ENVIRONMENTAL TRAINING

Short Course: Environmental Management in Construction & Maintenance of Roads & Asphalt Plants

South African Roads Federation
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(i) Background to the Course

This course has been prepared and presented jointly by the South African Roads Federation (SARF) and AquaEco. The primary objective of the course is to provide participants with a general and practical understanding of compliance to the respective environmental legal frameworks, as well as environmental management practices that apply to the construction and maintenance of roads and asphalt plants in South Africa. It has been structured to cover aspects ranging from the legal basis of environmental management through to the practical implementation of environmental management tools and environmental aspects typical to construction and maintenance of roads and asphalt plants; including the handling of materials, rehabilitation, monitoring, dealing with waste and dealing with authorities, the public and complainants.

The course will equip attendants with a broad overview of environmental management in construction and maintenance of roads and asphalt plants, so that each will be able to deal with most environmental situations in the sector. To achieve this, the course will briefly cover global environmental matters, an outline of the South African environment and South Africa environmental law. before dealing with environmental management at project or site level.

This course is compiled and presented by Etienne Hinrichsen from AquaEco. He holds a four-year BSc.Agric degree from the University of Stellenbosch with majors in Nature Conservation, Genetics and Animal Physiology. He also holds an M.Phil degree, is registered as an Environmental Practitioner with the South African Council for Natural Scientific Professions, is a member of the International Association of Impact Assessors (IAIA), is a member of the Environmental Law Society of South Africa, and has gained more than 20 years' worth of practical experience in environmental management in construction, much of which has been gained in asphalt production and the construction of roads.

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(ii) Objectives and Outcome

The objectives of the short course on environmental management in the construction and maintenance of roads and asphalt plants are:

- To equip the participants with a broad overview of environmental management, but specifically as this applies to the construction and maintenance of roads and asphalt plants.
- To provide a basic understanding of environmental law to the extent that the participants are sensitised to environmental obligations and a framework for reference.
- To heighten the awareness of environmental management as an essential component in the construction and maintenance of roads and asphalt plants.
- To create a general awareness of environmental management to the extent that the participants understand the role and importance of the environmental manager.
- To create an understanding of the environmental tools (EIA's, management plans, audits, method statements) and the interpretation thereof.
- To assist the participants to reach a level of environmental management competence to allow them to understand most environmental situations in the construction and maintenance of roads and asphalt plants.

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(iii) Abbreviations and Acronyms

AEL	Atmospheric Emissions Licence
BA	Basic Assessment
CEMP	Construction Environmental Management Plan
DEA	Department of Environmental Affairs
DEO	Designated Environmental Officer
DWS	Department of Water and Sanitation
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EM	Environmental Manager
EMC	Environmental Monitoring Committee
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development
I&AP	Interested and Affected Party
NEMA	National Environmental Management Act
NEM: AQA	National Environmental Management: Air Quality Act
NEM: WA	National Environmental Management: Waste Act
NWA	National Water Act
OEMP	Operational Environmental Management Plan
PAEL	Provisional Atmospheric Emissions Licence
POS	Plan of Study
ROD	Record of Decision
SAHRA	South African Heritage Resource Agency

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1. Introduction

1.1. Terminology

In understanding "***environmental management***" we need to define the term together with certain key concepts such as "sustainable", "biodiversity", "conservation" and "integrated".

The word "***environment"*** can be defined in many ways but is most commonly used in describing the "natural" environment and means the sum of all living and non-living things that surround us. Environment includes all elements, factors, and conditions - both biotic (living) and abiotic (non-living). Abiotic factors such as light, temperature, water, atmospheric gases combine with biotic factors in a continuous and changing interaction.

The word "***management***" can also be defined in many ways. It can be a process of dealing with or controlling things or people or controlling situations. The act of management is typically an action related to human behaviour and in which control is taken of situations or matters towards bringing about improvements, better functionality, more knowledge, skills, efficiencies and more.

Combing "***environmental***" and "***management***" therefor can be broadly seen as the process in which control is taken over all biotic and abiotic factors with the objective of bringing about improvement. In environmental management this includes taking such steps and actions to allow the environment to function naturally. Some of these steps and actions on a global scale include:

- To reduce world consumption of fossil fuels.
- To reduce and clean up all sorts of pollution.
- Emphasis on clean, alternative energy sources that have low carbon emissions.

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TOWARDS GREENER CONSTRUCTION

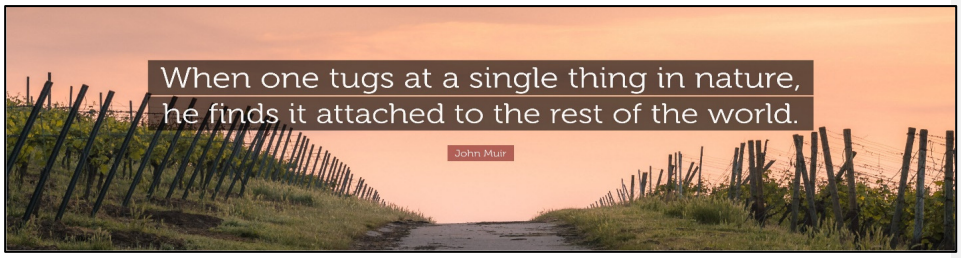
- Sustainable use of water, land, and other resources.
- Conservation of species and protection of biodiversity.

"***Sustainable***" environmental management means to be able to manage or use the environment in a manner that maintains a certain state or by means of conserving a balance to avoid depletion and degradation. To achieve this, the environment must remain diverse and productive over time. A sustainable way of life is one in which human needs are met without diminishing the ability of other people, wild species (the environment), or future generations to survive.

"Biodiversity" is the range (richness) or variation of plant and animal life in the environment and the distribution (evenness) thereof. When undisturbed, the environment tends to maintain as high a level of biodiversity as possible.

The term "***conservation"*** differs from preservation in that conservation refers to upholding the state of a sustainable (and changing) environment as opposed to preservation that means the maintenance of a state without change.

The concept of "***integration"*** is often coupled to environmental management to illustrate the fact that environmental management concepts cannot be dealt with in isolation given the interconnectedness of all environmental aspects. Integration of environmental management is often also used to describe the need or desire to incorporate environmental aspects into traditional fields of technical, financial and business management.



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1.2. Understanding Environmental Services

Environmental services refer to all the qualitative and quantitative life-support functions and goods that we use daily from the land, water, air and the natural systems supported thereby.

Environmental services influence every aspect of our everyday lives and include:

- The food we eat
- Electricity
- Fuel
- The air we breath
- The water we drink

These services all have value and are therefore "**assets**". Basic economic principles dictate that the costs of services (and assets) will be determined by supply and demand. Therefore, the less services we have (nature under pressure) and the higher the demand (growing population), the more services will cost. The first to suffer will be impoverished and marginalised communities.

As the environment deteriorates, the valuable environmental assets or services will become more costly. With many poorer South Africans directly dependent on natural resources (assets) to survive, we can ill afford to let the environment deteriorate to the extent that these assets and services become unattainable to many.

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1.3. The Global Environmental Context

The global environment that we live in has undergone rapid change in recent times. The human population is increasing rapidly, while we as humans continue to place pressure on natural resources and environmental systems.

Forests are being lost, species are rapidly becoming extinct, biodiversity is falling, desertification is accelerating and petroleum reserves from fossil fuels will run out. Global warming is expected to increase the Earth's temperature by 3°C in the next 100 years, resulting in multiple adverse effects on the environment and human society, including widespread species loss, ecosystem damage, flooding of populated human settlements and increased natural disasters.

Under even the most optimistic World Bank and UN population projections, the human population is expected to increase for at least half a century, and industrial activity to increase indefinitely. These projections imply that unless a major famine, plague, war, or other catastrophe occurs to dramatically reduce human numbers and industrial activity, the environmental destruction and species extinction will continue.

