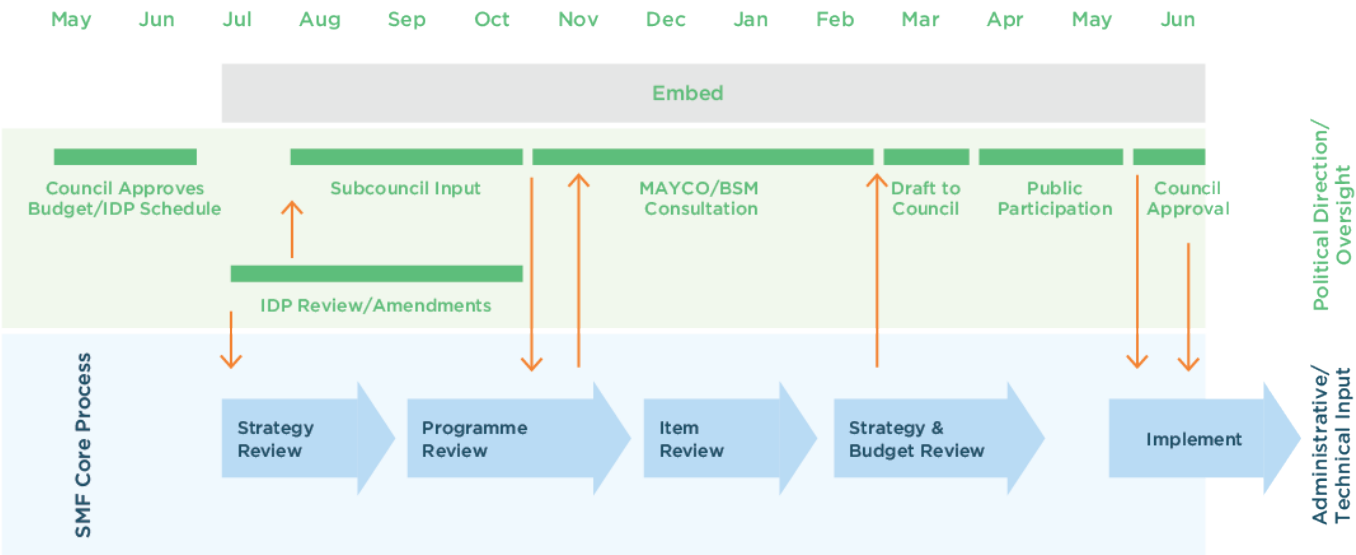
SOURCE: CITY OF CAPE TOWN

2.9 The City data context

The City of Cape Town has a good track record of using data and harnessing technology to achieve its strategic goals and priorities. This has been strategy-led and partnership-driven.

The City introduced its first Smart City Strategy in 2000, the same year the metropolitan municipality was established. The Strategy laid the foundation for significant investment in business process integration and automation to promote efficiencies in City systems and service delivery. The City has established a single transactional platform shared by all its business units, which provides an integrated capability that underpins service delivery. This implementation has included an integrated spatial information system component linking its Geographic Information System (GIS) with its Enterprise Resource Planning platform. This integrated City administrative data platform provides a rich evidence base for the City's reporting, monitoring and City policy and planning instruments and is continuously being enhanced.

In 2014, the City adopted the Open Data Policy that is driving transparency and promoting the greater availability of the City's data sets. The City has an open data portal which aims to increase transparency in its processes and actively involve residents and other stakeholders in local government, as well as promote economic opportunity. The open data portal has more than 100 large sets of data available for use.

As part of its recent organisational transformation process, the City's focus is on leveraging technology for progress, in particular improving digital capacities and growing the digital economy within the city. Simultaneously, the City is implementing an Enterprise Content Management System that joins integrated document and records management, with guidelines, processes and systems to manage the City's content, including data.

Within this strategy and implementation context, the City has developed and continues to develop a good understanding of its data, the data-management initiatives and the data necessary for strategy development.

As the City is a multi-functional and complex organisation, it deploys many different types of datasets for different purposes, for example, reporting, monitoring performance, planning and decision-making. It also has a range of technical tools such as modelling, 3D modelling and aerial photography that are used to enhance the City's data capability.

Various City fora focus on particular types of data and associated processes to continually enhance and improve the City's data, for example, the Property Value Chain governance forum and the GIS forum.

The City also improves its data through certification processes and recently received accreditation to the World Council for City Data's implementation of ISO 37120 Sustainable Development of Communities: Indicators for City Services and Quality of Life, the new international standard for city data. These standards will support cities in their measurement of progress towards the United Nations Sustainable Development Goals.

More recent current data-related programmes include an evidence-led decision-making programme that has the digital tools to further automate and improve the management of business processes, and the data analysis methodology project that aims to address current gaps in data tools and analysis, building the City's capacity to effectively analyse, package and distribute data to inform decision-making and planning.

The City also intends to extend its city data analytical capabilities to the matching of administrative and big data sources to official and city-level survey sources. This is taking the form of a City Data Innovation Project, in partnership with National Treasury.

The City has good relationships with data providers and knowledge sources in Cape Town and wider, including the four universities located in the region and their specialist institutes, other spheres of government, Statistics South Africa and specialist technical and data service providers. There are a range of national and intergovernmental data processes that the City participates in, for example, the National Treasury Reporting Reforms Project, which aims to consolidate the number of indicators cities are required to report on.

These relationships all support the City's data capacity and development, including the quality and availability of the City's data, all to enhance its service delivery and achievement of strategic objectives and tangible outcomes.

2.10 Resilience timeline of Cape Town

Below is a resilience timeline of physical, economic, social shocks and stresses that Cape Town has experienced. It is not intended to be exhaustive, although it is intended to capture some of the key moments in the history of the city. Interspersed in this timeline are notable shock events including disease outbreaks, and natural disasters such as earthquakes, fires and drought. Most notably the timeline includes critical milestones in the struggle against apartheid and the attainment of constitutional democracy. The long history of racial segregation and oppression in the Cape, dating back to the early years after the arrival of the first colonists, has left a painful legacy in Cape Town, which contributes in many ways to several of the stresses that are pervasive in the city. Being a resilient city means continually reflecting and learning from past events, while ensuring we embrace new approaches and technologies that can improve liveability for future generations. See section 3.5 for a breakdown of the current shocks and stresses facing Cape Town as identified by Phase 1 of this process.

2000 years ago The southern and south-western Cape regions are inhabited by the Khoikhoi people.

1488 The Portuguese explorer Bartolomeu Dias circumnavigates the Cape, naming it 'Cabo de Boa Esperança' or the Cape of Good Hope.

1652 Jan van Riebeeck, arrives in Table Bay and establishes a refreshment station for the Dutch East India Company.

1657 First instance of the introduction of the official policy of territorial segregation in South Africa relating to the movements of the Khoikhoi people.

1697 First hospital instituted at the Cape by Simon van der Stel.

1713 An outbreak of smallpox results in the death of a large portion of both the settler and Khoikhoi populations.

1798 A fire devastates large areas of Cape Town.

1809 A large earthquake hits Cape Town, estimated to have measured 6.5 on the Richter scale.

1814 Cape Town formally becomes part of the British Empire after the Battle of Waterloo.

1838 The apprenticeship of slaves, formally emancipated in 1834, ends. This marks the factual end of slavery in the Cape.

1863 Railways connecting Cape Town to the winelands are built.

1885
The Parliament buildings are completed at the Cape.

1890s Water, drainage and sewerage infrastructure is installed in Cape Town.

1895 First municipal electricity supply for lighting is established.

1901 An outbreak of bubonic plague hits Cape Town.

1910 The Union of South Africa is formed.

1918 The University of Cape Town is established.

1923 The Urban Areas Act is passed, forcing Africans to live in designated locations.

1924	The first one-day flight between Cape Town and Pretoria takes place.
1935	The reclamation of 480 acres of land on Cape Town's foreshore begins.
1936	The Table Bay power station is built.
1948	The National Party wins the general elections and commences institutionalised racial segregation under apartheid.
1950	The Group Areas Act is passed by Parliament, mandating that certain geographical areas are declared for exclusive occupation by specific race groups.
1960	The British prime minister, Harold Macmillan, delivers the 'Wind of Change' speech to the Parliament of South Africa in Cape Town.
1960	Phillip Kgosana leads a Pan Africanist Congress march of between 30 000 and 50 000 protestors from Langa and Nyanga to police headquarters in Caledon Square, where protestors offer themselves up for arrest for not carrying passes.
1960	The government bans the African National Congress and the Pan Africanist Congress.
1960	The University of the Western Cape is established as a university for coloured people only.

1964

Nelson Mandela is imprisoned on Robben Island in Table Bay, beginning his 27-year incarceration as a political prisoner.

|	
1966	District Six is declared a 'White' area under the Group Areas Act of 1950, with removals starting in 1968. About 30 000 people living in the specific group area were affected.
1967	The world's first human heart transplant is successfully performed at Groote Schuur Hospital in Cape Town by Dr Christiaan Barnard.
1969	A 6.3 magnitude earthquake, the most destructive in South African history, occurs in Tulbagh, northeast of Cape Town.
1976	There is a significant increase in civil protests against apartheid. In September 200 000 coloured workers stay away from work in an unprecedented protest action.
1982	The Koeberg nuclear power station, still under construction, is bombed by Umkhonto we Sizwe, setting back construction by 18 months.
1983	Plans for the building of Khayelitsha are announced, one of the apartheid government's final attempts to enforce the Group Areas Act.
1983	The United Democratic Front is launched at the Rocklands Community Hall in Mitchells Plain.
1984	Unit 1 of the Koeberg nuclear power station is synchronised with the grid. It becomes the first, and remains the only nuclear power station in Africa.

1986	The 'Gugulethu Seven', a group of anti-apartheid activists, are shot and killed by members of the then South African Police Force.
1989	On 13 September, 30 000 Capetonians from all communities marched in support of peace and the end of apartheid. The march was conducted in defiance of the State of Emergency.
1990	On Sunday 11 February, after 27 years in prison, Nelson Mandela is released from Victor Verster prison. On the same day he addressed a mass rally from the balcony of the Cape Town City Hall.
1994	The first democratic elections are held in South Africa. Nelson Mandela becomes president of the Republic of South Africa.
1998	A terrorist attack occurs at the Planet Hollywood restaurant in the Waterfront.
2000	In January, two wildfires burn more than 8 000 hectares of the Cape Peninsula, destroying houses and property.

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

2000 The City of Cape Town metropolitan municipality is formed by a merger of Cape Town/Central, Tygerberg, South Peninsula, Blaauwberg, Oostenberg, and Helderberg municipalities.

2001	The first project to offer antiretroviral treatment in the public sector in South Africa is launched in Khayelitsha as a partnership between the provincial government and Médecins Sans Frontières.
2005	Several incidents lead to shut downs of the Koeberg nuclear power station, leading to black-outs across the Cape.
2006	The Koeberg nuclear power stations shuts down again temporarily.
2008	Xenophobic attacks spread throughout South Africa, including Cape Town.
2013	Load-shedding takes place across the country, with rolling black-outs being experienced in Cape Town.
2014	In March wildfires across the Cape Peninsula burn 6 900 hectares of land, destroying 13 properties.
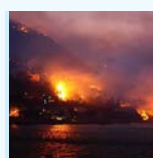
2015

On 3 March the temperature in Cape Town reaches 42.4 degrees, the hottest day recorded in a century.

|	
2015	The current drought, commonly regarded as the most severe in the region in over 100 years, begins.
2015	A fire in the Imizamo Yethu informal settlement in Hout Bay destroys 4 500 homes and displaces 15 000 people.
2017	There is listeriosis outbreak across South Africa, resulting in at least 29 deaths in the Western Cape.

3 Understanding Our Resilience

We have used a range of analytical tools to build on the findings of the Agenda Setting Workshop held in May 2017 and to develop a clearer understanding of the current state of play for resilience in Cape Town. These tools were populated and analysed following extensive stakeholder engagement using a variety of methodologies.

Notably we ran a face-to-face survey with 11 178 Capetonians living in poor and vulnerable communities, including informal settlements and backyards. This survey administered by 40 surveyors from the City's Expanded Public Works Programme, was the largest face-to-face survey ever conducted by the City. Conducting the survey in poor and vulnerable communities was a deliberate choice, as this is where the greatest resilience challenges are experienced. In addition, we hosted nine thematic focus groups with thematic experts and conducted a number of face-to-face interviews.

