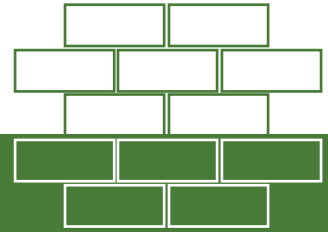


GREENING our supply chain



A guide to Environmental Sustainability
for suppliers and contractors to Garden
Cities NPC (RF)

materials



Garden Cities



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MATERIALS

1. Committing to sustainable materials

Building with sustainable materials is a priority for Garden Cities NPC (RF). We support building processes that are resource efficient, focus on recovery of waste materials and minimize the life cycle impacts of materials on the environment. To help us build more sustainably, we encourage our suppliers and contractors to select materials that have minimal environmental impact.

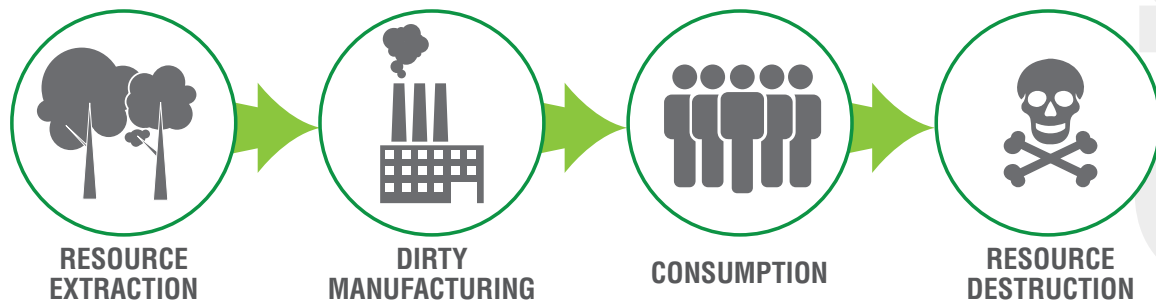
Buildings are one of the main contributors to climate change. Building green is an opportunity to use resources efficiently and address climate change while creating healthier and more productive environments for people and communities.

2. Materials and the environment

2.1 Linear production system

Typically, the way we design, produce, use and dispose of most of our products and packaging is through a linear “cradle to grave” system of industrial production and consumption. In this system manufacturers and suppliers bear little to no responsibility for products at the end of their useful life. The result is continuing growth in both the volume and the toxicity of materials designed for disposal in landfill or incinerators. Such products therefore pose health threats to people and the environment either through direct exposure to dangerous chemicals through inhalation or absorption in our homes, schools and office buildings, or by indirect exposure through ingesting or inhaling pollutants, which have migrated out of products into the environment and the food chain.

Linear, one-way production system



2.2 Waste to landfill

Landfills are often the cause of serious social and environmental issues, including contamination of groundwater and soil, and the emission of methane gas. Although extensive efforts are made to capture and treat leachate from landfills before it reaches underground water systems, engineered liners have a limited life span and eventually every landfill liner will leak. Decaying organic waste in a landfill naturally generates methane, a potent global warming greenhouse gas, which in itself is flammable and potentially explosive. In properly managed landfills, gas is collected and utilized in waste-to-energy projects.

Most packaging is used only once...
95% of plastic packaging material value is lost after one use cycle.

Marine litter is a global problem and **80%** of it is made of plastic packaging. By 2050 there may be more plastic than fish in the ocean.

3. Sustainable built environments

Buildings are one of the main contributors to climate change. Building green is an opportunity to use resources efficiently and address climate change while creating healthier and more productive environments for people and communities.

3.1 Green building

The objective of green building is to reduce the overall impact of the built environment on human health and the natural environment by integrating design and construction such that it mimics natural processes. This includes making use of natural lighting and ventilation, harvesting or diverting rainwater for irrigation, choosing water-based non-toxic paint, and using materials that are recyclable or have recycled content. Another important feature of green building is the integration of the site in harmony with surrounding natural features like rivers, wetlands and indigenous vegetation.

Sustainable materials are materials that can be produced in required volumes without depleting non-renewable resources and without disrupting the natural equilibrium of ecosystems throughout the life-cycle of the material.

Green buildings use fewer resources and have a lesser negative impact on the environment. Such buildings use less water, optimize energy efficiency, conserve natural resources, and generate less waste and pollution.