The following aspects related to the environmental condition of the Earth have become well know through the Global media:

- Population Growth
- Availability of Water
- Resource Depletion
- Pollution
- Greenhouse Gasses
- Global Warming
- *HIV and Aids (indirect)*
- *Education (indirect)*
- *Economic Growth (indirect)*
- *War (indirect)*

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The condition of the global environment is often reflected or measured in terms of indices, which include:

- Condition of the atmosphere and climate
- Biodiversity and natural heritage conservation
- Level of environmental management
- Human well-being
- Inland water
- Land use types
- Condition of the marine environment, coast and estuaries
- Degree of waste management

worldometers
world statistics updated in real time

1.4. State of the South African Environment

https://soer.environment.gov.za/soer/CMSWebSite/WebIndex.aspx

The South African Environmental Outlook (SAEO, 2016) Report, shows that the South African environment, as in much of the world, is deteriorating.

The report shows that South Africa has made progress in environmental management, but despite this, there have been increasing pressures on our resource base and some aspects of the environment have become critically dysfunctional. The report indicates that there is increasing pressure on the country's natural systems, but that the ability to deal with these pressures is weak. The message is clear: we need to act now, individually and collectively. If we do not act decisively, we run the risk of losing the environmental services that we depend on.

The report contains a significant amount of information, which is grouped into themes, environmental drivers, maps, indicators and emerging issues.

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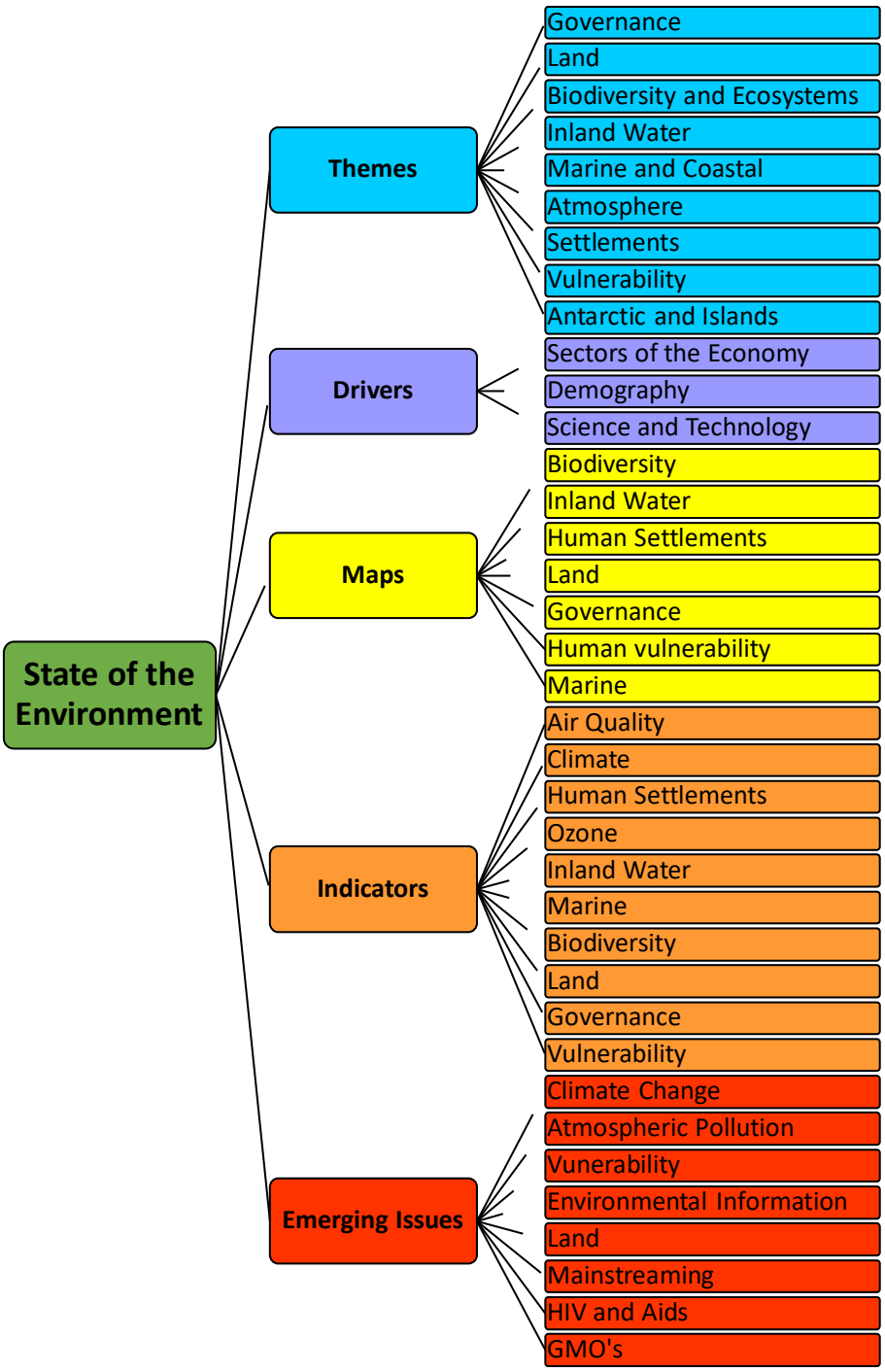
State of the Environment
Themes
Governance
Land
Biodiversity and Ecosystems
Inland Water
Marine and Coastal
Atmosphere
Settlements
Vulnerability
Antarctic and Islands
Drivers
Sectors of the Economy
Demography
Science and Technology
Maps
Biodiversity
Inland Water
Human Settlements
Land
Governance
Human vulnerability
Marine
Indicators
Air Quality
Climate
Human Settlements
Ozone
Inland Water
Marine
Biodiversity
Land
Governance
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Emerging Issues
Climate Change
Atmospheric Pollution
Vunerability
Environmental Information
Land
Mainstreaming
HIV and Aids
GMO's

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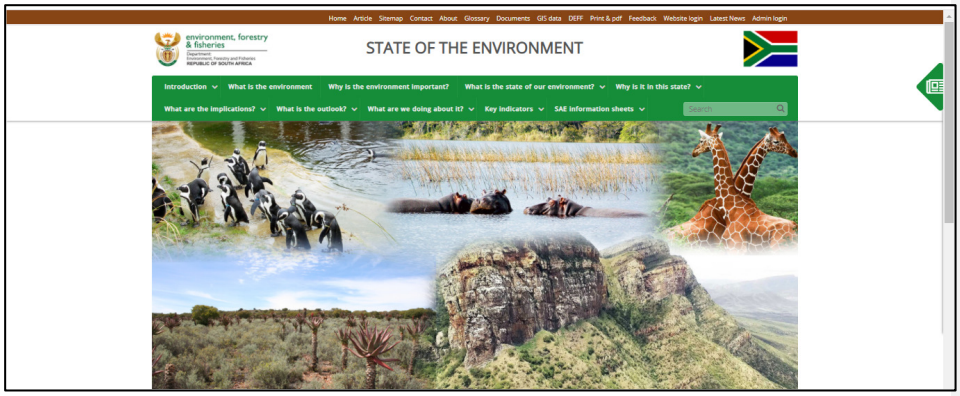
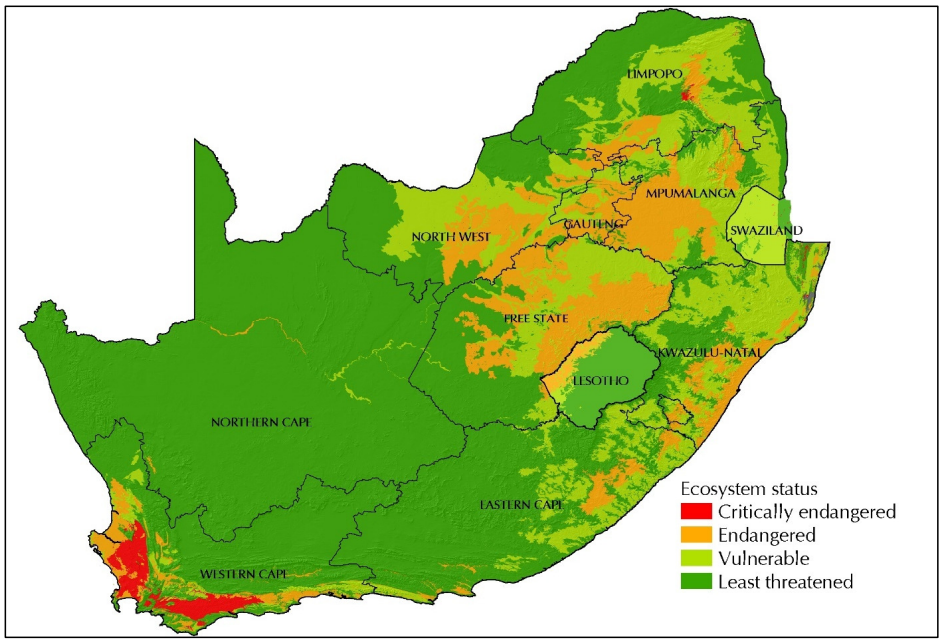


The report (and website) contains much information, some of which is presented to describe the status of an environmental aspect, together with the goal, indicator and progress therein.