FIGURE 15
Summary of stakeholder engagement
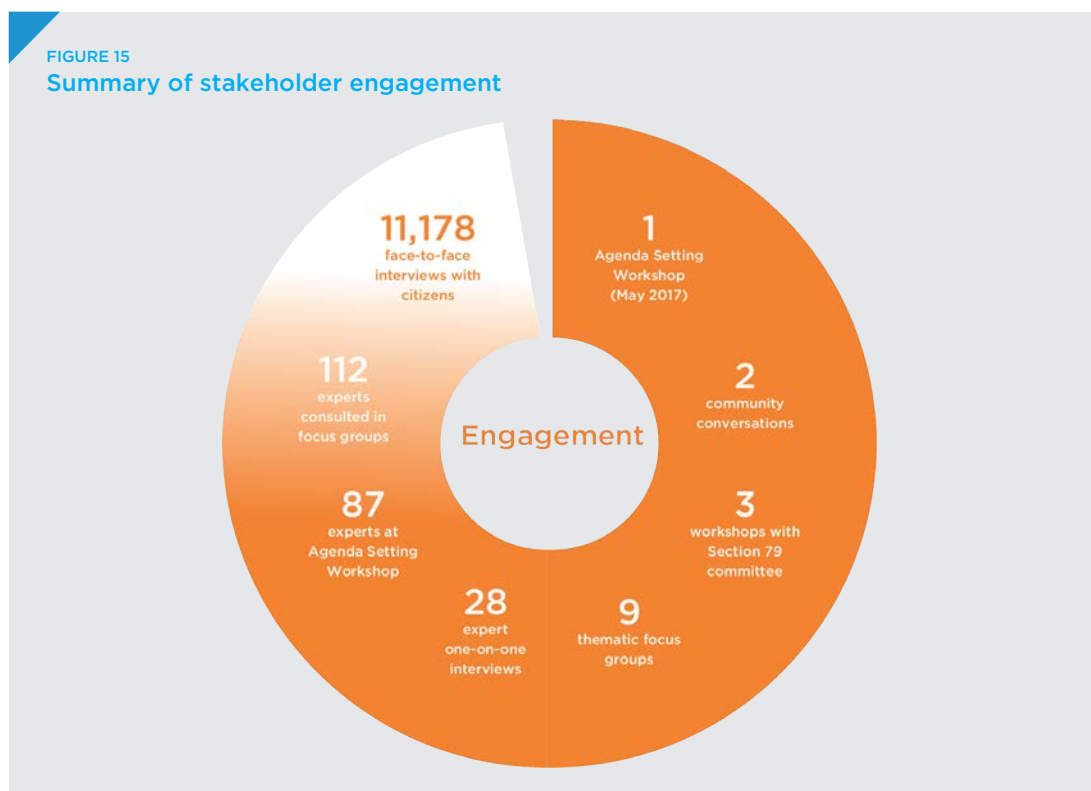
The resilience strategy process did not start with particular outcomes in mind, other than an intention to build Cape Town's resilience. The extensive engagements leading up to the Preliminary Resilience Assessment contributed to determining Cape Town's unique resilience challenges and opportunities. These insights inform the proposed Enablers and Discovery Areas in the next section. See figure 15 for a summary of stakeholder engagement conducted and appendix C for a list of organisations stakeholders are associated with.

3.1 Actions Inventory

The success of the Resilience Strategy will partly depend on the degree to which it aligns with and builds from existing efforts. To support this, the Resilient Cape Town team has developed a comprehensive inventory of resilience-building actions currently underway across the city.

100RC provides all cities in the network access to the City Resilience Actions Inventory Tool. Based around the CRF (introduced in Section 1), it is designed to help us catalogue existing plans, strategies, programmes, projects, practices, initiatives, legislation and funding sources that contribute to our city's resilience. Each action has been tagged against the drivers of the CRF that it may be contributing towards.

Actions can be spatial or non-spatial, and they can be driven by businesses, civic organisations, or municipal, provincial or national government entities. They can be in planning, execution or on hold. In total 1999 actions were tagged in Cape Town's action inventory (see figure 16).

Despite the extensive consultation and effort involved in completing this tool, it can never be considered exhaustive. It can only be regarded as an insight into Cape Town's resilience and needs to be viewed alongside other tools such as the Perceptions Inventory and the CRI. The Actions Inventory principally reveals where effort is being exerted by stakeholders. The tool is not without its limitations. Most notably, different actions can be considered to have different scales, values and impacts. One driver where the issue of scale has affected the result is 'Provides reliable communication and mobility'. Populated in this driver are actions that are very large in scale, principally directed at improving integrated public transport. There may be fewer discrete actions in this driver compared with the majority of drivers, yet their impact can be considered to be substantial.

FIGURE 16
Actions Inventory
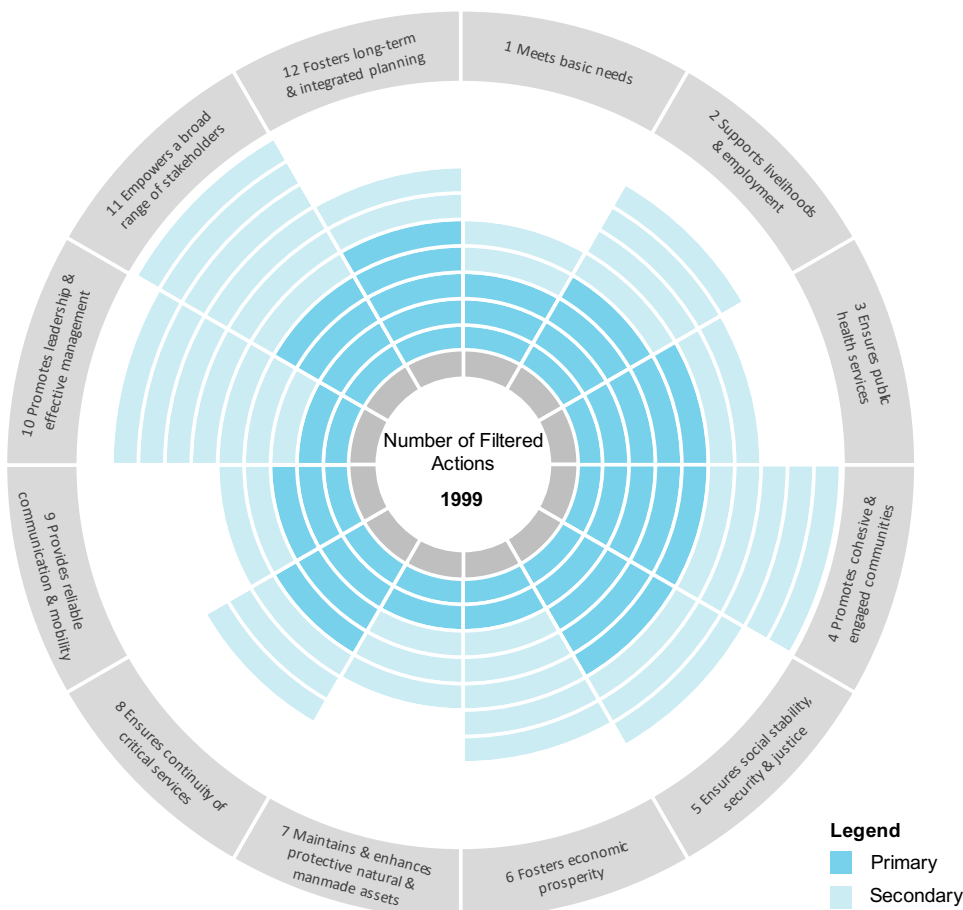
To overcome potential biases created by the equivalence of actions in the tool, the Resilient Cape Town team decided to perform a mass population of the tool, coding more actions than any other city that has used this tool. Each distinct bar on the tool therefore represents sixty-four codings against the sub-drivers of resilience. In addition, to provide an extra lens of analysis, the interdependencies of actions have also been mapped - see figure 17. This is relevant because actions can have multiple benefits. This is at the heart of what is referred to as the 'resilience dividend'. For example, an expansion of the MyCiti bus service does not only contribute to providing reliable transport, it also connects communities thus improving social cohesion, it connects people to health care, and it supports livelihoods and employment.

There are a significant number of actions that support livelihoods and employment, with a considerably strong interdependency with the driver, 'Fosters economic prosperity'. This is understandable in a city with high unemployment, as all spheres of government and civil society have an imperative to skill citizens for work, and within the limits of their power, create an enabling environment for job creation by the private sector. There is also a strong interdependency between the drivers, 'Fosters long-term and integrated planning' and 'Fosters economic prosperity'. Two points are relevant here. Firstly, there is a concerted effort by particularly the City to build the infrastructure required for economic prosperity, whether it be transport infrastructure, broadband capabilities or the provision of basic services. Secondly, there is a long-term time horizon on the building and maintenance of the economic infrastructure that is contained in a multitude of plans and strategies.

The driver 'Ensures social stability and justice' also has a considerable number of actions. While the majority of actions are owned by spheres of government, particularly by national government by way of the SAPS and the court system, there are a very high number of actions owned by civil society. This is predominantly

FIGURE 17
Actions Inventory interdependencies

through the means of neighbourhood watches, community policing forums, community safety forums and efforts to divert people away from crime. Initiatives to improve safety are perhaps the area of greatest collaboration between government and civil society in Cape Town. As noted above, the actions reflected in this tool are only an indication of effort, not impact.

The drivers 'Promotes cohesive and engaged communities' and 'Empowers a broad range of stakeholders' are the two most populated drivers in the tool. It must be noted that in both cases this is because a number of actions have these drivers as secondary drivers. The extent of actions in the 'Promotes cohesive and engaged communities' driver masks the fact that relatively fewer actions are coded against the sub-driver of 'Social connectivity', and far more are coded against the sub-driver of 'Community participation'. This indicates that there is generally a high degree of participation by Capetonians in projects or initiatives in their communities, but less focus on actions that bring different communities together.

There is a similar masking effect in the driver, 'Empowers a broad range of stakeholders'. This driver includes the sub-driver of 'education' for which there are a multitude of actions in Cape Town. However, the other sub-drivers within this driver including 'public risk awareness', 'risk monitoring and alerts' and 'communication between government and public' are relatively less populated, which may suggest these as areas which required more effort.

The last driver worth mentioning in this analysis is 'Maintains and enhances protective man-made and natural assets'. This driver may suffer from the same issue as the driver 'Promotes reliable communication and public transport' mentioned earlier. It has fewer actions, but the scale of these actions may be significant, and therefore do not necessarily indicate a deficiency. Notably, however, this driver does include the sub-driver of 'Redundant, diverse infrastructure', against which relatively fewer actions are coded. It's possible that too many systems in the city, whether they be man-made or natural, are operating at or beyond their capacity, which is a particular risk during times of shock. On reflection, the presented outcomes of the tool may also indicate that there are insufficient actions around green infrastructure in the city.

3.2 Most relevant strategies and plans

Key strategies and plans in Cape Town are led by different departments and different spheres of government, with a range of partners and implementation timeframes. Developing a resilience strategy is an opportunity to link these different initiatives more meaningfully. The Resilience Strategy should never be a duplication of goals and actions captured in other strategies and plans, instead it should be about filling the gaps and leveraging work done elsewhere.

CITY PLANS	CORE PURPOSE AND OBJECTIVES OF THE PLAN
Integrated Development Plan	To provide a strategic planning instrument that guides and informs all planning, development and decisions in the municipality.
Environmental Strategy	To enhance, protect and manage Cape Town's natural and cultural resources for long-term prosperity, in a way that promotes access and social well-being, and optimises economic opportunities.
Coastal Management Programme (CMP)	To promote the principles of the National Integrated Coastal Management Act in protecting Cape Town's coastline and its strategic value as a social, economic and environmental asset.
Municipal Disaster Risk Management (DRM) Plan	To provide an overview of the institutional and organisational arrangements to deal with disasters and emergency incidents in the municipal area.
District Health Plan	To provide effective, efficient and quality primary healthcare services to the people of Cape Town.
Economic Growth Strategy	To develop and grow the local economy.
Cape Town Energy And Climate Action Plan (ECAP)	To guide decision-making towards a more resilient, lower carbon, resource-efficient and equitable future for Cape Town, which will grow the administration's stature as a leading and innovative city.
Organisational Development And Transformation Plan (ODTP)	To address the internal transformational needs of the City by reorganising the City's systems for strategy management as well as oversight and delegations to produce clearer lines of decision-making and authorisation.
City Of Cape Town Built Environment Performance Plan (BEPP)	To align the focus of existing planning instruments in order to reduce poverty and inequality and enable faster, more inclusive urban economic growth. It includes clear spatial targeting and restructuring initiatives, public investment programmes and regulatory reforms to achieve measurable improvements in urban productivity, inclusivity and sustainability.
Cape Town Municipal Spatial Development Framework	To provide a long-term vision of the desired spatial form and structure of Cape Town, and align the City's spatial development goals, strategies and policies with relevant national and provincial spatial principles, strategies and policies.
Social Development Strategy	To improve and enhance the quality of life of all people, especially the poor and marginalised.
Integrated Waste Management Plan (IWMP)	To put in place the solid-waste management strategies of waste minimisation, provision of sustainable and affordable services, and compliance with the goals of the National Waste Management Strategy and the objectives of the National Environmental Management Waste Act.

Water Services Development Plan	To provide relevant, summarised inputs for water-services development planning so as to integrate technical planning with social, institutional, financial and environmental planning.
City of Cape Town Air Quality Management Plan	To manage ambient air quality in the municipal area.
Comprehensive Integrated Transport Plan	To improve accessibility, reduce congestion, improve options and affordability, shorten travel times, increase the use of non-motorised transport and manage parking-related problems.
Transit Orientated Development (TOD) Strategic Framework	To identify tools and mechanism to be employed by various role players who have a collective impact on development to ensure that they move progressively towards a more sustainable, compact and equitable urban form.
Medium Term Revenue And Expenditure Framework (MTREF)	To provide an overview of budget assumptions and projections for a three-year period.
Electricity Generation And Distribution Plan	To provide an operational plan for electricity services.
Alcohol and other Drug Strategy	To reduce the health, economic and social burden caused by alcohol and drug abuse in Cape Town.
NATIONAL PLANS	**CORE PURPOSE AND OBJECTIVES OF THE PLAN**
National Development Plan	To eliminate poverty and reduce inequality by 2030. According to the plan, South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.
New Growth Path Framework	To enhance growth, employment creation and equity. It identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda.
PROVINCIAL PLANS	**CORE PURPOSE AND OBJECTIVES OF THE PLAN**
Western Cape Climate Change Response Strategy	To guide the collective implementation of innovative projects as well as the search for opportunities that combine a low-carbon development trajectory with increased climate resilience that includes enhancement of ecosystems and the services they provide, as well as economic growth and job creation.
Green is Smart - Western Cape Government Green Economy Strategy Framework	To establish the Western Cape province as the lowest carbon province and leading green economic hub of the African continent.
Project Khulisa	To grow the economy and create jobs. While focus will remain on initiatives aimed at supporting all businesses, this project will put in place a set of high-priority, practical projects to unlock opportunities in sectors where the Western Cape has a clear but unrealised competitive advantage.
Western Cape Strategic Framework for Fire and Burn Injury Prevention	To support the prioritisation of programmes that will help prevent fires and burn injuries in the Western Cape. This Framework is a strategic endeavour to change key environmental, social and behavioural factors that contribute to the causes of fires and burn injuries.
Healthcare 2030 Framework	To provide the vision, values and principles guiding the provincial Department of Health to 2030. The document presents a strategic framework for the department and includes a set of planning parameters and tools that will be incrementally applied. The 2030 strategy represents the third wave of health reform in the Western Cape since the Health Plan of 1995 and the Healthcare 2010.