Guiding design principles

Conservation: think harmony with nature

Efficiency: use resources sparingly

Recycling: recycle all waste, build from recycled materials, and build from recycable materials

Renewable resources: rely principally on renewable resources

Restoration: rehabilitate and maintain ecosystem services

3.2 Zero Waste

Zero Waste to landfill is the sustainability principle applied in the area of waste management. It means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.

ZERO WASTE

An ethical, economical, efficient and visionary goal... to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use.

- Zero Waste International Alliance

Only by “closing the loop” can we hope to develop a sustainable economy. The idea is to reduce consumption as much as possible by using design-for-environment in all products and their packaging, and to make all products and packaging recyclable. Achieving Zero Waste depends on designing products and industrial processes so that their components can be dismantled, repaired and/or recycled. Zero Waste means linking communities, businesses and industries so that one’s waste becomes another’s feedstock. It means preventing pollution at its source.

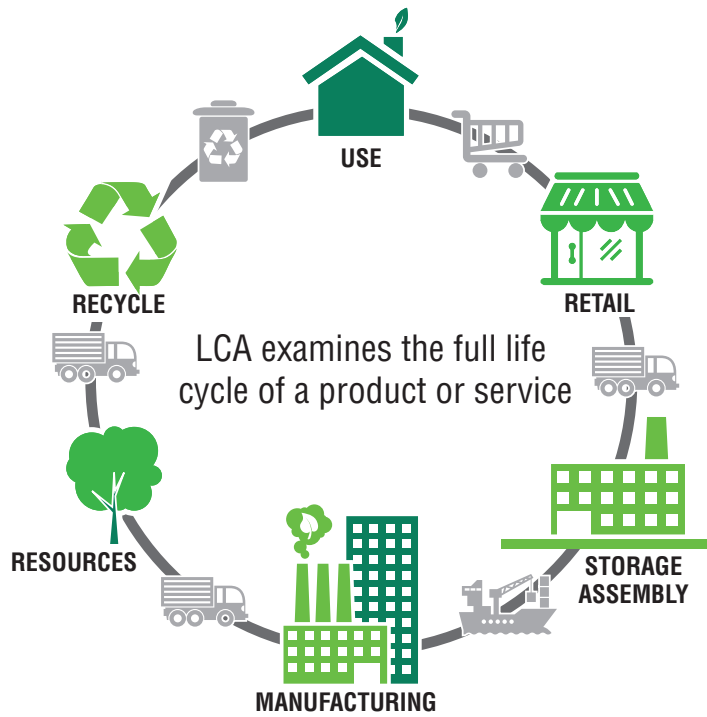
The zero waste economy

Designing a full-cycle system - upstream and downstream
Zero Waste means to design for the environment



3.3 Life Cycle Assessment

The goal of Life Cycle Assessment or Analysis (LCA) is to compare the full range of environmental impacts attributed to products and services. LCA quantifies all inputs and outputs of material flows, assessing how these material flows affect the environment. This information is used to improve processes, support policy and provide a sound basis for promoting environmentally responsible processes. The term life cycle refers to the notion that a fair, holistic assessment requires the assessment of raw-material production, manufacture, distribution, use and disposal including all intervening transportation steps necessary or caused by the product's existence. The procedures of LCA form part of the ISO 14000 environmental management standards: ISO 14040 and 14044.



4. Green building in South Africa

4.1 Vision for sustainable development

South Africa's sustainable development vision is outlined in the National Framework for Sustainable Development (2008) as "aspiring to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration"

CSIR

The Council for Scientific and Industrial Research (CSIR) supports the country's response to national priorities by drawing on its multidisciplinary science, engineering and technology skills base. The CSIR says environmentally sustainable and efficiently operated socio-economic infrastructure is critical for the development and well-being of the country. An effective built environment increases productivity, social development and growth. The organisation contributes to sustainable infrastructure development, asset preservation, socio-economic growth and global competitiveness in and for the built environment. The fundamental need for socio-economic development, the cornerstone of societal well-being, can be addressed only when people have access to basic services and amenities such as electricity, water and sanitation, as well as housing, schools and hospitals.

4.2 Green economy

In the Western Cape, the Western Cape Provincial Government's overarching Green Economy strategy identifies the built environment sector for green growth initiatives. A key tenet to the living strategy is the 110% green campaign, which was launched by the Premier of the Western Cape in 2012 with the goal of encouraging 110% worth of commitment towards developing the green economy. Green building, however, is not a new phenomenon in South Africa. Organisations such as the Council for Scientific and Industrial Research (CSIR) and the South African Property Owners Association (SAPOA) have been advocating the adoption of green building practices since the establishment of the Green Buildings for Africa (GBFA) programme in 1997.