SA Ecosystem Status (2016) for the SA Environmental Outlook.

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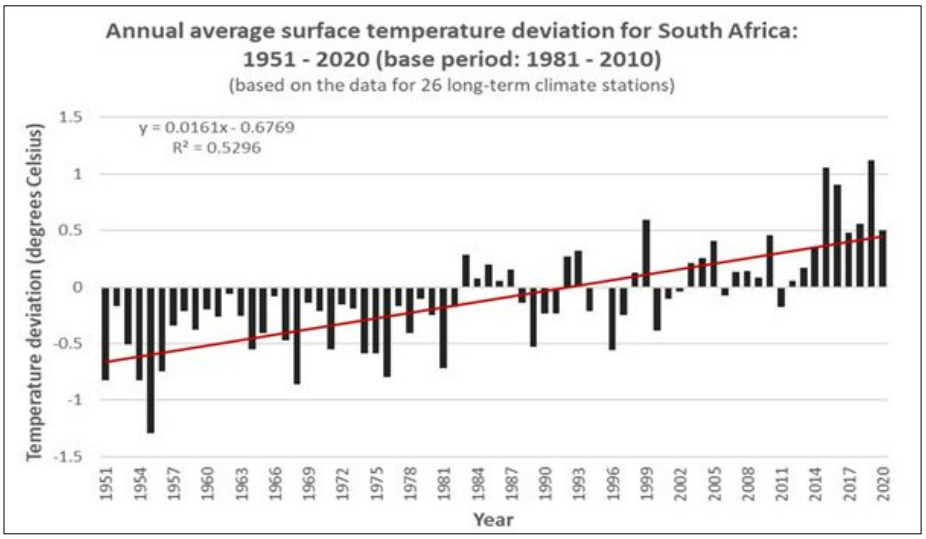
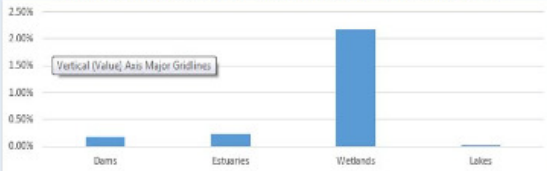


Climate change (temperature data) from the SA Environmental Outlook.

SDG 6.6. 1D1. Extent of water related ecosystems including wetlands, reservoirs, lakes and estuaries as a percentage of total land area.		
STATE	Extent of freshwater ecosystems as a percentage of total land area	OUTLOOK
		
2018 Concern - The current status does not meet policy objectives, targets or standards and/or the trend is negative	Rivers are excluded from the analysis as South Africa does not have rivers that noticeably change in their extent. However, rivers are a key ecosystem type and in future an indicator that measures the trends in river ecosystem integrity will need to be included.	Concern - Policy objectives, targets or standards are unlikely to be met within the next 5 years

Key

Current status			Outlook		
Favourable - The current status meets policy objectives, targets or standards and the trend is stable or positive	**Improving** - Although the current status does not yet meet policy objectives, targets or standards, the trend is positive	**Concern** - The current status does not meet policy objectives, targets or standards and/or the trend is positive	**Good** - Policy objectives, targets or standards are met or exceeded or will be met or exceeded within 5 years and there are no obvious threats to this situation	**Uncertain** - Due to various threats or circumstances, it is unclear whether policy objectives, targets or standards will be met or maintained in the next 5 years	**Concern** - Policy objectives, targets or standards are unlikely to be met within the next 5 years

Extent of water related ecosystems.

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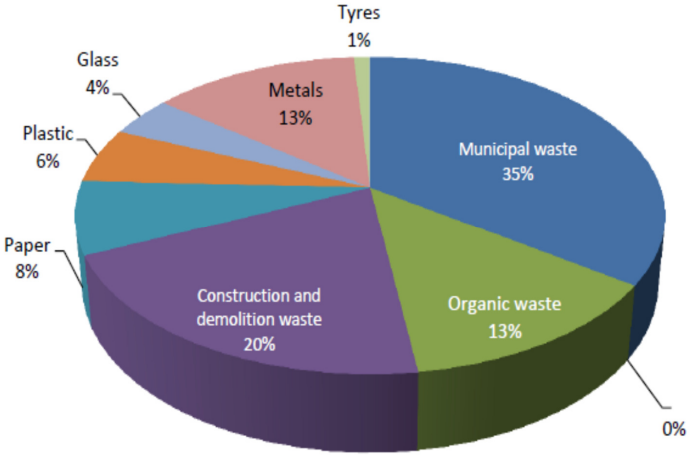
Many other information sources abound with regards to environmental data. A topical area of concern is South Africa (apart from air quality and general environmental degradation), is waste. It was estimated that South Africa generated 59 million tons of waste per annum in 2011, much of which could have been recycled.



Province	kg/capita/annum	Waste generated as % of Total waste
Western Cape	675	20
Eastern Cape	113	4
Northern Cape	547	3
Free State	199	3
KwaZulu Natal	158	9
North West	68	1
Gauteng	761	45
Mpumalanga	518	10
Limpopo	103	3

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AFRICA
ECOLOGICAL
FOOTPRINT
REPORT
Green Infrastructure for Africa's Ecological Security

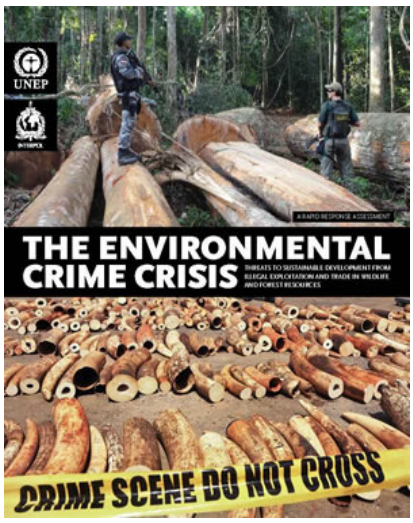
Environmental
Sustainability
Indicators
Technical Report 2009

The State of South Africa's Biodiversity
2012

World Climate Widget
Global Temperature Anomaly
Nov 2014: 0.33°C
Nov CO2: 397.13ppm
Nov montly:
Sunspot #
70.1
Click for more information

ENVIRONMENTAL
SUSTAINABILITY
INDICATORS
Technical report 2011

GREEN economy
Modelling Report of
South Africa


UNEP
THE ENVIRONMENTAL
CRIME CRISIS
CRIME SCENE DO NOT CROSS

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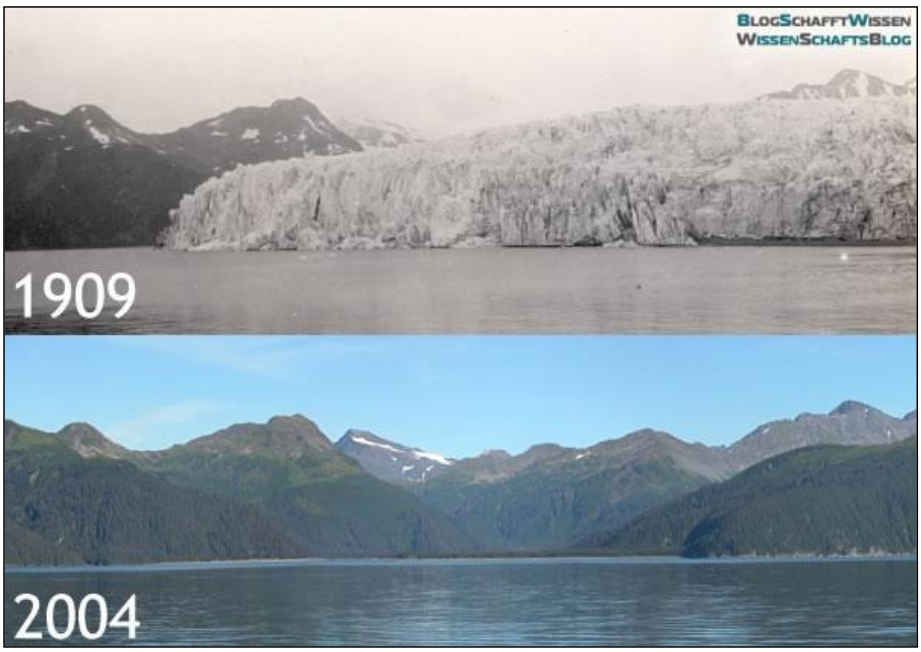
1.5. What is Climate Change?