3.3 Perceptions of Resilience

During Phase 1, a range of stakeholders, citizens and subject experts across Cape Town were consulted to obtain their input on resilience in Cape Town. During each engagement, perceptions of resilience were gathered.

Perceptions inventories were created for each major methodology of engagement. There is one inventory for engagements with stakeholders in focus groups and one-on-one interviews, another for the face-to-face community survey, and one each for the two community conversations held. While each provides unique perceptions and a different lens of analysis, there are also distinct overlaps that provide insightful lenses for understanding areas of strength and weakness in our city.

These are not the most rigorous datasets, and while this limitation is acknowledged, the perceptions inventories do nonetheless provide valuable insights to be considered alongside other tools, like the Actions Inventory, during the PRA development phase.

In figure 18, the perceptions obtained from subject experts, either during thematic focus groups or through one-on-one interviews, are reflected against the drivers of resilience in the CRF. These specific perceptions were collated with the assistance of the CRI questionnaire, which provided a useful methodological basis for gathering perceptions aligned with the drivers of resilience.

What becomes clear is that the area of greatest perceived weakness identified by this group is the driver 'Promotes cohesive and engaged communities'. Another area of comparative weakness is 'Ensures social stability, security and justice'. Interestingly, when overlaid with the Actions Inventory, both of these drivers have the highest amount of primary actions associated with them. What this tells us is that despite a lot of effort,

FIGURE 18
Perception Inventory from focus groups and interviews with experts

LEGEND
- Need to do better
- Doing well, but can improve
- Area of strength
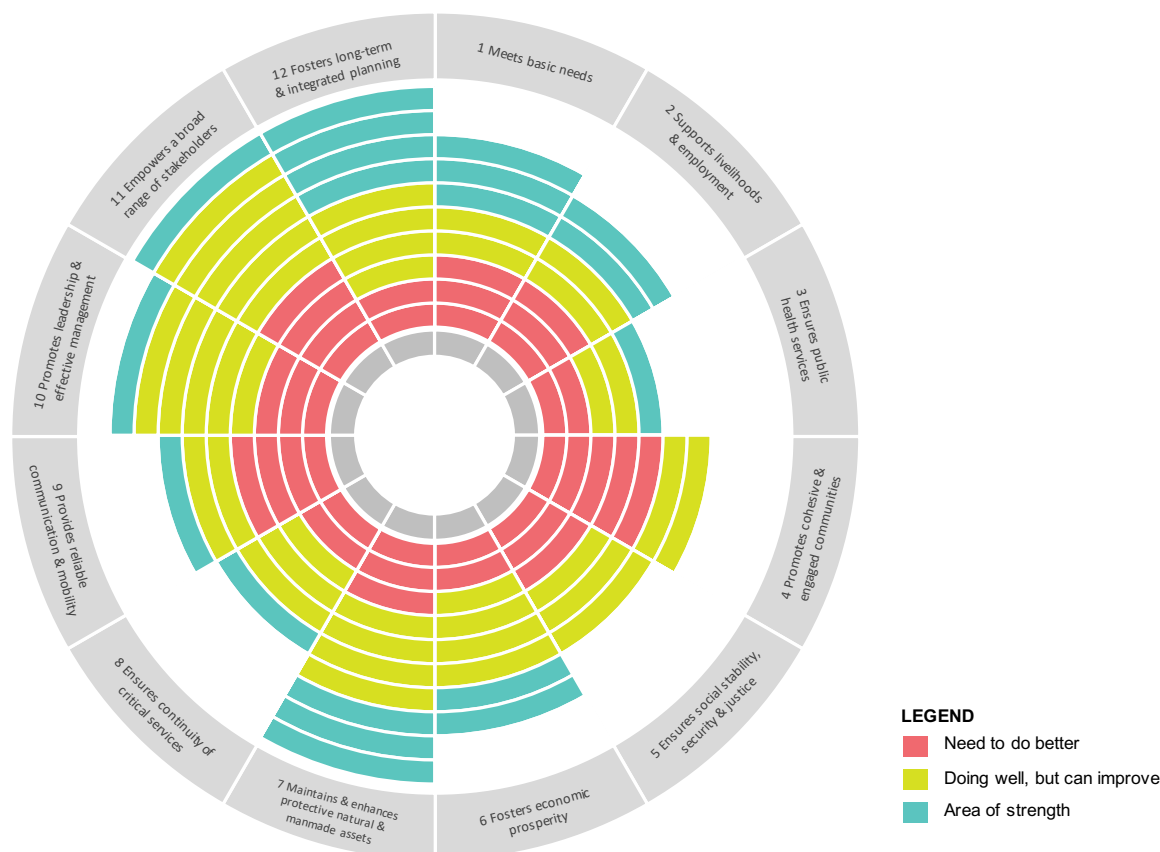
significant challenges still remain with social cohesion and crime in Cape Town. In Phase 2 we will need to investigate whether this disparity is indicative of overwhelmingly large challenges, meaning even more action is needed; or whether some of the current actions are not working, and if so, why they are not working?

The drivers 'Fosters long-term and integrated planning' and 'Maintains and enhances protective natural and man-made assets' were perceived by this group as stronger drivers – indicating that the thematic experts consider data-use, land-use and planning in the city to be relatively strong. Furthermore, efforts to protect and enhance natural and man-made assets are considered to be delivering mostly satisfactory outcomes.

It is also interesting, however, to interrogate some of the discrepancies between expert opinions within some of the dimensions. While 'Maintains and enhances protective natural and man-made assets' is perceived quite highly overall, there is a significant spread of perceptions for this dimension among the group. Looking closer at the sub-dimensions of this driver provides greater insight in this regard. Many experts believe that ecosystems are not sufficiently considered as assets to physically protect the city alongside manmade infrastructure. This means that the sub-driver 'Safeguards for critical infrastructure' was perceived quite poorly, whereas energy redundancy, under the sub-driver 'Alternative provision of services' was perceived strongly by this group.

The same mixture of perceptions can be seen in the second dimension, 'Supports livelihoods and employment'. Here experts perceived institutional issues, such as labour policy to be strong, while direct support issues such as support in developing business continuity plans, or emergency support to households following a shock to be much weaker. This level of analysis is helpful in identifying gaps for further investigation in Phase 2.

Figure 19 shows the perceptions from the

FIGURE 19
Perceptions inventory from the face-to-face community survey
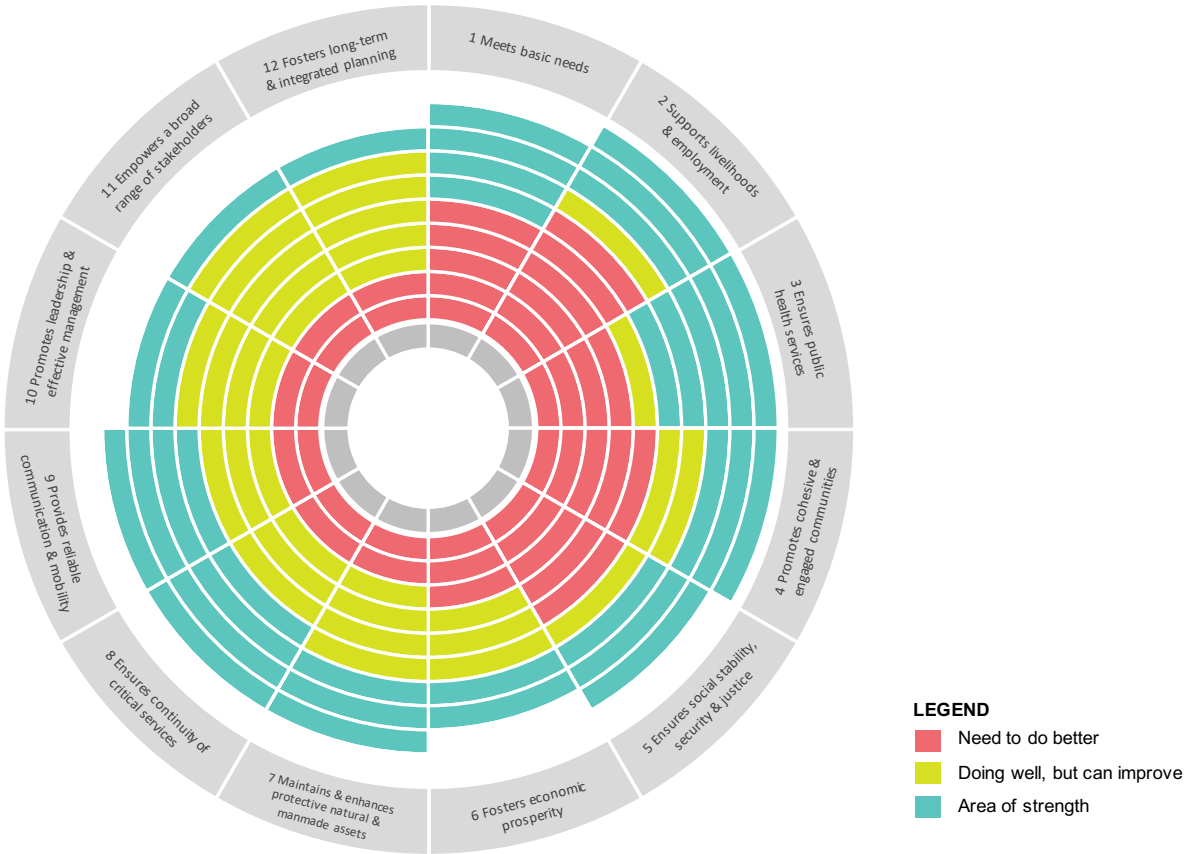
community survey during which 11 178 Capetonians were interviewed in their homes. These views were specifically sought from citizens living in poor and vulnerable communities of Cape Town. In addition, the survey was conducted during working hours, so it is noted that, as a consequence, those people who responded are most likely retired, unemployed or primary care givers. This speaks directly to the perceptions obtained, with the five drivers identified as most in need of focus being the ones that affect people most directly in their day-to-day lives, and hence are of a more direct and personal nature, including basic needs, employment, public health, social cohesion and crime. In comparison to these, more systemic drivers such as continuity of critical infrastructure were rated more highly.

Importantly, the drivers that are more systemic in nature and that fall predominantly on the left side of the CRF show alignment with the areas of focus identified by the subject experts, although the subject experts appear in some respects to consider 'Meets basic needs' as an area of relative strength. What this likely means is that 'Meets basic needs' is interpreted through different lenses depending on the point of view of the respondent. According to the strict definition of 'Meets basic needs' access to water, housing, energy and food may be considered acceptable according to the minimum prescribed standards, although from the personal view of people living in poor and vulnerable communities, the access to basic needs is inadequate.

In figures 20 and 21 the specific perceptions of the participants at community conversations in Hout Bay and the Greater Muizenberg area are reflected. For both community conversations the views of a much smaller group of citizens are presented, as opposed to figures 18 and 19. Therefore, while these perceptions inventories are not as methodologically robust, they do nonetheless provide valuable snapshots of specific communities in the city. These first two communities were chosen as starting points as they can be seen as microcosms for the city – each community contains a broad range of economic, social and cultural groupings. Going forward into Phase 2, the plan is to continue with further community conversations in a

variety of other areas of the city, including Bellville CBD, Langa and Khayelitsha. It should also be noted that there is value in Phase 2 in considering these perceptions inventories against existing datasets from each community.

Figure 20 shows that the weakest area identified by this community was 'Empowers a broad range of stakeholders'. Interestingly, this was also listed as an area of weakness in the second community conversation and has therefore been captured as an area for further investigation in Phase 2. During this conversation the main area of contention was communication between government and citizens, which those present felt was severely lacking. Other areas of weakness identified were 'Fosters economic prosperity' and 'Fosters long term and integrated planning'. In these instances, the participants from Hout Bay perceived the enabling economic environment of the community to be in need of improvement. In relation to long-term planning, the main issues raised related to land-use planning and building standards and codes, and their enforcement or lack thereof.

The 'Ensures social stability, security and justice' driver is worth noting. Some participants perceived this to be very weak, because crime is an ongoing challenge in Hout Bay, while others rated this as an area of strength because the community of Hout Bay is very active in fighting and deterring crime through active citizen participation in community organisations such as the local neighbourhood watch.