View the Western Cape Government Green Economy Report, 2015: www.westerncape.gov.za/110green/documents

GreenCape

Established in 2010 by the Western Cape Government, GreenCape is a Special Purpose Vehicle to support the development of the green economy in the region. The not-for-profit sector development agency supports businesses operating within the green economy in the Western Cape. Its aim is to help unlock the investment and employment potential of green business, technologies and manufacturing, contributing to improved the resource efficiency and resilience of the regional economy.

Definition of Green Economy in South African context

The national Department of Environmental Affairs (DEA) defines Green Economy as a "system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities". It implies the decoupling of resource use and environmental impacts from economic growth. It is characterized by substantially increased investment in green sectors, supported by enabling policy reforms.

5. Building policies and regulation

The regulatory framework for the built environment in South Africa is governed by the Department of Public Works. The National Department of Human Settlements (NDHS) plays a role of oversight in the social housing planning process in the country.

5.1 Key standards

National Building Regulations and Building Standards Act

The National Building Regulations and Building Standards Act (No. 103 of 1977) forms the basis of how buildings in South Africa should be constructed and developed to suit human habitation. The New Building Regulations (NBRs) were introduced in 2008.

SANS 10400-XA

The South African Bureau of Standards (SABS) is responsible for developing standards for the building industry in line with the regulations. In 2011, the SABS introduced the SANS 10400: The application of the National Building Regulations. This code sets out prescriptive provisions that are deemed to satisfy the technical aspects of the new NBRs. Part X of the SANS 10400 deals with environmental sustainability, and Part XA deals with energy usage in buildings such as glazing, insulation, shading, orientation, and building services, including HVAC and energy usage. The amended South African National Building (SANS) 10400–XA Regulations now require the following:

- XA1 says that buildings should utilise energy efficiently and reduce greenhouse gas emissions in accordance with a checklist of requirements.
- XA2 says that not more than 50% of the annual volume of domestic hot water must be heated using electricity.

National Framework for Green Building (2011)

Promotes the objectives of green building in the public sector.

Green Building Manual (2012)

Outlines a set of guidelines for green construction principles for the built environment professionals.

National Framework for Green Building (2013)

In 2011 the South African Government adopted a National Framework for Green Building in South Africa (NFGBSA) as its official policy toward green building.

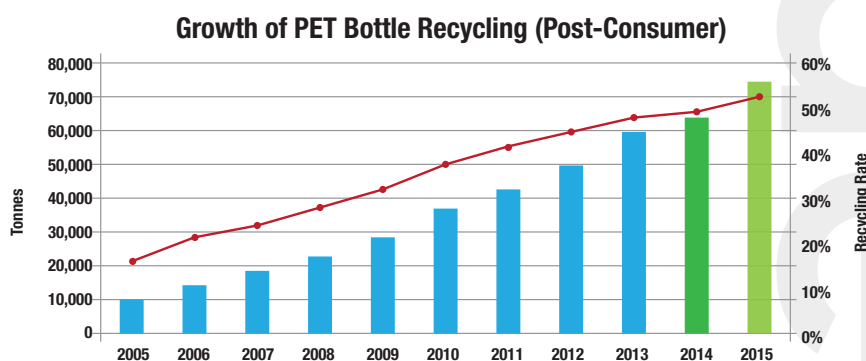
6. Waste management in South Africa

6.1 Diversion of waste-to-landfill

The Western Cape has limited remaining landfill airspace. The average lifespan of existing landfills is estimated at 8 years, with less than 3 years left for Stellenbosch municipality. One of the main objectives of The Western Cape Green Economy Strategic Framework (2013) is to achieve resource efficiency by minimizing the amount of waste generated in agricultural and industrial processes as well as creating economic opportunities from our current waste streams. According to the CSIR, the waste economy in South Africa is estimated at R15.3 billion (0.51% of the GDP) including both the public and private sectors. The National Waste Management Strategy (NWMS) published in 2011 has set ambitious waste economy targets to establish 2600 small and medium enterprises (SMEs) and create 69 000 jobs in the South African by 2016.

6.2 Recycling industry

The average recycling rate in South Africa is 19.6%, compared to a global average of 23.3%. The recycling industry is well established in South Africa, and has existed for over 20 years with over 180 recyclers across the country. The main materials recycled are packaging wastes i.e. metals, paper, glass and plastics.