The key emerging environmental issue is climate change. Worldwide, it is thought to be one of the most important environmental and development issues facing society. Most scientists and governments recognize that, while uncertainties exist, there is strong evidence to suggest that human activities, notably greenhouse gas emissions, are changing the earth's climate and that further change is inevitable.



Although South Africa is still a developing economy, our dependence on coal-driven energy sources and the energy intensive nature of our economy have resulted in an extremely high carbon emission level per unit of gross national product, compared to the rest of the world. We have emission levels equivalent to that of developed nations such as the United Kingdom. We are also located in one of the region's most susceptible and vulnerable to climate change, and we appear already to be experiencing the early effects of global warming and climate variability. Average land and sea surface temperatures have increased, sea level is rising, rainfall patterns have changed, and the intensity and frequency of extreme weather events have increased.

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Projected climate changes in South Africa over the next 50 years indicate that the western parts of the country will become dryer, that certain areas will experience shorter rainfall seasons, and that air temperatures will rise, particularly in the interior. Other potential changes include increased incidence of floods and droughts and more severe temperature inversions, which will exacerbate air pollution problems. Such changes in climate will significantly affect all components of the natural environment, various sectors of the economy, such as agriculture, fishing and tourism, human health, and, therefore, the well-being of all South Africans. Changes in terrestrial ecosystems and species distributions are already being correlated with climatic changes over the sub-continent, and the pace of these changes is expected to accelerate.

Given these risks, addressing the challenge will require a broad range of mitigation and adaptation activities. Mitigation involves reducing emissions, while adaptation involves measures to increase the capability to cope with impacts. While many responses to climate change overlap with those of human vulnerability, several points are worth mentioning.

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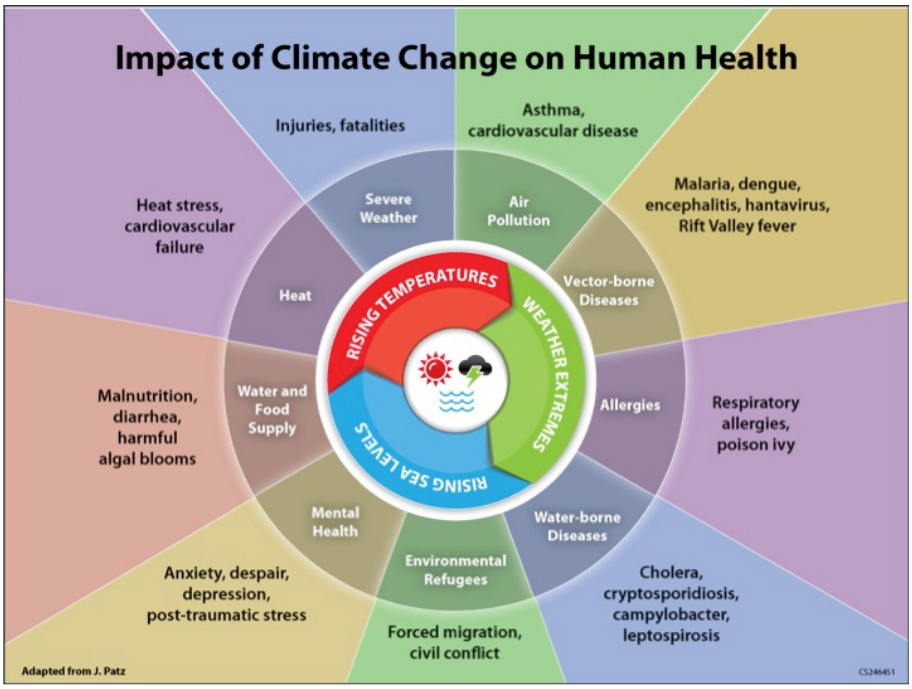
Reducing emissions in South Africa will require improving the sustainability of production and consumption. Economic growth is still firmly linked to energy-intensive resource consumption. Reducing emissions therefore means improving energy efficiency, increasing the use of renewable energy sources, implementing cleaner technologies, and moving toward a zero-waste economy. As yet, too little attention has been paid to large-scale energy efficiency and renewable energy interventions. A strong drive to develop cost-effective alternative sources of energy is required. This should include providing solar, wind, wave, hydrogen, nuclear, and biomass alternatives via a decentralized network of energy generation entities.

No mitigation effort, no matter how rigorous, will prevent the climate from changing. Adaptation is therefore an essential component of our response strategy. It will require strategies that are linked to planning and decision-making processes at all levels.



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1.6. Why Look After the Environment?

There are many reasons why each person should look after the environment. Some important reasons include:

- It saves money because environmental services cost money
- It keeps us healthy
- It creates business and employment
- It leaves a legacy and resources for our children
- A clean environment reflects who you are
- It creates an orderly society
- It prevents natural disasters and epidemics

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2. Basic Overview of Environmental Law

2.1. The Constitution and NEMA

In South Africa, the conservation and management of the environment is underpinned by various laws. In 1994 the new Constitution established the environment as a fundamental right in the Bill of Rights, which is the cornerstone of democracy in South Africa. The Bill enshrines the rights of all people and affirms the democratic values of human dignity, equality, and freedom.

Examples of Rights contained in the South African Bill of Rights

- Equality
- Human Dignity
- Life
- Freedom and Security
- Privacy
- Freedom of Expression
- Citizenship
- Freedom of Movement

The state must respect, protect, promote, and fulfil these rights. Amongst others, this means that all of Government's actions must be in accordance with this right, including the laws it makes and every action it takes.

Private persons, including citizens, companies and associations must also act in accordance with the right. The Constitutional Court can set aside a law which goes against this right and courts can set aside the actions of Government or the public where they break this law or impinge on this right.

The South African Constitution (1996) provides for the right of each person (and for future generations):

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
    - prevent pollution and ecological degradation;
    - promote conservation; and
    - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

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To give effect to these Constitutional Rights the National Environmental Management Act (Act 107 of 1998) (NEMA) was developed and promulgated as the primary environmental legislation for South Africa. NEMA protects the Rights of each South African to an environment that is not harmful to health and well-being. In this context the environment is defined as the natural environment and the physical, chemical, aesthetic and cultural properties of it that influence human health and well-being.

NEMA is broadly based on a set of "environmental principles". Environmental principles guide Government in environmental management. These principals are:

- Environmental management must put people and their needs at the forefront and must serve their interests fairly.
- Development must be socially, environmentally, and economically sustainable. This means that the following things must be considered before there is development:
    - Disturbance of eco-systems and loss of biodiversity.
    - Pollution and degradation of the environment.
    - Disturbance of landscapes and sites where the nation's cultural heritage is found.
    - Production of waste must be minimised or avoided.
    - Non-renewable resources must be used responsibly.
    - The precautionary principle must be applied.
    - Negative impacts must be anticipated and prevented and if they can't be prevented, they must be minimized or remedied.
- Environmental management must be integrated.
- The best practical environmental option must be pursued.
- Environmental justice must be pursued so that there is not unfair discrimination in the way that negative environmental impacts are distributed.
- There should be equitable access to environmental resources, benefits, and services to meet basic human needs. Special measures may be taken to ensure access for persons disadvantaged by unfair discrimination.
- Responsibility for environmental health and safety of any policy, programme or project must continue throughout the life cycle of a project.