Finally, the driver 'Ensures continuity of critical infrastructure' was perceived to be

FIGURE 20
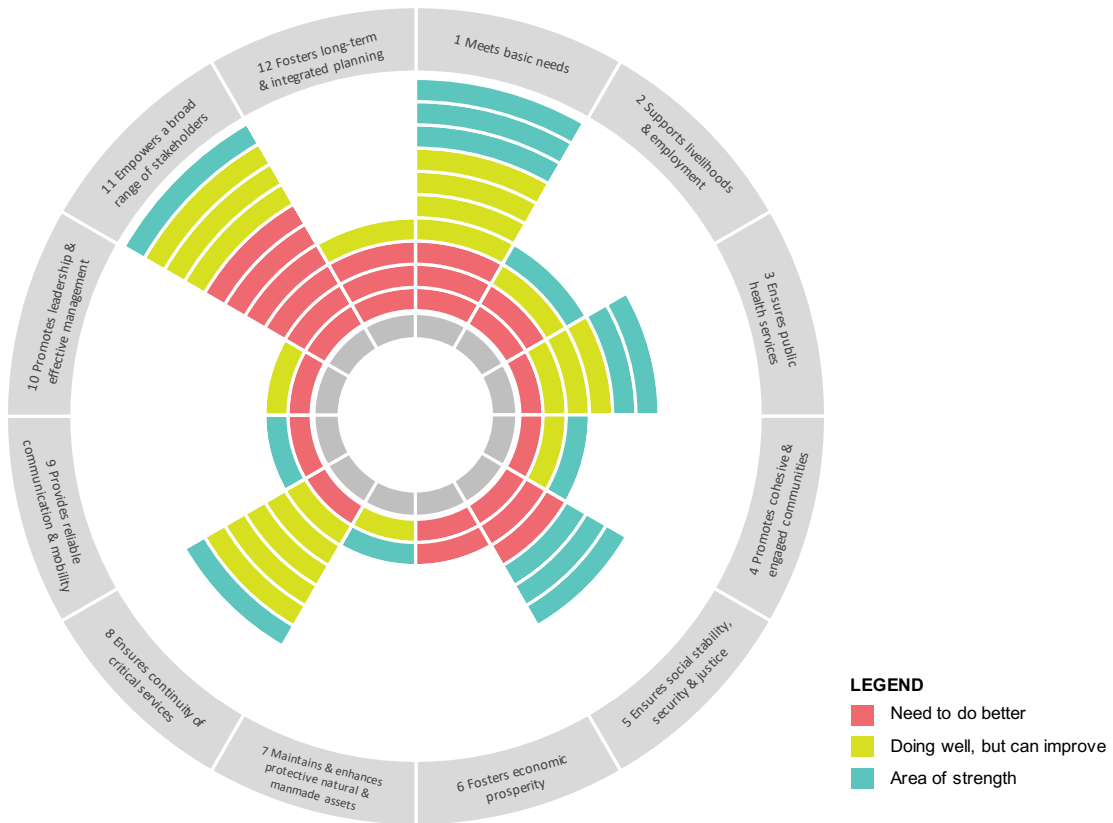**Perceptions inventory from Hout Bay community conversation**

Chart segments:
1 Meets basic needs
2 Supports livelihoods & employment
3 Ensures public health services
4 Promotes cohesive & engaged communities
5 Ensures social stability, security & justice
6 Fosters economic prosperity
7 Maintains & enhances protective natural & manmade assets
8 Ensures continuity of critical services
9 Provides reliable communication & mobility
10 Promotes leadership & effective management
11 Empowers a broad range of stakeholders
12 Fosters long-term & integrated planning

LEGEND
- Need to do better
- Doing well, but can improve
- Area of strength

FIGURE 21
Perceptions Inventory from the Greater Muizenberg community conversation

Chart segments:
1 Meets basic needs
2 Supports livelihoods & employment
3 Ensures public health services
4 Promotes cohesive & engaged communities
5 Ensures social stability, security & justice
6 Fosters economic prosperity
7 Maintains & enhances protective natural & manmade assets
8 Ensures continuity of critical services
9 Provides reliable communication & mobility
10 Promotes leadership & effective management
11 Empowers a broad range of stakeholders
12 Fosters long-term & integrated planning

LEGEND
- Need to do better
- Doing well, but can improve
- Area of strength
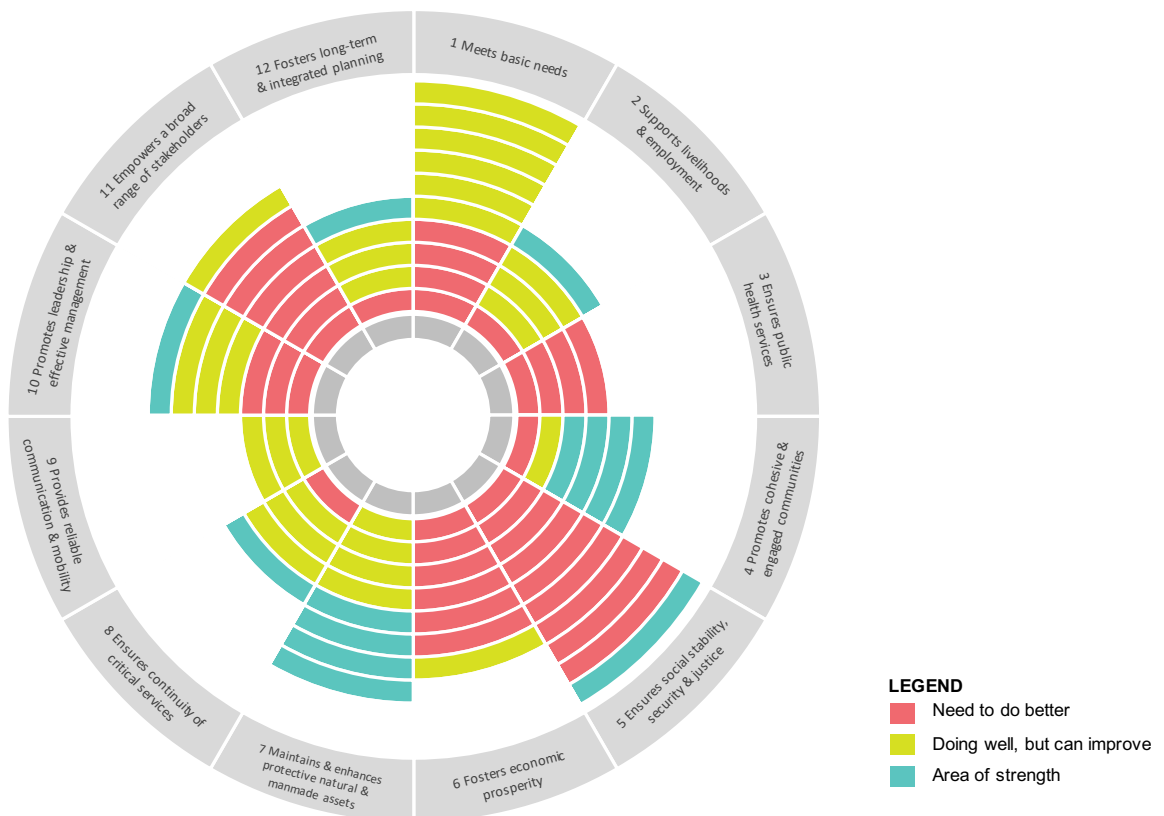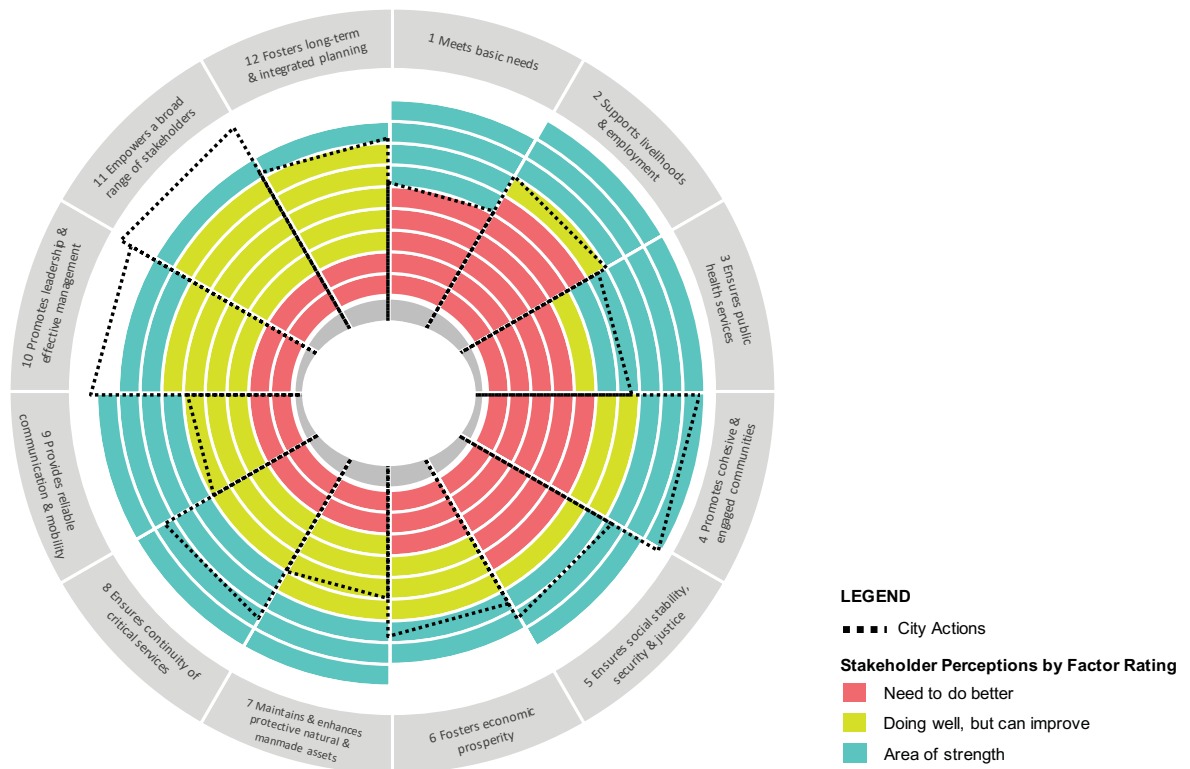
FIGURE 22
Perceptions and Actions Inventory overlay

FIGURE 22
Perceptions and Actions Inventory overlay

an area of medium strength. This must be interpreted in the context of the Hout Bay area being particularly prone to shock events, including both wildfires and fires in its informal settlement Imizamo Yethu. In both instances, the community felt that emergency services responded well to the disasters.

Figure 21 shows the perceptions of a small group of citizens from the Greater Muizenberg area. There were four distinct areas of weakness identified by this group, 'Ensures social stability, security and justice', 'Empowers a broad range of stakeholders' 'Ensures public health services' and 'Fosters economic prosperity'. There are significant overlaps between these perceptions and those of the other groups consulted. The group felt that 'Meets basic needs' was an area that still requires significant improvement, but noted that a lot of work was being done in this area. The strongest areas identified were 'Maintains and enhances protective natural and manmade assets' and 'Promotes cohesive and engaged communities'. On the first of these, several participants were involved in work aimed

at protecting and enhancing natural areas, such as the Zandvlei Estuary Nature Reserve and the Fish Hoek common. In both instances, the perceptions were rated highly based on the actions of active citizens in the thematic areas.

Overall, irrespective of which perceptions inventory is reviewed, it must be noted that the 'Ensures social stability, security and justice' driver was perceived to be mostly weak by every group consulted. This aligns directly with the outcomes of the Shocks and Stresses mapping (see Section 3.4) that identified crime and violence, and in particular gang violence and gender-based violence, to be the top stresses for citizens across the city.

In figure 22, the Perceptions Inventory from the face-to-face community survey is overlaid with the Actions Inventory. It is evident that the drivers that require further attention and should be pulled through into Discovery Areas in the next section include those that involve job creation, crime and policing, and social cohesion.

3.4 City Resilience Index

The CRI is designed to enable cities to measure and monitor the multiple factors that contribute to their resilience. Its primary purpose is to diagnose strengths and weaknesses and measure relative performance over time. It is structured around the CRF dimensions, drivers and sub-drivers and thus provides a useful tool to be considered alongside the actions and perceptions inventories.

The CRI provides a baseline understanding of the resilience of Cape Town at the present moment. It is an index that measures relative performance over time rather than comparison between cities. It therefore does not deliver a single score against which cities can be rated or ranked in terms of resilience. Rather it provides a common basis of measurement and assessment to better facilitate dialogue and knowledge-sharing between cities. The CRI also provides an indication of the strength of each dimension in relation to the qualities of resilience.

The index is not only useful for the City administration – it can also be used by other interested organisations and individuals for further analysis, understanding and information.

While the index enables cities to assess and measure their present-day performance, it also provides information on the necessary trajectory towards a more resilient future. This is achieved by the assessment and measurement of 156 qualitative and 156 quantitative data points.
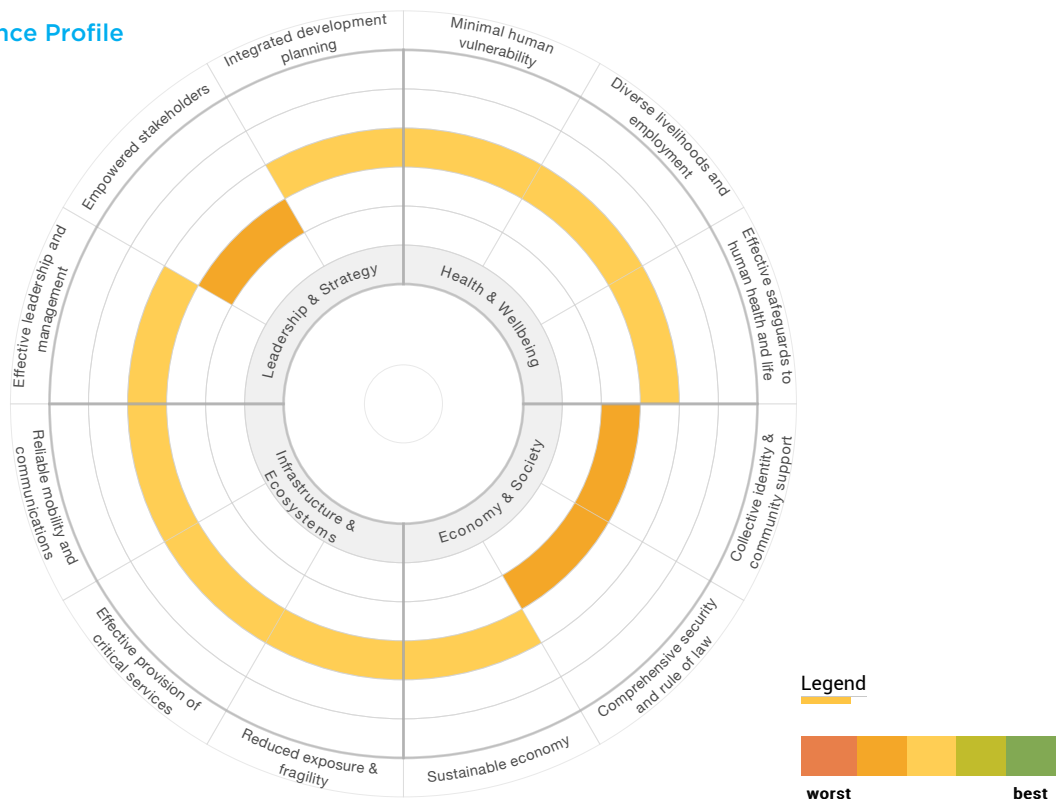
The CRI is not commonly concluded during the PRA process, however the Resilient Cape Town team endeavoured to conduct this highly rigorous process at the same time as conducting the stakeholder engagement. Hence, while the team was gathering perceptions for the Perceptions Inventory it was also gathering qualitative input for the CRI. A total of 147 experts from a variety of thematic areas have

FIGURE 23
Qualitative Resilience Profile

Integrated development planning

Minimal human vulnerability

Diverse livelihoods and employment

Empowered stakeholders

Effective safeguards to human health and life

Effective leadership and management

Leadership & Strategy

Health & Wellbeing

Collective identity & community support

Reliable mobility and communications

Infrastructure & Ecosystems

Economy & Society

Effective provision of critical services

Comprehensive security and rule of law

Reduced exposure & fragility

Sustainable economy

Legend

worst   best

contributed to the qualitative assessment. This assessment involved contemplating the performance of the city, from a 'whole of society' approach, against each sub-driver of the CRI based on a series of qualitative questions. Scores and comments were then aggregated and summarized for final input into the index.