7. Waste policies and regulation

7.1 Waste Act

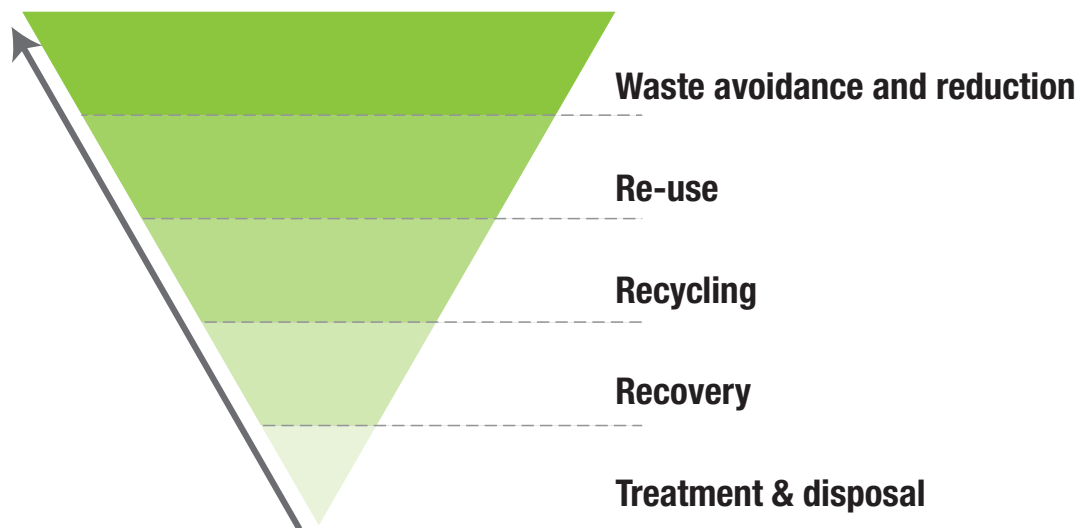
Over the last decade, the number of companies in the waste sector has increased significantly due to the changes implemented by the National Department of Environmental Affairs (DEA) reflected in the National Environmental Management: Waste Act (NEM:WA, Act 59 of 2008). The Waste Act shifts the focus from end of pipe to cradle-to-cradle solutions to include waste minimization through recycling and recovery of valuable material from the waste streams. The Act places minimum requirements for any person who undertakes an activity that produces waste or a person who handles any waste that has already been produced to comply with. This includes storage of waste, transportation, processing, including people who are reusing or recycling waste. It is the responsibility of any “holder of waste” to determine if they require a waste licence for their particular activity.

Importantly, the Waste Act also legislates the following previously non-compulsory practices:

- Reporting of waste into the waste information system;
- Development of Integrated Waste Management Plans; and
- Development of the National Waste Management Strategy

7.2 Integrated Waste Management (IWM) By-Law

In terms of the Waste Act and the City of Cape Town’s Integrated Waste Management (IWM) By-Law (2009), it is a requirement that all commercial entities comply with the development of a waste policy supported by an Integrated Waste Management Plan (IWMP) for all areas of business where waste is generated, stored or transported.



Hierarchy for an IWM plan in terms City’s IWM By-law, 2009

7.3 Environmental Management Systems

Further to legislative frameworks and national statutes, environmental management or quality accreditation systems such as ISO 14001 or ISO 9001 require a commercial site or business entity to provide a detailed waste management policy with associated procedures, as well as good record keeping demonstrating that these policies and procedures are adhered to.

8. Industry Bodies and Associations

8.1 Sustainable built environment

Industry organisations promoting a sustainable built environment include:

GBCSA

The Green Building Council of South Africa (GBCSA) leads the transformation of the South African property industry to ensure buildings are designed, built and operated in an environmentally sustainable way. A member of the World Green Building Council, the GBCSA provides tools, training, knowledge and certification to promote green building practices based on its Green Star SA rating system. In 2014 the GBCSA launched the Excellence in Design for Greater Efficiencies (EDGE) rating system to be utilised for homes in South Africa. Edge seeks to help facilitate a transformation of the property sector in rapidly urbanising countries by influencing design considerations. To achieve the EDGE standard, minimum savings of 20% energy, water, and embodied energy in materials must be met.

Website: www.gbcsa.co.za and www.edgebuildings.com

8.2 Waste management and materials recovery

Industry associations focusing on materials recovery and recycling include the following.

PlasticSA

PlasticsSA represents all sectors of the South African plastics industry including polymer producers and importers, converters, machine suppliers, fabricators and recyclers. They play an active role in the growth and development of the plastics industry and provide strategic leadership on environmentally responsible actions.