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- Public participation in environmental decision making must be promoted. The participation of vulnerable and disadvantaged groups must be ensured.
- Decisions must take into account the interests, needs and values of all interested and affected parties. This includes recognizing all forms of knowledge including traditional and ordinary knowledge.
- Community well-being and empowerment must be promoted through environmental education.
- The social, economic, and environmental impacts of the activities must be assessed.
- The right of workers to refuse to do work that is harmful to human health or the environment and to be informed of dangers must be respected.
- Decisions must be taken in an open and transparent manner and access to information provided in accordance with the law.
- There must be inter-governmental co-ordination and harmonisation of policies and laws.
- Actual or potential conflicts of interest between organs of state must be resolved through conflict resolution procedures.
- Global and international responsibilities relating to the environment must be discharged in the national interest.
- The environment is held in a public trust for the people, and the use of environmental resources must serve the public interest and be protected as the people's common heritage.
- The polluter must pay for the costs of remedying pollution, environmental degradation, and adverse health impacts.
- The vital role of youth and women in environmental management must be recognized and their full participation promoted.
- Sensitive or stressed eco systems must receive special attention in planning which might affect them especially when they are subject to significant resource usage and development pressure.

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Further important notes related to NEMA are:

- NEMA helps protect the environment by making stakeholders look at all the effects ("environmental impacts") that a development can have before it is allowed to go ahead.
- NEMA protects workers who refuse to do work that might harm the environment.
- NEMA protects people who blow the whistle (give information) about others who are harming the environment.
- NEMA makes it easier for us to solve problems and disagreements ("conflict resolution" and "conciliation") related to environmental matters.
- NEMA makes it less risky for you to go to court to protect your rights when other ways of solving problems have not worked.
- NEMA guarantees you access to government information about the state of the environment, actual or future threats and hazardous waste, if your request is reasonable.

NEMA allows any person to take legal action if:

- Someone, including government has broken an environmental law.
- Government has not obeyed a principle of NEMA in an action that may significantly affect the environment.
- Government has given permission for an activity or development that significantly affects the environment without properly checking how it could affect the environment, the society, and our cultural heritage.
- Someone, including government has caused significant pollution or degradation of the environment.
- You have been punished, disciplined or threatened for refusing to do work that might harm the environment or for blowing the whistle (i.e. giving information) about how someone is harming the environment.
- A major accident that threatens the public has happened and there has not been a proper report about it or a clean-up.
- The state has not prosecuted a person for breaking an environmental law, and you believe that he/she might be guilty.

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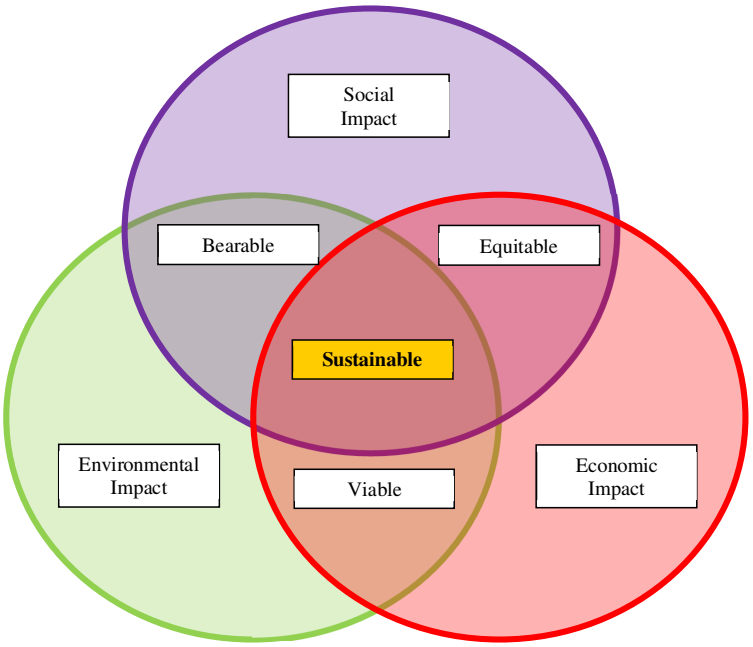

The triple bottom line of sustainability as promoted by NEMA

NOTES

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2.2. The Air Quality Act

The National Environment Management: Air Quality Act (Act 39 of 2004) or NAM: AQA has repealed the Atmospheric Pollution Prevention Act (previously the basis for the issue of Registration Certificates / APPA permits) and provides for measures for the management of the nation's air quality. The regulations promulgated in terms of the act provide for procedures to have certain activities that influence air quality to be authorised and sets the minimum air quality standards and methods for monitoring of these (Government Notice 893 of 2013) in various categories:

- Combustion Installations
- Petroleum Industry
- Carbonisation and Coal Gasification
- Metallurgical Industry
- Mineral Processing, Storage and Handling
- Organic Chemicals Industry
- Inorganic chemicals Industry
- Disposal of Hazardous and General Waste
- Pulp and Paper Manufacturing Industries
- Animal Matter Processing

Listed emission activities have been identified in terms of Section 21 of the NAM: AQA, together with the associated minimum air quality standards (Government Notice 893 of 22 Nov 2013):

A Macadam process refers to the making of road and related surfaces by means of compressed layers of stone bound by asphalt (after the inventor John Macadam 1756 – 1836).

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Government Notice 893 of 22 Nov 2013

Subcategory 2.4: Storage and Handling of Petroleum Products

- Determining factor for licencing is storage of 1 000 cubic meters of petroleum product.
- Greater than 14 kPa – leak detection and repair programme approved by licencing authority.
- Storage greater than 1 000 cubic meters:

True vapour pressure of contents at product storage temperature	Type of tank or vessel
Type 1: Up to 14 kPa	Fixed-roof tank vented to atmosphere, or as per Type 2 and 3
Type 2: Above 14 kPa and up to 91 kPa with a throughput of less than 50'000 m³ per annum	Fixed-roof tank with Pressure Vacuum Vents fitted as a minimum, to prevent "breathing" losses, or as per Type 3
Type 3: Above 14 kPa and up to 91 kPa with a throughput greater than 50'000 m³ per annum	a) External floating-roof tank with primary rim seal and secondary rim seal for tank with a diameter greater than 20m, or b) fixed-roof tank with internal floating deck / roof fitted with primary seal, or c) fixed-roof tank with vapour recovery system.
Type 4: Above 91 kPa	Pressure vessel

- Control of Total Volatile Organic Compounds (TVOC) in loading or offloading in units of greater than 14 kPa **and** with a throughput of greater than 50 000 m³ per annum by means of vapour recovery/destruction unit:

Description:	Vapour Recovery Units		
Application:	All loading/ offloading facilities with a throughput greater than 50 000 m³		
Substance or mixture of substances		**Plant status**	**mg/Nm³ under normal conditions of 273 Kelvin and 101.3 kPa.**
Common name	**Chemical symbol**		
Total volatile organic compounds from vapour recovery/ destruction units using thermal treatment.	N/A	New	150
		Existing	150
Total volatile organic compounds from vapour recovery/ destruction units using non-thermal treatment.	N/A	New	40 000
		Existing	40 000

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- Where throughput is less than 50 000 m^3, bottom loading must be used with a venting pipe connected to a vapour balancing g system or a VOC recovery system with 95% efficiency.

Government Notice 893 of 22 Nov 2013

Subcategory 5.10: Macadam Preparation

Description:	The production mixtures of aggregate and tar or bitumen to produce road surfacing in permanent facilities and mobile plants.		
Application:	All plants.		
Substance or mixture of substances		**Plant status**	**mg/Nm³ under normal conditions of 273 Kelvin and 101.3 kPa.**
Common name	**Chemical symbol**		
Particulate matter	N/A	New	50
		Existing	120
Sulphur dioxide	SO_2	New	1000
		Existing	1000
Total volatile organic compounds from vapour recovery/ destruction units (Thermal treatment).	N/A	New	150
		Existing	150

Government Notice 201 of 28 March 2014

Declaration of Temporary Asphalt Plants as Controlled Emitters

- A temporary asphalt plant is used for the sole purpose of supplying asphalt for a specific road paving contract not exceeding a period of 24 months.
- Measuring and reporting requirements remain in force.