On the quantitative side, the Cape Town team was able to source data for 120 of the 156 data points in the index. This is a high percentage of completeness compared with other cities that have completed the index. As resilience is an abstract concept that can only be measured following a real-life shock or period of stress, this part of the CRI is based on proxy measurements within each sub-indicator that indicate how the city is currently performing. This part of the index allows cities to establish a baseline, identify aspects of their resilience profile that may need strengthening and track performance over time.

Combined, these two complimentary perspectives enable us to develop a deeper understanding of the systems, processes and functions that shape our city's resilience profile.

Below is a preliminary, high-level assessment of the outputs of the CRI, specifically in relation to the other tools considered in the PRA. It should be noted that there will be further in-depth analysis and interpretation of the detailed results of the CRI in Phase 2. (See annexures A and B. for more detail behind the CRI).

Figure 23 shows the qualitative resilience profile for Cape Town. The three weakest dimensions, each scoring 2 on the scale of 1 being worst and 5 being best, are 'Empowered stakeholders', 'Comprehensive security and rule of law', and 'Collective identity and community support'.

The latter two dimensions were both similarly poorly perceived in both the Perceptions inventories for the groups of experts and the face-to-face community survey, while 'Comprehensive security and rule of law' was poorly perceived perceived by both the Hout Bay and Muizenberg community-conversation participants.

While 'Empowered stakeholders' was rated highly by experts in the face-to-face survey, it was poorly rated in both community conversations. Our interpretation of this is that in the mass

Quantitative resilience profile

Legend

worst   best

survey, participants were mostly concerned with issues that directly affected their livelihoods, and experts sometimes operate at a level where they have more knowledge of government action than ordinary citizens. By comparison, during the community conversations there were more negative perceptions based on lived experience during times of crisis. For example, during the Hout Bay conversation much of the discussion underlying this negative perception related to a lack of communication between government and citizens during both the latest wild fires and during the informal settlement fires and subsequent protest action – all of which occurred in Hout Bay.

All other dimensions received a score of 3 – which is mid-level. This means that in the majority of dimensions, experts perceive Cape Town to be fairly resilient, with room for improvement.

Figure 24 shows the quantitative resilience profile of Cape Town. The weakest dimension identified is 'Diverse livelihoods and employment'. This corresponds most directly with the perceptions of the mass face-to-face survey – reflective of the impact of unemployment and poverty that is pervasive in Cape Town. It also links

to the shocks and stresses mapping, where unemployment was rated most highly across the board. The other four dimensions in the orange colour range, receiving scores of 2 respectively, are all issues that directly affect citizens and overlaps once again specifically with the outcome of the mass face-to-face survey. These are also all dimensions that have an impact on or are impacted by a lack of social cohesion.

Finally, while 'Reliable mobility and communications' scores highly, there is some concern in our interpretation that this does not capture the informal sector well enough. It is thus an area that will be explored in greater detail in Phase 2.

Taken together, the outputs of the CRI, at a very high level, serve to reinforce the conclusions reached in this PRA document. The CRI process has provided us with a richness of data that will prove useful and insightful as it is examined in greater detail. Importantly, for the first time the City now has a dedicated set of data points with which to track resilience over time. The aim will be to redo the CRI every three years in order to assess progress or regression.

3.5 Shocks and stresses

A resilient city understands its known risks, anticipates potential future risks and develops strategies for an uncertain future. Key to 100RC's definition of resilience is a holistic approach to risk – not simply preparing for shocks, but understanding the relationship between shocks and stresses and how stresses impacts a city's ability to thrive and respond in moments of shock.

For example, Capetonians living in informal settlements are more likely to be adversely affected by severe rainfall flooding. At the same time, these citizens are less able to respond and thrive in the face of shock events due to higher incidences of unemployment and poverty. Poor and vulnerable Capetonians are thus disproportionately

negatively affected by shock events due to the numerous continuous stresses they face.

Our list of shocks and stresses was determined from the outputs of our conversations with subject experts, and from citizens through our face-to-face community survey and the two community conversations. Understanding these shocks and stresses and their interdependencies will be a crucial aspect of Phase 2 as we work to develop Cape Town's Resilience Strategy.

Some of these shocks occur regularly. For example, wildfires are common during the hot months from December to March each year. There is therefore a well-developed response plan in

SHOCKS

CYBER-ATTACK
In an increasingly connected world we face the reality of exponential advances in the mechanisms of cyberattack, as well as the vulnerabilities associated with such threats. As a city, our utilities are specific high-risk areas, as is the personal-, individual- and household-level information that the administration holds. We have an obligation to ensure maximum protection for such data and to ensure that crucial utilities in the city are not suspended due to attack.

FIRE
The threat and impact of fires in Cape Town are most acutely experienced in informal settlement fires, which displace large portions of communities, and through wildfires in the mountainous areas that surround Cape Town, where the urban edge interacts frequently.

INFRASTRUCTURE FAILURE
Cape Town must maintain a balance between building new infrastructure for growth and servicing and replacing existing ageing infrastructure. Some of this infrastructure is owned by spheres of government other than the City. At the moment the most critical failures in operations are being experienced by Metrorail.

RAINFALL FLOODING
This is a shock that affects a large number of Capetonians living in informal settlements on an annual basis. Due to climate change Cape Town is expected to have more frequent and intense flood events in the future.

DISEASE OUTBREAK
In early 2018 Cape Town, as well as other areas of South Africa, experienced a severe outbreak of listeriosis. The high population densities in certain parts of the city, particularly in informal settlements, combined with high levels of poverty and acute weather events, such as flooding and droughts, increase the possibility of disease outbreaks in Cape Town.

FINANCIAL/ECONOMIC CRISES
Cape Town's economy is fully intertwined with national and the global economies. The direct impact of financial crises in a globalised world is most acutely experienced by the poorest segments of the population through job losses and inflation.

NUCLEAR INCIDENT
The Koeberg nuclear power station, located in Cape Town, is Africa's sole nuclear power station. Ensuring the continued safety and stability of this installation is paramount to ensuring the continued safety and wellbeing of our citizens.

CIVIL PROTESTS
Perceived slow service delivery as well as the large degree of income inequality between Capetonians can manifest itself in unrest and protest action in the city. These protests are usually localised in their reach, but the prospect of widespread, multiple location protests is an increasing risk when one overlays a variety of shock events and continuous stresses at the same time.

DROUGHT
Cape Town is currently (2015-2018) experiencing the worst drought in its recorded history. Climate change has increased the likelihood of more frequent and intense drought in the future.

HEAT WAVE
Increased incidences of extreme heat events as a result of climate change are a distinct possibility for Cape Town. The impact of heat waves on vulnerable people, for example, the elderly and young children, can be particularly severe. Multi-day heat events can result in deaths, and are a contributing factor to wildfires.

POWER OUTAGE
Cape Town has experienced the devastating effects of load shedding in recent years due to an inability of the national electricity utility, Eskom, to match supply with demand. A national blackout was also deemed possible at a certain point in the recent past. Cape Town's electricity supply comes almost entirely from Eskom, hence it is vulnerable to occasional operational issues faced by that utility.

STORM SURGE
Cape Town is sometimes referred to as the 'Cape of Storms'. Being a coastal city with a 307km coastline, it is prone to extreme weather events such as storms which can manifest in coastal erosion, coastal flooding and high winds, causing damage to both manmade and natural assets.

STRESSES

CLIMATE CHANGE
Climate change impacts Cape Town in a number of ways and exacerbates the occurrence and severity of extreme weather events such as droughts, heatwaves and storms. Cape Town also has large coastal areas and low-lying residential areas that may be impacted by a rise in sea level in the future.

INADEQUATE PUBLIC TRANSPORT SYSTEMS
Cape Town's public transportation system experience's many challenges, ranging from a lack of integration to poor quality, unreliability and a lack of safety. Notwithstanding the success of the rollout of the MyCiti bus system by the City, there are multiple roleplayers in this sector, including private role players and other spheres of government, that make coordination complex.

LACK OF SOCIAL COHESION
Cape Town's lack of social cohesion continues through the legacy of apartheid spatial planning and high income inequality, making interaction between people of different races and socio-economic classes more challenging.

RACISM
Despite the end of apartheid and legislated racial segregation, racism continues to exist in many forms in the city. Whether perceived or real, many black Capetonians do not feel comfortable in all spaces in the city.

CRIME AND VIOLENCE
Cape Town ranks among the top 20 most violent cities in the world. Areas in Cape Town like Nyanga and Khayelitsha have some of the highest murder rates in the country, while the levels of gang violence in the Cape Flats is a significant concern. Rape, murder and serious contact crimes are very high in the city.

INFORMAL SETTLEMENTS
A large portion of Cape Town's population resides in informal settlements. Providing formal housing opportunities is relatively slow, and there is a significant backlog, hence there is now concerted effort going into upgrading informal settlements. However, informal settlements continue to expand and their residents are particularly prone to the negative impacts of shock events.

RAPID URBANISATION
With sustained inward migration into Cape Town, increasingly more people are looking for opportunities in the urban centre. This puts additional strain on the ability of people to access services, jobs and housing opportunities.

TRAFFIC CONGESTION
Cape Town is the most congested city in South Africa and ranks 48th in the world. This is exacerbated by the fact that safe and reliable public transport is not offered uniformly across the city. It can be further worsened by shock events such as rainfall flooding and storm surges.

UNEMPLOYMENT
Even though Cape Town's unemployment figure is slightly better than the national figure, when compared to global cities in developed countries it remains very high and is of significant concern.

SUBSTANCE ABUSE
Drug and alcohol abuse are both very prevalent in Cape Town. This is especially true in poorer residential areas where substance abuse is often linked to high levels of unemployment and poverty. Drug abuse also has a direct link to crime, while alcohol abuse is linked to domestic violence.

LACK OF AFFORDABLE HOUSING
Due to South Africa's apartheid history as well as high unemployment coupled with slow economic growth, many Capetonians cannot afford to live close to work opportunities. Living far from opportunities means that transport and time costs are most heavily felt by less advantaged citizens.

POVERTY
High unemployment and slow economic growth coupled with a large income inequality gap has contributed to a large portion of Cape Town's population living in poverty.

TRAUMA
Given the high rates of crime, violence and poverty experienced on a daily basis by many citizens, trauma and mental health conditions are experienced by many people. There is still a significant stigma associated with mental health challenges and there are insufficient support mechanisms in the public sector for people living with trauma and mental health conditions.

FOOD INSECURITY
For many poor and vulnerable Capetonians, the ability to put food on the table is a daily challenge. At the same time, in light of climate change-related shocks, like the current drought, ongoing food security is of crucial importance to Cape Town's resilience.

place based on learnings from past experience. In other instances, there are possible shocks on the horizon for which Cape Town has no previous experience to learn from – such as cyber- attack. In such an instance, proper preparedness, and lessons from other cities will be crucial should such an event occur in the future. Similarly, a constant consideration of the relationships between shocks and stresses is vital. For example, were the drought crisis ever to reach the point of 'Day Zero', how would the stresses of poverty, lack of social cohesion, and crime and violence interact in such a shock moment?

Finally, it is important to note that the research conducted during Phase 1 revealed that not all shocks experienced in the past are relevant for prioritisation going forward. Earthquake is a prime example. While the timeline in section 2.10 shows that a large earthquake was experienced in Cape Town in 1809, and there have been occasional small tremors experienced since then, the chance of a large repeat event is remote. The City Disaster Management Centre has an earthquake plan in place that will be reviewed along with all disaster plans during Phase 2. However, for the purpose of the PRA, this potential shock is not prioritised.

4 Enablers and Discovery Areas

Cape Town is a city where the foundational stresses of historical inequality and injustice – whether they be economic, social or spatial – manifest themselves in people's daily lives. They show themselves in the distribution of infrastructure around the city and where and how communities have been serviced, even amid concerted efforts to address historic backlogs and legacies. These stresses accentuate shocks when they strike, testing the city's capacity and ability to respond to them. Cape Town, due to its geographic location and unique climatic conditions, is particularly vulnerable to a wide array of climate-related shocks. Furthermore, being plugged into the global economy in an increasingly digital world, Cape Town is increasingly prone to economic and cyber-related shocks from far beyond its borders.