Website: www.plasticsinfo.co.za

SAPRO

The South African Plastics Recycling Organisation (SAPRO) represents the plastics re-processors in South Africa. Its members procure sorted, baled end-of-life plastics and re-process it into raw material. The recycled material can be used to manufacture new plastics products. Recyclate can be used as a percentage of the final material mix or even solely used to produce new products.

Website: www.plasticrecyclingsa.co.za

PETCO

PETCO aims to minimize the environmental impact of post-consumer PET on the South African landscape by supporting PET collection and recycling networks and promoting consumer education and awareness programmes.

Website: www.petco.co.za

Packaging Council of South Africa (PACSA)

Founded in 1984, PACSA has been replaced by a new industry body called Packaging SA. Packaging SA is closely associated with The Institute of Packaging South Africa (IPSA) and is a voluntary body representing the main role players in the packaging industry. PACSA supports programs and policies relating to environmental protection including resource recovery and recycling.

Website: www.packagingsa.co.za

e-waste Alliance

The e-Waste Alliance is a non-profit organization, which helps co-ordinate responsible management of the entire electronic waste (e-waste) stream. It is made up of independent business units who are able to handle all parts of the e-waste waste stream.

Website: www.ewastealliance.co.za

WISP

Western Cape industrial Symbiosis Programme (WISP) is a free service that connects companies so that they can identify and realise the business opportunities enabled by utilising unused or residual resources (materials, energy, water, assets, logistics, and expertise), enhancing business profitability and sustainability. The programme is funded by the Western Cape Department of Economic Development and Tourism under its green economy portfolio and is delivered by GreenCape. WISP works with a broad range of industries and companies of all different sizes to create mutually beneficial links between member companies. No company is too big or too small to benefit from WISP and membership is free.

Website: www.greencape.co.za/wisp/

9. Garden Cities Green Building Guidelines

9.1 Material selection and procurement

Building materials can have significant environmental impacts throughout their life cycle, including emission of greenhouse gases, toxicity and waste generation. To assist in mitigating these impacts, Garden Cities NPC (RF) recommends the following guidelines in the selection and procurement of materials:

Dematerialisation	Dematerialisation encourages designs that produce a net reduction in the amount of material used, for example exposed structures with no cladding, or reduced finishes such as polished concrete floors.
Low embodied energy	Embodied energy is the energy consumed by all of the processes associated with the production of a material, from the mining and processing of natural resources to manufacturing, transport and product delivery. Materials with low embodied energy (for example mud brick, stabilised earth, air-dried timber, concrete blocks, precast concrete and recycled materials) or materials that have had little processing are preferred. Materials with high-embodied energy can be considered when properties such as strength or longevity are critical.
Local sourcing	Local Sourcing reduces transportation requirements and the embodied energy of a material while also supporting local business.
Eco-rated products	Eco-rated products are considered less harmful to the environment than other products within the same category. They carry independent third-party assessments or recognised certifications backed by laboratory testing and should comply with ISO 14020 series, which deals with environmental labels and declarations.
Recycled content and reused materials	Recycled content and reused materials encourage prolonging of the useful life of existing products and encourages uptake of products with recycled content. Where reasonable, materials that have proven recycled content (such as aluminium, glazing, gypsum, flooring, carpets and roofing materials) should be used.
Concrete with recycled aggregate	The use of concrete encourages the reduction of high embodied energy materials and resource depletion, especially if industrial waste or recycled aggregate is included.
Sustainable timber	Sustainable Timber encourages the use of post consumer recycled timber products or timber sourced from FSC certified sources.
Concrete masonry	Concrete masonry encourages the reduction of embodied energy and resource depletion with a reduction of virgin masonry units. Concrete bricks and blocks with recycled content are desirable.

9.2 Waste minimisation

Garden Cities NPC (RF) encourages its suppliers and contractors to adhere to the following waste minimisation guidelines:

1. Use of materials that have resulted in minimal waste during their production;
2. Use of materials that will result in minimal waste during the construction, maintenance and demolition of developments;
3. Waste management systems that facilitate separating waste at source (for composting, re-use and recycling)
4. Installation/design of systems within homes that facilitate the easy separation of household waste into main recyclable categories (glass, metal, plastic and paper) and non-recyclable waste (which goes to landfill);
5. Design of layouts that ease servicing by local waste-collection services i.e. a separate recyclable collection and drop-off points or embayments within areas for this purpose;
6. Provision of recycling and waste management infrastructure for schools.