Description	The production mixtures of aggregate and tar or bitumen to produce road surfacing in temporary asphalt plants.		
Application	All temporary asphalt plants.		
Substance or mixture of substances		**Plant status**	**Limit value (dry mg/ Nm³ at 273K and 101.3kPa**
Common name	**Chemical/ Commonly-used symbol**		
Particulate matter	N/A	New	50
		Existing	120
Sulphur dioxide	SO_2	New	1000
		Existing	1000
Total volatile organic compounds from vapour recovery or thermal destruction units.	N/A	New	150
		Existing	150

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Government Notice 827 of 01 Nov 2013

National Dust Control Regulations

- Dust means any material composed of particles small enough to pass through a 1 mm screen and large enough to settle by their weight into the sampling container from the ambient air.

Restriction Areas	Dustfall rate (D) (mg/m²/day, 30-days average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months.
Non-residential area	600 < D < 1200	Two within a year, not sequential months.

- Dust generation in excess of the above (even if suspected by the air quality officer) triggers the need for a dust fall monitoring programme:
  - Identified monitoring points for ambient and contributed dust.
  - Annual monitoring report to air quality officer (or in terms of timeframes stipulated) and as per stipulated content.
  - Dust management programme as per stipulated content.
- If found guilty:
  - First offence = R 5 million / 5 years
  - Second offence = R 10 million / 10 years

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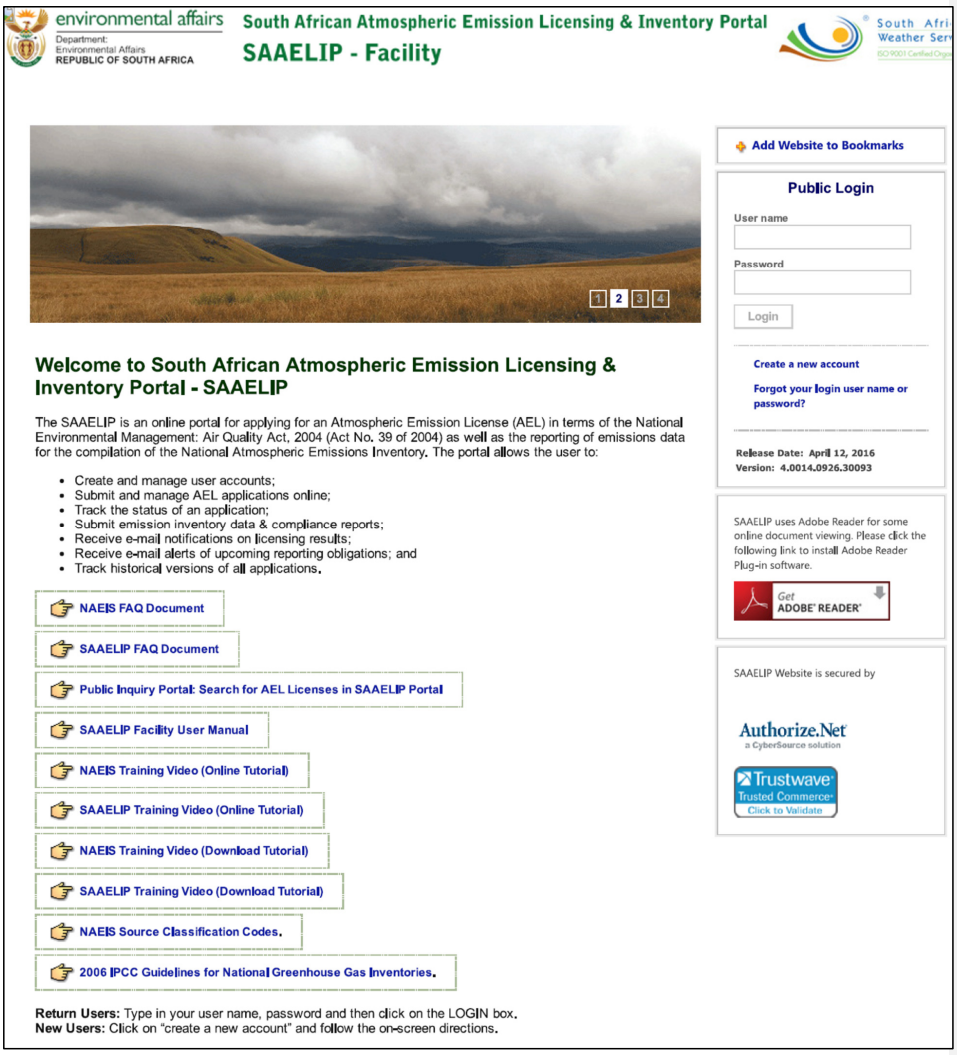
Government Notice 283 and 284 of 02 April 2015

National Atmospheric Emission Reporting Regulations

The purpose of these Regulations is to regulate reporting of data and information from an identified point, non-point and mobile sources of atmospheric emissions to an internet-based National Atmospheric Emissions Inventory System (NAEIS) towards the compilation of atmospheric emission inventories.



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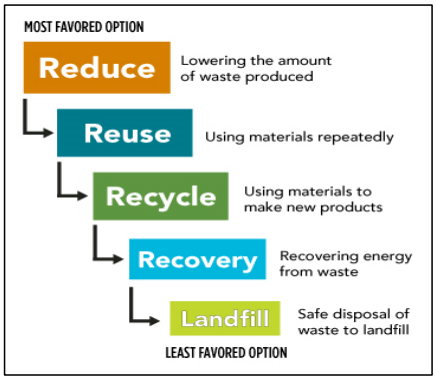
2.3. The Waste Act

The National Environment Management: Waste Act (Act 59 of 2008) provides for measures for the management of the nation's waste.

This act and associated regulations provide for procedures to have certain waste activities authorised (Government Notice 921 of Nov 2013):



Category A: Example of waste activities requiring Basic Assessment (see EIA process in Section 4) (not all activities included in these notes):

Storage of waste

- The storage of general waste in lagoons.

Recycling or recovery of waste

- The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1 000 m2.
- The recycling of general waste at a facility that has an operational area in excess of 500m2, excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.
- The recycling of hazardous waste in excess of 500kg but less than 1 ton per day calculated as a monthly average, excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises

Treatment of waste

- The treatment of general waste using any form of treatment at a facility that has the capacity to process in excess of 10 tons but less than 100 tons.

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Disposal of waste

- The disposal of domestic waste generated on premises in areas not serviced by the municipal service where the waste disposed exceeds 500kg per month.

Category B: Example of waste activities requiring Scoping and EIA (see EIA process in Section 4) (not all activities included in these notes):

Storage of hazardous waste

- The storage of hazardous waste in lagoons, excluding storage of effluent, wastewater or sewerage.

Reuse, recycling or recovery of waste

- The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.

Treatment of waste

Disposal of waste on land

Category C: Example of waste activities controlled by standards determined by the Minister (not all activities included):

Storage of waste

- The storage of general waste at a facility that has the capacity to store in excess of 100m3 of general waste at any one time, excluding the storage of waste in lagoons or temporary storage of such waste.
- The storage of hazardous waste at a facility that has the capacity to store in excess of 80m3 of hazardous waste at any one time, excluding the temporary storage of such waste.
- The storage of waste tyres in a storage area exceeding 500m2.

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Government Notice 634 of 22 Aug 2013
Waste Classification and Management Regulations

- For waste management activities that do not need licencing.
- Stipulated wastes that required classifications and hazardous wastes that require a waste manifest.
- (Annexure 1: (2)(a)(vii) "*building and demolition waste not containing hazardous waste or hazardous chemicals*", to be considered together with classification of bitumen (Appendix F), means that Reject Asphalt Product (RAP) does not require licencing or classification. This is open to interpretation.