Phase 1 of this project has given us useful lenses and insights into these complexities and has helped to frame the current state of Cape Town's resilience. In Phase 2 we will seek to dive deeper into each Discovery Area identified, while also gaining greater understanding of the enablers of resilience that have been identified for our city. The process of developing this PRA has helped the CRO and his team identify activities and assets on which to build, discover gaps and issues that require further study, and determine where shocks, stresses, systems and governance structures are interrelated.

The PRA should not be viewed as comprehensive or conclusive but instead as a tool to interpret complex data and insights. There are already a variety of strategies and programmes being rolled out across the city. This document is not an attempt to replace or supersede these, nor is it an attempt to fully summarise or capture the complexities of each issue. Rather, it seeks to identify overarching areas that contribute to Cape Town's resilience, and answer pathfinding questions that will help us to gain a greater depth of understanding of the gaps within these areas so that we can find ways to integrate and link agendas across the city as a whole.

Having reflected on the data emanating from our extensive engagement sessions with citizens and experts from across the city, we have identified four Enablers and four Discovery Areas that will underpin Cape Town's Resilience Strategy. These Enablers and Discovery Areas cover a variety of themes but have been framed in such a way as to focus on the connections between these themes in order to build resilience. Importantly, the Enablers are seen as transversal issues, which each have an impact in some way on each of the individual Discovery Areas. As such, each Discovery Area will be contemplated in Phase 2, taking into consideration the empowering possibilities of the relevant Enabler or Enablers.

As we move forward into Phase 2, our exploration of each Enabler and Discovery Area will culminate in a number of cross-cutting initiatives that will help catalyse resilience through collaborative partnerships across sectors in ways that maximises the resilience dividend.

SHOCKS

STRESSES

FIRE

HEATWAVE

RAINFALL FLOODING

DROUGHT

STORM SURGE

FOOD INSECURITY

INFORMAL SETTLEMENTS

TRAFFIC CONGESTION

INADEQUATE PUBLIC TRANSPORT

CLIMATE CHANGE

LACK OF AFFORDABLE HOUSING

RAPID URBANISATION

CIVIL PROTEST

DISEASE OUTBREAK

CRIME/VIOLENCE

RACISM

POVERTY

TRAUMA

SUBSTANCE ABUSE

LACK OF SOCIAL COHESION

INFRASTRUCTURE FAILURE

UNEMPLOYMENT

POWER OUTAGE

POVERTY

FINANCIAL/ECONOMIC CRISIS

INADEQUATE PUBLIC TRANSPORT

CYBERATTACK

DROUGHT

FIRE

CYBERATTACK

RAINFALL FLOODING

DISEASE OUTBREAK

NUCLEAR INCIDENT

FOOD INSECURITY

CLIMATE CHANGE

POVERTY

LACK OF SOCIAL COHESION

ENABLERS

⊘ Social
Cohesion

⊘ Funding
Resilience

⊘ Mainstreaming
Resilience in City
Decision Making

⊘ Knowledge
Management
& Data

↓ ↓ ↓ ↓

> **Connected, climate-adaptive city**

> **Compassionate, holistically healthy city**

> **Capable, job-creating city**

> **Collectively, shock-ready city**

DISCOVERY AREAS

4.1 Enabler 1: Social Cohesion

Cape Town, like many South African cities, struggles with social cohesion given our racially divided past. In Cape Town this has been particularly difficult to overcome given the impact of apartheid policies on the spatial planning of the city. Despite continued efforts at improved integration, these spatial divides largely continue to exist and will take some time to overcome.

Cape Town also has a high level of inward migration, from both regional and international destinations. This means that a lot of people living in Cape Town do not necessarily see the city as their actual home – in this context there is a lack of identification with a central Cape Town identity by a large portion of the population. Moreover, given spatial divides, local neighbourhoods or area-specific identities that do not translate outside of spatial boundaries tend to dominate in the city. While it is valuable from a resilience perspective to have strong bonds at a neighbourhood level, it is also beneficial in times of shock and during ongoing stresses, for citizens to feel a strong sense of connection and cohesion at a broader, city-wide level, as well as between communities. It is also vitally important that international inhabitants of Cape Town should be seen as an integral part of the fabric of the city and not as outsiders. Further, despite concerted efforts to transform from our racially divided past, racism and economic inequality persist in the city and still need to be overcome.

Finally, Cape Town's high levels of crime, unemployment, poverty and inequality mean that many Capetonians live with trauma on an ongoing basis. While it is imperative to overcome these causes of trauma, we need to look at ways to foster psychological resilience in the city for traumas already experienced, as well as anticipated ones.

Importantly, social cohesion is seen as an Enabler in the Cape Town context because it is a driver of resilience that transcends every response to shocks and stresses. Building networks between people, both physical in space through our urban form and socially by drawing people together, will ultimately help them to share a common future.

Pathfinding questions

How can we create a meta-identity for Cape Town that a wide cross-section of the population can identify with?

How do we address the root causes of trauma in our population to foster psychological resilience at a community level?

How can we build improved social cohesion between communities in Cape Town, including international inhabitants?

How do we increase the level of volunteerism in the city and direct volunteers toward initiatives with the greatest social impact?

It impacts on all four Discovery Areas identified for the city. By acknowledging and working with our people's interconnected pasts in ways that have at their root a broader social transcendence, but are practical and obtainable, Cape Town can attain significantly enhanced social cohesion.

Good practices

Open Streets Cape Town

A citizen-driven initiative working to change how people use, perceive and experience streets.

Status:
Ongoing since 2013

Relevant stresses:
Lack of social cohesion

Solution:
Re-imagining streets as places for people to meet, interact and play.

Resilience qualities:
Reflective, Resourceful, Inclusive, Integrated

The Western Cape Economic Development Partnership

Uses partnering solutions to improve the performance of the local economic system

Status:
Ongoing since 2012

Relevant stresses:
Unemployment; lack of social cohesion

Solution:
Issue-based and area-based partnering solutions, and knowledge-sharing.

Resilience qualities:
Resourceful, Robust, Flexible, Inclusive, Integrated

Integrated

4.2 Enabler 2: Mainstreaming resilience in City decision-making

The City of Cape Town enjoys a reputation of being a well-run metropolitan municipality, with excellent financial and risk-management processes, as attested to on numerous recent occasions by the Auditor General and credit-risk agencies. However, in order to contribute more coherently to building resilience across the whole of Cape Town in the face of future shocks and current stresses, the City administration needs to integrate and embody the principles of resilience thinking throughout its decision-making structures.

Mainstreaming resilience thinking is an Enabler because it cuts through all four Discovery Areas. Without a resilience lens being applied across the administration, the benefits of the integrated resilience project envisioned in the IDP will not be fully realised.

As such, we need to examine how we can apply resilience thinking to various processes including budget development, integrated risk management, corporate project portfolio management and procurement.

We also need to ensure that Cape Town is a reflective, self-aware city that continuously learns from past experiences and uses these learnings to improve strategies and plans for future shocks.

Further, it is imperative that there is improved accountability and decision-making around instances of shock. We also need to improve the quality and level of engagement between the City administration and Capetonians for the purpose of improved decision-making, as well as increased transparency and trust in decision-making.

Finally, Cape Town operates in a Constitutional framework where there are three distinct spheres of government: local, provincial and national. This framework creates a complexity of varying mandates and responsibilities many of which overlap and create important interdependencies. With this in mind, it is crucial that we look at ways to strengthen these intergovernmental relations in order to maximise the resilience dividend.

Pathfinding questions

How does the City better incorporate resilience into its decision-making by constructing hard 'gates' of resilience into its corporate business processes, including budget, risk, project and portfolio management, and strategic management framework processes; and how should these decisions be recorded?

How can we improve the quality and rigour of community engagement for the purpose of improved decision-making?

How do we improve intergovernmental relations in order to maximise the resilience dividend?

Good practices

Corporate Project Portfolio Management

Enables the alignment of projects with organizational strategy, thus enabling effective allocation of resources to projects and thereby improving service delivery.

Status:
Ongoing since 2015

Relevant stresses:
Financial/economic crises

Solution:
Mechanism to provide decision support, screening, assessments and advice to senior management on the composition of the portfolio, its progress against plans and any conflicting priorities.

Resilience qualities:
Flexible, Resourceful, Integrated

Integrated Risk Management Policy

Assists the City administration in ensuring that good governance principles with regards to risk management are applied throughout the administration.

Status:
Most recently revised in 2016

Relevant stresses:
Financial/economic crises

Solution:
Institutionalising risk-management processes throughout the City administration in order to manage risks in ways that are consistent with the approved Risk Acceptance Level.

Resilience qualities:
Reflective, Redundant, Integrated

4.3 Enabler 3: Knowledge Management and Data

Data is a powerful tool. With the right data, individuals, institutions and the City administration can be empowered to make the most impactful decisions and maximise the resilience dividend. It is imperative for a resilient Cape Town to ensure that the right data is collected, that it is appropriately interpreted and that it is shared in a way that makes data useable in the widest possible sense. Importantly, the data at the disposal of the City administration must be used to strengthen the resilience gates in decision-making. This enabler is thus a natural corollary of mainstreaming resilience as it plays a fundamental role in governing, projecting and informed decision-making.

Our use of data also needs to go beyond a one-dimensional collection and interpretation level; it even needs to go beyond two-dimensional projection analyses. Cape Town needs to become three-dimensional in its approach to data – we need to use modelling, forecasting and sophisticated future-scenario planning if our decision-making is to be truly empowered to respond and prepare for the shocks and stresses that await the city.

The importance of improved data governance is already acknowledged by the City administration. A data coordinating committee has been established, and a new data operating model and strategy are due in 2018. There is now a unique opportunity to include resilience into data models and usages.

Beyond data, there are significant benefits for knowledge sharing that can be realised through story-telling. The adaptive capabilities of Capetonians in responding to stresses and shocks is not well known. An immediate opportunity that presents itself is for Cape Town to tell the story of its response to the drought so that the lessons learnt can be leveraged before the knowledge gained is lost.

Data and knowledge management is an Enabler for the four Discovery Areas because they contain transferable and transversal resilience benefits.

Pathfinding questions

How can the City be a resilient thought leader, sharing resilience best practice locally, nationally and internationally? What knowledge management processes are required?

How can the City be more reflective, ensuring that knowledge from shocks is captured and leveraged for better response to future shocks?

How can the City better incorporate community-generated and external data for decision-making, specifically regarding informal settlements?

Good practices

Open Data Portal

By sharing data, the City administration aims to increase transparency in its processes and promote the use of its data for social and economic benefit.

Status:
Ongoing since 2015

Relevant shock:
Cyber-attack

Relevant stresses:
High unemployment, poverty

Solution:
The platform allows for the dissemination of data. The Open Data Steering Committee reviews and approves requests for additional data.

Resilience qualities:
Robust, Flexible, Resourceful

Global Cities Registry™ for ISO 37120

Cape Town is part of this internationally recognised list of cities that are certified in accordance with the WCCD.

Status:
Ongoing since 2016

Relevant stresses:
High unemployment; poverty

Solution:
Cape Town has offered third-party verified data to the WCCD Open Data Portal allowing for city-to-city comparisons. Currently Cape Town's certification level is "Aspirational".

Resilience Qualities:
Flexible; Resourceful; Integrated

4.4 Enabler 4: Resourcing and funding resilience

Developing the Cape Town Resilience Strategy offers a unique opportunity to re-examine the funding environment for projects and programmes in the City administration. We already operate in the context of constrained municipal finances, a situation that has been exacerbated by the need to divert funding from existing projects and programmes to the drought response. To add more initiatives under the Resilience Strategy, no matter how transformative they may be deemed to be, will be challenging in light of currently established priorities under the IDP. Yet a resilience strategy with a package of supporting initiatives means little if it cannot be funded.

A long-term financing strategy, that sets appropriate objectives for new typologies of bonds, innovative project finance mechanisms, and new modelling of tariffs and rates, all performed through a resilience lens, needs be explored.

Our city is changing organically in response to stresses and shocks. The load shedding crisis of 2014/2015 precipitated by the national electricity utility's inability to match supply with demand, resulted in decreased electricity sales for the municipality to its customers, many of which pursued individual resilience-building initiatives such as energy efficiency and embedded-generation options. Similarly, it can be expected that once Cape Town safely navigates itself to the end of the current drought, there will be decreased water sales to customers as Capetonians take forward some of their water saving behaviours into a less water-constrained environment. Resilience-building in households and businesses should be expected in a resource-constrained environment. However, they pose challenges to the sustainability of municipal finances. As green technologies advance and become more decentralised and accessible to consumers, a situation that should be embraced by the City, the challenges to municipal finances from lost revenue across all the utilities will continue. For example, in response to previous load shedding events, many households and businesses moved 'off the grid' by installing solar panels and energy-efficiency technologies

Pathfinding questions

How does the City develop a resilient long-term financial strategy? How do we use our data to understand future financing needs based on what we extrapolate from the 'resilience' gates in our strategic business processes and how do we construct a financial strategy accordingly?

How do we create mechanisms for future financing- in the bond market, through debt, and through taxation and grant mechanisms?

How do we ensure that the resources and pre-feasibility requirements of projects are adequately addressed and anticipated within the City?

– the result has been decreased electricity sales and therefore decreased revenue for the municipality. It is thus important that the City administration prepares a variety of scenarios and responds with improved resilience-building funding mechanisms for its sustainability, without unnecessarily constraining the market.

Overall, the Cape Town Resilience Strategy offers the opportunity to package a few large-scale capital projects for funding with new mechanisms not previously explored. For this, hard technical and financial skills will be required that will need to be sourced from institutions such as the Cities Support Programme and platform partners of 100RC.