NOTES

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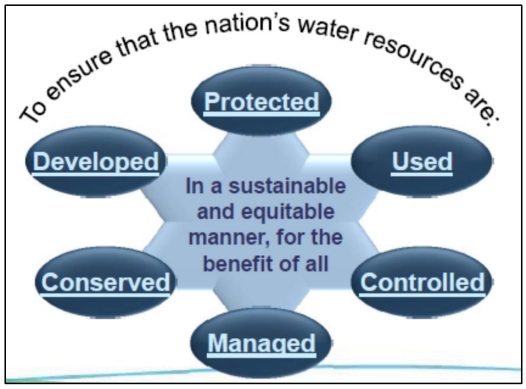
2.4. The National Water Act

The National Water Act (Act 36 of 1998) (NWA) provides for fundamental reform of the law relating to water resources. This Act recognises the following basic principles:



- That water is a scarce and unevenly distributed national resource which occurs in many different forms which are all part of a unitary, inter-dependent cycle.
- That while water is a natural resource that belongs to all people, the discriminatory laws and practices of the past have prevented equal access to water and use of water resources.
- That the Government carries the overall responsibility for and authority over the Nation's water resources and its use, including the equitable allocation of water for beneficial use, the redistribution of water, and international water matters.
- That the aim of water resource management is to achieve the sustainable use of water for the benefit of all users.
- That the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users.
- The need for the integrated management of all aspects of water resources and, the delegation of management functions to a regional or catchment level.

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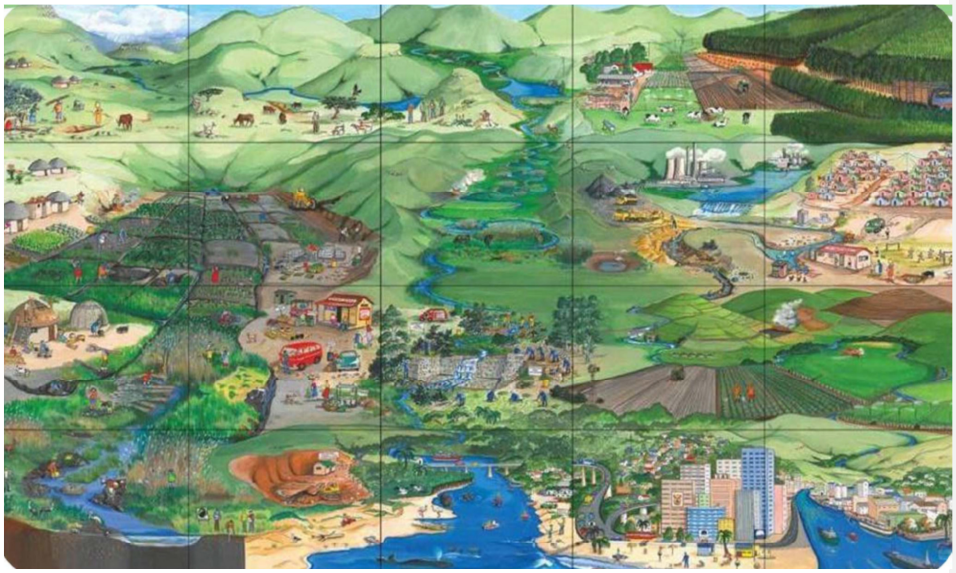

In terms of Section 21 of the NWA a water use means any one of the following:

a) taking water from a water resource (*abstraction*)
b) storing water
c) impeding or diverting the flow of water in a watercourse
d) engaging in a stream flow reduction activity (*for example commercial forestry*)
e) engaging in a controlled activity (*activities which impact detrimentally on a water resource, for example irrigating land with water containing waste*)
f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit
g) deposing of waste in a manner which may detrimentally impact on a water resource
h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generating process
i) altering the beds, banks, course or characterises of a watercourse (*changing the physical structure, obstructing or diverting the flow of water in a watercourse*)
j) removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons
k) using water for recreational purposes

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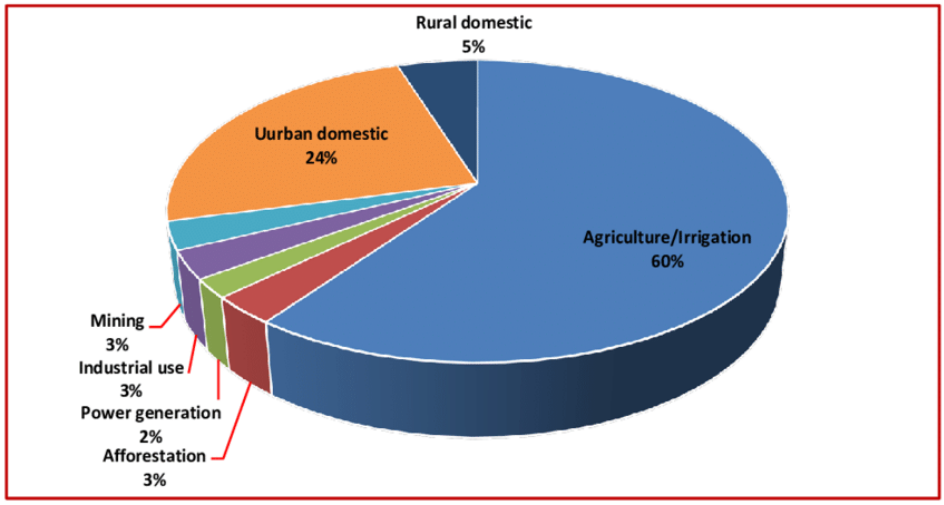

Use of water by major economic sectors in South Africa, 2015 (Source: DWS [11]).

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All water uses outside of that for basic human needs (and to maintain the reserve), requires authorisations by the DWS or a Catchment Management Agency by one of the following means:

Type	Description	Link to relevant documentation
Schedule 1 - permissible use of water	A person may, subject to this Act - ✓ S1(1)(a): take water for reasonable domestic use in that person's household, directly from any water resource to which that person has lawful access; ✓ S1(1)(b): take water for use on land owned or occupied by that person, for - ✓ S1(1)(b)(i): reasonable domestic use; ✓ S1(1)(b)(ii): small gardening not for commercial purposes; and ✓ S1(1)(b)(iii): the watering of animals (excluding feedlots) which graze on that land within the grazing capacity of that land, from any water resource which is situated on or forms a boundary of that land, if the use is not excessive in relation to the capacity of the water resource and the needs of other users; ✓ S1(1)(c): store and use run-off water from a roof; ✓ S1(1)(d): in emergency situations, take water from any water resource for human consumption or firefighting; ✓ S1(1)(e): for recreational purposes - ✓ S1(1)(e)(i): use the water or the water surface of a water resource to which that person has lawful access; or ✓ S1(1)(e)(ii): portage any boat or canoe on any land adjacent to a watercourse in order to continue boating on that watercourse; and ✓ S1(1)(f): discharge - ✓ S1(1)(f)(i): waste or water containing waste; or ✓ S1(1)(f)(ii): run-off water, including stormwater from any residential, recreational, commercial or industrial site, into a canal, sea outfall or other conduit controlled by another person authorised to undertake the purification, treatment or disposal of waste or water containing waste, subject to the approval of the person controlling the canal, sea outfall or other conduit. **Water users in this category can commence with their activities without informing the Department**.	https://www.dws.gov.za/iwqs/nwa/tmp_Schedule_1.html
Existing Lawful Use	Existing Lawful Water Use (ELU) means the use of water authorization by or under any law that took place at any time for a period of two years before the commencement of the NWA, 1998. These ELU descriptions can be found within the National Water Act – Section Number 32 – 35. These sections refer to the following:	http://www.energy.gov.za/files/policies/act_nationalwater36of1998.pdf

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	✓ 32.: Definition of existing lawful water use ✓ 33.: Declaration of water use as existing lawful water use ✓ 34.: Authority to continue with existing lawful water use ✓ 35.: Verification of existing water uses An Existing Lawful Water Use, with any conditions attached, is recognised but may continue only to the extent that it is not limited, prohibited or terminated by this Act. No license is required to continue with an Existing Lawful Water Use until a responsible authority requires a person claiming such an entitlement to apply for a license. If a license is issued it becomes the source of authority for the water use. If a license is not granted the use is no longer permissible. **This authorization requires a registration with the Department.**	
General Authorisation	There is a Government Notice (GN) for each water use activity which sets the limits and conditions for which a water use is permissible under general authorisation (GA). A general authorisation replaces the need for a water user to apply for a full water use licence in terms of Section 21 of the NWA. There are several documents which refer to the GA processes and offer advice on when an activity constitutes as a GA. These factors may vary depending on the type of operation, impact of the activity, area and quaternary catchment the specific operation fall within. The links to all the relevant GN notices are added in the column to the right.	GN538 - https://cer.org.za/wp-content/uploads/2010/05/National-Water-Act-1998-36-1998-Revision-of-General-Authorisation-for-the-taking-20160902-GGN-40243-00538.pdf GN509 - https://cer.org.za/wp-content/uploads/2010/05/General-Authorisation.pdf GN665 - https://cer.org.za/wp-content/uploads/2010/05/General-Authorisation.pdf
Water Use License	Section 21 of the NWA lists all water use activities that require a water use license (WUL) and are subject to a water use license application (WULA) process and is required if: ✓ the water use exceeds the parameters of Schedule 1; ✓ the water use took place or is planned to take place after 1998 (new water use);	http://www.energy.gov.za/files/policies/act_nationalwater36of1998.pdf