Good practices

Green Bond

Cape Town recently issued a Green Bond of R1 billion for the purposes of funding projects aligned with climate change adaptation. It was significantly oversubscribed at auction showing appetite from investors for green investment products.

Status:
Ongoing since 2017

Relevant shock:
Drought

Relevant stresses:
High unemployment, poverty, climate change

Solution:
The Green Bond was certified by the Climate Bonds Standard, which improved confidence and transparency in the product, making it more attractive.

Resilience qualities:
Reflective, Robust, Resourceful

Strategic Management Framework (SMF)

Facilitates integration between strategy, programmes, projects and budget. It removes previous duplication in the strategic management process.

Status:
Ongoing since 2017

Relevant shock:
Financial/economic crises

Relevant stresses:
Insecure municipal finances

Solution:
The SMF provides a weekly and daily timeline that integrates all activities related to the development of strategic and financial products.

Resilience qualities:
Reflective, Flexible, Resourceful, Integrated

An area of exploration that requires significant work is how to innovatively fund disaster responses. There is woefully insufficient disaster grant funding available to the City in times of need. As the shocks of the future may become more frequent and intense, there is a need to explore whether it is viable for the City to create risk-linked securities.

The Cape Town Resilience Strategy will inevitably include some initiatives that need not be funded by the City administration. In these cases, working in partnership with civil society organisations and business, there may be opportunities to leverage existing initiatives with project owners other than government for purposes of realising the resilience dividend.

4.5 Discovery Area 1 – Connected, climate-adaptive city

As our climate changes, what impacts will be amplified and compounded, and what resulting systems will need to be adapted to ensure a cohesive, inclusive and safer city in the future?

The Cape Town urban environment is constantly evolving, impacted upon by people, planning decisions, the economy and environmental processes, including climatic shock events. A resilient city is one where the built and natural environment are intertwined, and are able to adapt and thrive no matter the shocks and stresses experienced.

The current drought has brought to the fore the severity of the impacts of climate change. While there are already multiple policies and initiatives in place to address climate change, there remain important questions to explore if we are to transform Cape Town into a climate-resilient city. Thus as our climate changes,

we need to interrogate which threats will be amplified and compounded, and what resulting systems will need to be adapted to ensure a cohesive, inclusive and safer city in the future.

Significant effort is already being exerted into transforming the spatial form of the city, as articulated in the Transport-Orientated Development Framework and the Municipal Spatial Development Framework. However, urban transformations take time, while shocks can strike at any moment, and stresses exist continuously, often overlaid on top of each other. For example, there is no quick-fix relief to traffic congestion. As a city we are going to need to be more creative and work in partnership with

Good practices

Water Conservation and Water Demand Management Strategy

This globally award winning strategy seeks to ensure the long-term balance between available water resources and water demand and to minimise water wastage.

Status:
Ongoing since 2001

Relevant shock:
Drought, infrastructure failure

Relevant stresses:
Climate change, poverty

Solution:
A variety of intersecting solutions including public awareness, pressure management, leak detection and repair, and installation of water management devices.

Resilience qualities:
Resourceful, Robust, Redundant, Flexible

Travel Demand Management Strategy

A City strategy that uses various measures aimed at changing the individual's travel behaviour, usually from the use of single-occupancy vehicles to more sustainable modes of transport.

Status:
Ongoing since 2017

Relevant shock:
Infrastructure failure

Relevant stresses:
Traffic congestion, inadequate public transport

Solution:
Promotes the use of flexible working time programmes, the development of park and ride schemes, and bike share initiatives, among other interventions.

Resilience qualities:
Reflective, Resourceful, Flexible

each other to alleviate congestion while the integrated transport system is being developed.

Further, we need to accept that many individual households are creative and resourceful in developing their own resilience-building initiatives, particularly when the state is unable to deliver a reliable or cost-effective service. We need to consider how household- and neighbourhood-level delivery of resilience initiatives can make our city collectively stronger. Similarly, we need to examine whether improved urban planning, particularly in relation to the design of public facilities, can also leverage greater resilience dividends.

From a resilience perspective, we need to think more about how we create places, physical and social, that bring people together. In packaging projects we need to think deeply about multiple value creation, in pursuance of the resilience dividend. It means a greater

appreciation for the value of ecosystems goods and services, and the protective abilities of green infrastructure. There should be an acknowledgement that people know their own communities best, and hence need to have significant input into the local design of space.

A resilient Cape Town is one where citizens can access opportunities and can respond to climate-related shocks in a flexible and robust manner.

Pathfinding questions	Shock	Stress
How can we use green infrastructure for achieving multiple resilience-related dividends?	Rainfall flooding Severe storms Heat waves Drought	Unemployment Lack of social cohesion
How can we improve coordination within and governance of the water catchment management system?	Drought	
How can we improve our understanding of the extent and impact of resilience-building initiatives at the household level in relation to public initiatives? Where do they complement and conflict with each other?	Drought Rainfall flooding	Lack of social cohesion
How can we create empowering engagement mechanisms for diverse stakeholders to contribute to building a climate resilient city?	Drought	Lack of social cohesion
How can we improve the design and co-location of public facilities to achieve multiple resilience dividends?	Heat waves Severe storms Rainfall flooding	Lack of social cohesion Crime
How can we incentivise city residents to become more involved in resilient place making?	Heat waves Rainfall flooding	Lack of social cohesion
How can partnerships in society be leveraged to contribute to reducing the stress of traffic congestion?	Severe storms Infrastructure failure Rainfall flooding	Traffic congestion

Discovery Area 2 – Compassionate, holistically healthy city

What are the key opportunities for Cape Town to improve well-being and reduce human vulnerability, and in particular, where can we best intervene to increase this across several dimensions?

Various stresses intersect in our communities negatively affecting the health and safety of Capetonians. In our face-to-face survey of 11 178 Capetonians living in poor and vulnerable communities, the top two stresses identified were crime and substance abuse.

Individual and community health is fundamental to a society that can quickly adapt and recover. This Discovery Area thus takes a broad approach to what it means to be a healthy city. It looks at ways to improve wellbeing and reduce human vulnerability through multi-dimensional interventions. It does not focus on traditional access to primary health care for which there have been immense strides made since the dawn of democracy, notwithstanding continued uneven health outcomes in our population. It rather focuses on means to tackle pervasive substance abuse and trauma in the city and its intersection with other stresses such as crime, violence and unemployment. The importance of tackling substance abuse is well acknowledged by both the City of Cape Town and the Western Cape Government. However, the stress is significant and cannot be deemed to be in hand.

Emerging from our divided past, and with crime and violence being pervasive today, it was the view of many stakeholders we engaged with during the PRA process that a large number of Capetonians live with the impacts of trauma in their daily lives. This is in most cases undiagnosed, and where it is diagnosed, accessible treatment options are limited. A healthy mental wellbeing is critical for a resilient city.

Efforts to both deter crime and police crime are already significant in Cape Town, as is evident from the Actions Inventory. It is an area where there is particularly high involvement from civil society and community organisations. It is also an area of complexity due to initiatives owned by all three spheres of government, with the most critical functions of policing, justice and correctional services resting with national government, despite the considerable impact of these functions on the urban environment. There is room for improved intergovernmental coordination; however, for the purposes of this analysis, subjects that could require improved effort include deterrents to crime and methods to rehabilitate and reintegrate people who have served time in local prisons.

Pathfinding questions	Shock	Stress
Where are food deserts in the city? How can we improve access to affordable and nutritious food in the city?	Civil protest	Food insecurity Poverty
What are the impacts of social inequalities and exposure to violence on children and youth, and what specific needs does this create?	Civil protest	Trauma Racism Poverty
How can existing mental health facilities, programmes and interventions be better leveraged and scaled?		Trauma
How can existing substance abuse programmes be better leveraged and scaled?		Substance abuse
How can we improve the rehabilitation and reintegration of citizens who have served prison terms into the city?		Crime and violence Unemployment Poverty
How can we leverage economic opportunities to divert young people away from gangs and other criminal activities?	Civil protest	Crime and violence Unemployment

Good practices

Matrix-certified programmes at City clinics

Drug and alcohol outpatient treatment programmes, based on the Matrix® model.

Status:
Ongoing since 2011

Relevant stresses:
Substance abuse

Solution:
Three to four sessions a week offered to outpatients including counselling sessions, a relapse prevention group, and a social support group.

Resilience qualities:
Robust, Flexible, Integrated

Chrysalis Academy

This preventative programme, funded mainly by the Western Cape Government, is in response to substance abuse and active gang culture in mainly disadvantaged communities.

Status:
Ongoing since 2000

Relevant stresses:
Crime and violence, substance abuse, unemployment

Solution:
Youth development training focusing on the individual's physical, emotional, mental, and spiritual development.

Resilience qualities:
Reflective, Resourceful, Robust

4.7 Discovery Area 3: A capable, job-creating city

In order for Cape Town to build a diverse, inclusive and sustainable economy, what levers and capabilities does the city require to adapt to the requirements of the fast-changing global economy?

High unemployment, poverty and economic inequality are significant chronic stresses experienced everyday by a large number of Capetonians. It affects the ability of people to thrive and reach their full potential, and significantly reduces the ability of people to respond to shock events.

While Cape Town may have one of the lowest unemployment rates out of all metropolitan areas in South Africa, and has the lowest rate of discouraged work seekers, by any standard it is not good enough.

Despite considerable effort going into the establishment of an enabling environment for job creation, at least at the local and regional level, as evidenced by the Actions Inventory in the previous section, Cape Town's unemployment rate is stuck in a narrow band. The city economy largely tracks the economic performance of the country as a whole, even if it outperforms it slightly, meaning that local fortunes remain inextricably linked to the national economy, and nationally prescribed policy and legislation, which is itself heavily impacted upon by international sentiment.

It is likely that no game-changing improvement in the local economy will occur without significantly improved cooperation between the three spheres of government. The South African economy as a whole is well studied, with a myriad of proposed actions contained in the National Development Plan 2030 and The New Growth Path. Yet, implementation and coordination remain weak. Policy uncertainty in the economic space at the national level has been a contributing factor to sluggish growth. Cape Town cannot be a passive observer on the sidelines of the national economic debate. If it desires to strengthen local resilience, it will need to influence the national agenda of economic actions.

Nevertheless, in the local economy, where stakeholders can have more direct impact, building on existing jobs and skills initiatives is crucially important. There is already a considerable ecosystem of support for livelihoods and employment and synergies can be improved to increase impact. Further, there are opportunities to improve the retention of Capetonians in education, training and employment opportunities.

There are also new opportunities that need to be explored. Importantly, we need to look at the changes that the 'Fourth Industrial Revolution' will bring for the future of our city. We need to ensure that our citizens are adequately prepared and equipped for the economic realities of the future that are likely to include further automation and increased use of artificial intelligence.

Alongside this we need to seize on the job-creating opportunities of the green economy as we strive to be an increasingly resource-efficient region. We have the potential to be an African leader in the delivery of green goods and services, and hence can expand into market opportunities elsewhere on the continent.

We also need to examine ways to diversify and harness the potential of the informal economy which is underappreciated for its potential to take people out of poverty.

Pathfinding questions	Shock	Stress
What does a new consolidated economic implementation package for the Cape Town economy look like?	Economic/financial crisis	Unemployment
How can we attract and retain diverse talent in Cape Town?	Economic/financial crisis	Lack of social cohesion
What are the risks and opportunities of the 'Fourth Industrial Revolution' to Cape Town? How do we prepare our citizens for an increasingly digitised future?	Economic/financial crisis Cyber-attack	Unemployment
How can businesses generally, and SMEs in particular, become more resilient, including improving business continuity?	Drought Cyber-attack Heat wave Civil unrest	Unemployment
How can we engage businesses in both the formal and informal sector in the city's resilience building efforts?		
How can we build a green economy that improves resource efficiency in Cape Town and improves linkages between the formal and informal economy?	Drought	Unemployment
How can we enable the growth and diversification of the informal economy, particularly into specialist sectors beyond retail?	Economic/financial crisis	Unemployment
How can we synergise existing skills and work programmes run by all spheres of government to improve impact of outcomes?	Economic/financial crisis	Unemployment

Good practices

Outcomes-based workforce tender

This initiative is established to support economic inclusion, achieve a more productive workforce and reduce the number of discouraged work seekers.

Status:
Ongoing since 2018

Relevant shock:
Economic/financial crises

Relevant stresses:
High unemployment, poverty, substance abuse

Solution:
This tender focuses on results rather than associated activities and tasks. The service provider is only remunerated if they place beneficiaries in education, training or work opportunities. The more sustained placements made, the more the service provider earns.

Resilience Qualities:
Resourceful, Reflective, Inclusive

Western Cape Industrial Symbiosis Programme

This multiple award-winning free facilitation service connects companies with unused or residual resource such as materials, energy and water.

Status:
Ongoing since 2013

Relevant shocks:
Economic/financial crises, drought

Relevant stresses:
High unemployment, climate change

Solution:
The operations and waste streams of businesses are studied to determine underutilized resources. Thereafter, engagements are facilitated between businesses where resources are exchanged between matched businesses.

Resilience Qualities:
Resourceful, Redundant, Integrated

4.8 Discovery Area 4 – Collectively shock-ready city

In what ways do continuous stresses in Cape Town amplify shock events and how can we ensure that in preparation for and execution of shock-related plans that we fully incorporate these considerations?

The current drought is a shock event that has tested the resilience of the whole city. It is particularly extreme in nature and has resulted in restrictions on water use that are much more severe than other cities that have experienced similar extreme droughts in recent times. While droughts are routinely planned for in Cape Town, the extremity of this event has placed significant pressure on Cape Town, predominantly because it is city-wide in scale. Most shock events in Cape Town, such as fire and rainfall flooding, are localised in nature, although they can nevertheless be severe for those people directly impacted.

We need an improved understanding of our ability to respond to city-wide shocks and, importantly, the ability to continue with business as usual, as far as possible, despite the shocks. Rainfall flooding, heat waves, and cyber-attacks all have the ability to manifest across the city, causing damage in multiple locations simultaneously. Importantly we also need to understand how shocks intersect with the continuous stresses our city faces and how the latter compounds the former. In the context of resilience, it is not only important that we can respond to moments of shock, but it is vital that we address underlying stresses so that we can recover, quickly adapt and thrive in the aftermath of shocks. There need to improved resilience-building initiatives at the household and community level in preparation for shocks. In responding to shocks the state institutions have limited capabilities, especially if the shock is city-wide, hence there is a need for citizens to take greater responsibility for preparation and adaption to shocks, with a particular emphasis on leveraging social cohesion for maximum impact.

Pathfinding questions	Shock	Stress
How can we improve our understanding of hazards and risks at the neighbour-hood level? How can we use this information to improve household resilience, especially in informal settlements?	Drought Heat wave Storm surge Fire Rainfall flooding	Climate change
How confident are we that the current suite of city & regional disaster plans is sufficiently robust in light of future shocks, particularly climate shocks which are expected to be more frequent & intense?	Cyber-attack Heat wave Fire Storm surge Nuclear incident Rainfall flooding	Food insecurity Lack of social cohesion
How can we improve dissemination of information on shocks in real time in order to ensure timely and efficient responses?	Disease outbreak	Poverty
How can the diverse social and community networks that exist in the city be better linked and coordinated for scalability but also to pull together in moments of shock?	Drought Rainfall flooding Heat wave	Lack of social cohesion Racism

Good practices

Winter Readiness Plan

A City transversal initiative that targets high risk flood-prone areas, mostly informal settlements, instituting a wide range of initiatives to prepare and recover from flooding.

Status:
Ongoing since 2000

Relevant shock:
Rainfall flooding

Relevant stresses:
Poverty, informal settlements

Solution:
A multipronged approach including community-awareness campaigns, weather warnings, reducing blockages in storm-water systems, and distributing essential items in conjunction with civil society partners.

Resilience qualities:
Resourceful, Redundant, Integrated

Family Disaster Preparedness Guidelines

A City initiative that helps households prepare for disaster by providing information and useful resources.

Status:
Ongoing since 2000

Relevant shocks:
Fire, rainfall flooding, nuclear incident

Relevant stresses:
Poverty, informal settlements, food insecurity

Solution:
Templates for a family emergency plan plus checklists of important items to store in the home. Also basic guidance on what actions to take in an emergency.

Resilience qualities:
Reflective, Redundant, Inclusive

5 Next Steps

Phase 1 has provided the Resilience Team with a range of insights and has helped to establish a baseline assessment of Cape Town's resilience. It enabled the team to identify the four Enablers and four Discovery Areas that will inform the development of the city's Resilience Strategy. Working groups will now be established for each Discovery Area and for each Enabler. The working groups will be comprised of City officials and thematic experts.

These working groups will help the Resilience Team develop a deeper understanding of each Enabler and Discovery Area, further identifying specific gaps and opportunities, and ultimately guiding the work towards tangible and implementable initiatives.

Phase 2 will also involve collaboration with international experts and 100RC platform partners. The Resilience Team will also learn from the experiences of other cities in the 100RC network.

Importantly, the Resilience Team will continue with the extensive stakeholder engagement which was integral to Phase 1 of this project. The team will continue to interact with Capetonians across the city, particularly through community conversations. We will test assumptions and proposed initiatives with Capetonians. During Phase 2 we also aim to build a coalition of implementing partners for the Resilience Strategy.

At some point towards the end of 2018 it is intended for the Resilience Strategy to serve before the Council of the City of Cape Town where approval for its passing will be sought.

The above word cloud was created from the answers to the open-ended question on Cape Town's strengths in the online resilience survey. The online survey is an ongoing engagement tool being used by the Resilience Team to build further knowledge and understanding about resilience in Cape Town.

6. ANNEXURES

6.1 Annexure A: Detailed qualitative CRI outputs

Dimension 1: Health & Wellbeing

1.1 Minimal human vulnerability

Safe and accessible housing
Adequate affordable energy supply
Inclusive access to safe drinking water
Effective Sanitation
Sufficient affordable food supply

1.2 Diverse livelihoods and employment

Inclusive labour policies
Relevant skills and training
Dynamic local business development and innovation
Supportive financing mechanisms
Diverse protection of livelihoods following a shock

1.3 Effective safeguards to human health and life

Robust public health systems
Adequate access to quality healthcare
Emergency medical care
Effective emergency response services

Dimension 2: Economy & Society

2.1 Collective identity & community support

Local Community Support
Cohesive communities
Strong city-wide identity and culture
Actively engaged citizens

2.2 Comprehensive security and rule of law

Effective systems to deter crime
Proactive corruption prevention
Competent policing
Accessible criminal and civil justice

2.3 Sustainable economy

Well-managed public finances
Comprehensive business continuity planning
Diverse economic base
Attractive business environment
Strong integration with regional and global economies

Dimension 3: Infrastructure & Ecosystems

3.1 Reduced exposure & fragility

Comprehensive hazard and exposure mapping
Appropriate codes, standards and enforcement
Effectively managed protective ecosystems
Robust protective infrastructure

3.2 Effective provision of critical services

Effective stewardship of ecosystems
Flexible infrastructure
Retained spare capacity

Diligent maintenance and continuity
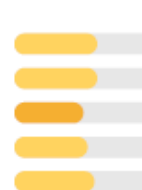Adequate continuity for critical assets and services

3.3 Reliable mobility and communications

Diverse and affordable transport networks
Effective transport operation & maintenance
Reliable communications technology
Secure technology networks

Dimension 4: Leadership & Strategy

4.1 Effective leadership and management

Appropriate government decision-making
Effective co-ordination with other government bodies
Proactive multi-stakeholder collaboration
Comprehensive hazard monitoring and risk assessment
Comprehensive emergency management

4.2 Empowered stakeholders

Adequate education for all
Widespread community awareness and preparedness
Effective mechanisms for communities to engage with government

4.3 Integrated development planning

Comprehensive city monitoring and data management
Consultative planning process
Appropriate land use and zoning
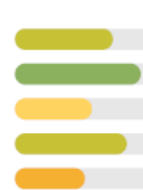Robust planning approval process

6.2   Annexure B: Detailed quantitative CRI outputs
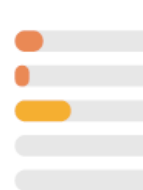
Dimension 1: Health & Wellbeing

1.1. Minimal human vulnerability

Safe and accessible housing
Adequate affordable energy supply
Inclusive access to safe drinking water
Effective Sanitation
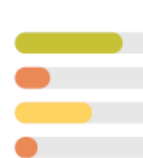Sufficient affordable food supply

1.2. Diverse livelihoods and employment

Inclusive labour policies
Relevant skills and training
Dynamic local business development and innovation
Supportive financing mechanisms
Diverse protection of livelihoods following a shock

1.3. Effective safeguards to human health and life

Robust public health systems
Adequate access to quality healthcare
Emergency medical care
Effective emergency response services

Dimension 2: Economy & Society

2.1. Collective identity & community support

Local Community Support
Cohesive communities
Strong city-wide identity and culture
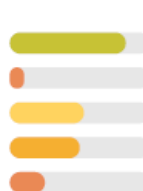Actively engaged citizens

2.2. Comprehensive security and rule of law

Effective systems to deter crime
Proactive corruption prevention
Competent policing
Accessible criminal and civil justice

2.3. Sustainable economy

Well-managed public finances
Comprehensive business continuity planning
Diverse economic base
Attractive business environment
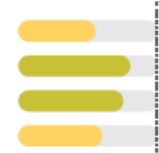Strong integration with regional and global economies

Dimension 3: Infrastructure & Ecosystems

3.1. Reduced exposure & fragility

Comprehensive hazard and exposure mapping
Appropriate codes, standards and enforcement
Effectively managed protective ecosystems
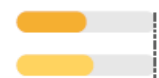Robust protective infrastructure

3.2. Effective provision of critical services

Effective stewardship of ecosystems
Flexible infrastructure
Retained spare capacity

Diligent maintenance and continuity
Adequate continuity for critical assets and services

3.3. Reliable mobility and communications

Diverse and affordable transport networks
Effective transport operation & maintenance
Reliable communications technology
Secure technology networks

Dimension 4: Leadership & Strategy

4.1. Effective leadership and management

Appropriate government decision-making
Effective co-ordination with other government bodies
Proactive multi-stakeholder collaboration
Comprehensive hazard monitoring and risk assessment
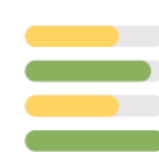Comprehensive emergency management

4.2. Empowered stakeholders

Adequate education for all
Widespread community awareness and preparedness
Effective mechanisms for communities to engage with government

4.3. Integrated development planning

Comprehensive city monitoring and data management
Consultative planning process
Appropriate land use and zoning
Robust planning approval process

6.3 Annexure C: Stakeholder engaged

Individuals from the following institutions were engaged at some point during the development of the Preliminary Resilience Assessment.

Accelerate Cape Town
African Policing Civilian Oversight Forum
Athlone Community Policing Forum
Cape Town Tourism
City of Cape Town – Area Based Service Delivery Directorate
City of Cape Town – Arts and Culture Department
City of Cape Town – Budgets Department
City of Cape Town – City Growth Management Department
City of Cape Town – City Health
City of Cape Town – Disaster Risk Management Centre
City of Cape Town – Electricity Generation and Distribution Department
City of Cape Town – Grant Funding Department
City of Cape Town – Economy and Environment Cluster Committee
City of Cape Town – Enterprise and Investment Department
City of Cape Town – Environmental Management Department
City of Cape Town – Finance Directorate
City of Cape Town – Informal Settlements Department
City of Cape Town – Information and Knowledge Management Department
City of Cape Town – Metro Police
City of Cape Town – Organisational Effectiveness and Innovation Department
City of Cape Town – Organisational Policy and Planning Department
City of Cape Town – Public Participation Unit
City of Cape Town – Risk Management Department
City of Cape Town – Social Development and ECD Department
City of Cape Town – Social Services Directorate
City of Cape Town – Solid Waste Management Department
City of Cape Town – Sustainability and Resilience Cluster Committee
City of Cape Town – Sustainable Energy Markets Department
City of Cape Town – Transport and Urban Development Authority
City of Cape Town – Urban Integration Department
City of Cape Town – Water and Sanitation Department
Common Cause South Africa
Community Cohesion
Consulate of the Netherlands in Cape Town
Conversations that Count
Council for Scientific and Industrial Research (CSIR)
Development Action Group
Equal Education
GreenCape
False Bay Echo
Fish Hoek Area West Disaster Risk Management
Fish Hoek Valley Ratepayers' and Residents' Association
Future Cape Town
Hout Bay Neighbourhood Watch
Hout Bay Community Health Forum
Informal Settlement Network
Institute for Justice and Reconciliation
Jakupa Designers & Urban Architects
Leading Women of Africa
Marina Da Gama Association
Muizenberg Improvement District
National Government – National Treasury
National Government – Department of Environmental Affairs
Open Streets Cape Town
Partners for Possibility
Pedal Power Association
Polyco

Prime Media
Project 90 by 2030
PwC South Africa
Ndifuna Ukwazi
Santam
SDI South African Alliance
SEED
SEE Sustainability
Sentinel News
Shine Literacy
Spier Wine Farm
Social Justice Coalition
South African Renewable Energy Business Incubator
Sun Valley EcoWatch
Sustainable Livelihoods Foundation
The Community Organisation Resource Centre (CORC)
The Green Cab
The Muizenberg Lakeside Residents' Association
The Nature Conservancy
Thrive Hout Bay
University of Cape Town – African Centre for Cities
University of Cape Town - African Climate & Development Initiative
University of Cape Town – Department of Chemical Engineering
University of Cape Town – Faculty of Engineering & the Built Environment
University of Cape Town - Institute for Safety Governance and Criminology
University of Cape Town – Lung Institute
University of Cape Town – Safety and Violence Initiative
University of Cape Town – School of Architecture, Planning and Geomatics
University of Cape Town – School of Geography
University of Cape Town – School of Public Health and Family Medicine
University of the Western Cape – Department of Political Studies
Urban Resilience Initiative
Wesgro
Western Cape Association for Persons with Disabilities
Western Cape Economic Development Partnership
Western Cape Government – Department of Community Safety
Western Cape Government – Department of Economic Development and Tourism
Western Cape Government – Department of Environmental Affairs and Development Planning
Western Cape Government – Department of Health
Western Cape Government – Department of the Premier
Western Cape Government – Ministry of Economic Opportunities
Western Cape Government – Ministry of Education
Western Cape Government – Standing Committee on Community Safety
WWF South Africa

6.4 Annexure D: List of figures

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6.5 Annexure E: List of acronyms

100RC – 100 Resilient Cities Network
ART – Antiretroviral Treatment
BioNet – Biodiversity Network
BSM – Budget Strategy Committee
CFR – Cape Floristic Region
CRF – City Resilience Framework
CRI – City Resilience Index
CRO – Chief Resilience Officer
GDP – Gross Domestic Product
GIS – Geographic Information System
IDP – Integrated Development Plan
ODTP – Organisational Development and Transformation Plan
MAYCO – Mayoral Committee
PRA – Preliminary Resilience Assessment
PRASA – Passenger Rail Agency of South Africa
SAPS – South African Police Service
SMF – Strategic Management Framework
TB – Tuberculosis
WCWDM – Water conservation and water demand
     management
WCWSS – Western Cape Water Supply System

End notes

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