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	✓ the water use exceeds the parameters set out in the General Authorisation Government Notice. ✓ The impacts of the activity in question has a medium to high impact rating (DWS Risk Matrix). The water use License process is generally done according to the following 3 steps: **Step 1 - Pre-Application process**: This is done when your pre-application enquiry is received. This is a step where the Department determines and advises you on the information required to compile a water use licence application technical report to support the application. The determination of information requirements will be based on the information contained on the form or the site inspection, if required. Applicants may be requested to advertise the proposed water use, or to invite interested and affected parties to comment. You will be required to provide a complete application on the day of submission which includes the application fee (R 115.00). **Step 2 - Screening:** This is the screening of the Technical Report resulting in the acceptance or rejection thereof. **Step 3 - Processing and Finalising:** This includes the assessment of the Technical Report where the information is evaluated by specialist groups and recommendation to the Delegated Authority for a decision. After considering all the relevant information, the Delegated Authority will decide on whether to approve the application. The Regional Office starts with the implementation of the licence, including issuance and highlighting any conditions that might be attached to the water use licence. An application for a water use licence can take up to 90 days to process, depending on the complexity of the application, its benefits to the nation, and its possible impacts. Generally, low impact, high value licence applications will be processed quicker.	

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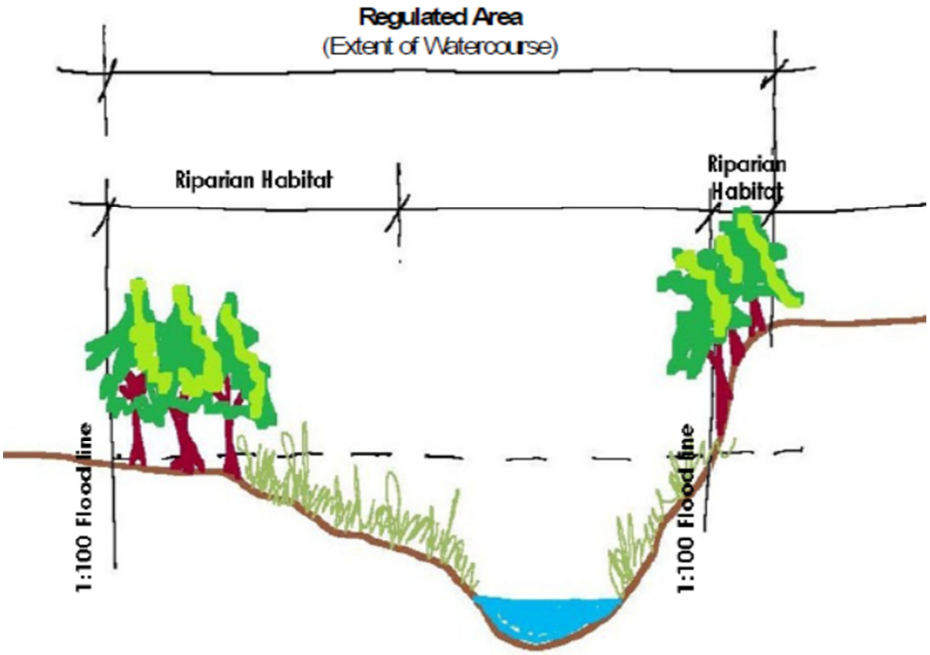
What is a watercourse or the regulated area (Section 21 c&i):

Extent **and** 'Regulated Area' =
Outer edge of the Riparian habitat / 1:100 flood line (whichever is greatest)

'Regulated Area' =
Within 500 m radius from the **boundary (extent)** of a wetland



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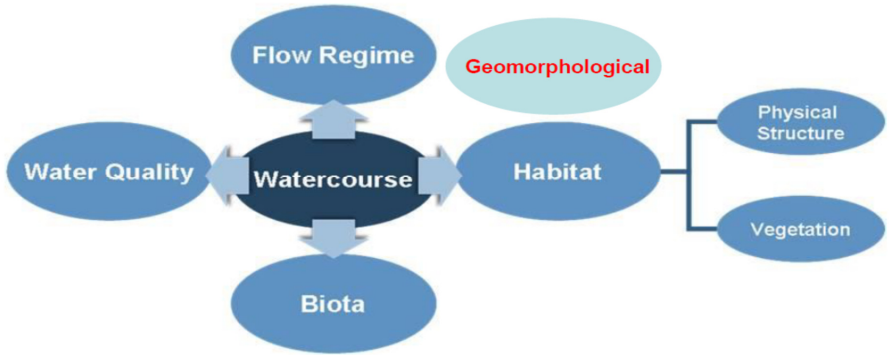
What are the elements of ecological sensitivity in a watercourse (Section 21 c&i):



The Risk Matrix for Section 21 c&i

					Severity							
No.	Phases	Activity	Aspect	Impact	Flow Regime		Physico & Chemical (Water Quality)		Habitat (Geomorph+Vegetation)		Biota		Severity
1													

Severity	Spatial scale	Duration		Consequence		Frequency of activity	Frequency of impact	Legal Issues	Detection		Likelihood	Significance	Risk Rating
													L

Risk Rating	Confidence level	Control Measures	Borderline LOW MODERATE Rating Classes	PES AND EIS OF Watercourse
L				

RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

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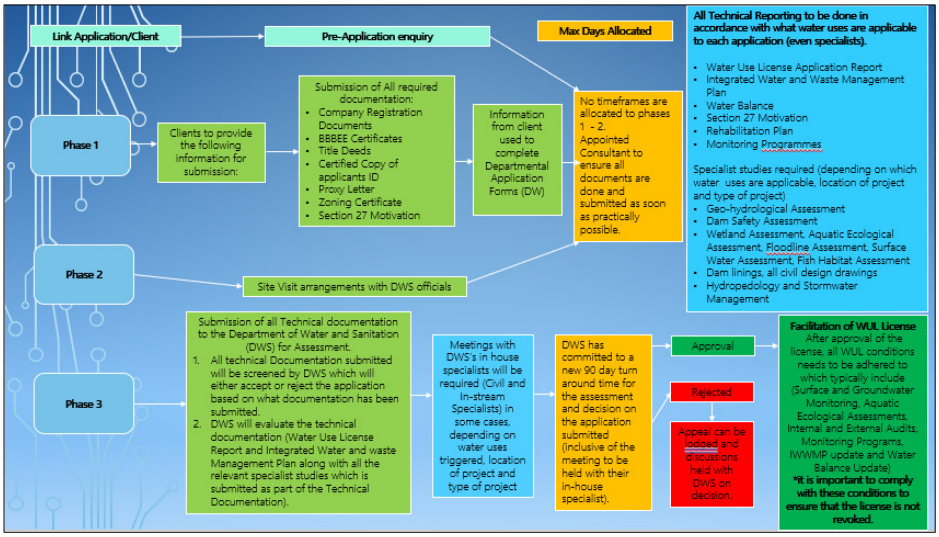
Important considerations in terms of General Authorisation for Section 21 c&i

- General Authorisation applies to **Low Risk** profile – registration is required.
- SANRAL and other Provincial Departments of Transport or Municipalities: All maintenance of bridges over rivers, streams and wetlands and new construction of bridges done according to SANRAL Drainage Manual or similar norms and standards.
- General Authorisation can be applied in emergency situations
- Conditions, monitoring and rehabilitation measures still apply.

Licencing of Section 21 Water Uses



Water Use License Application (WULA) Process Flow Chart.

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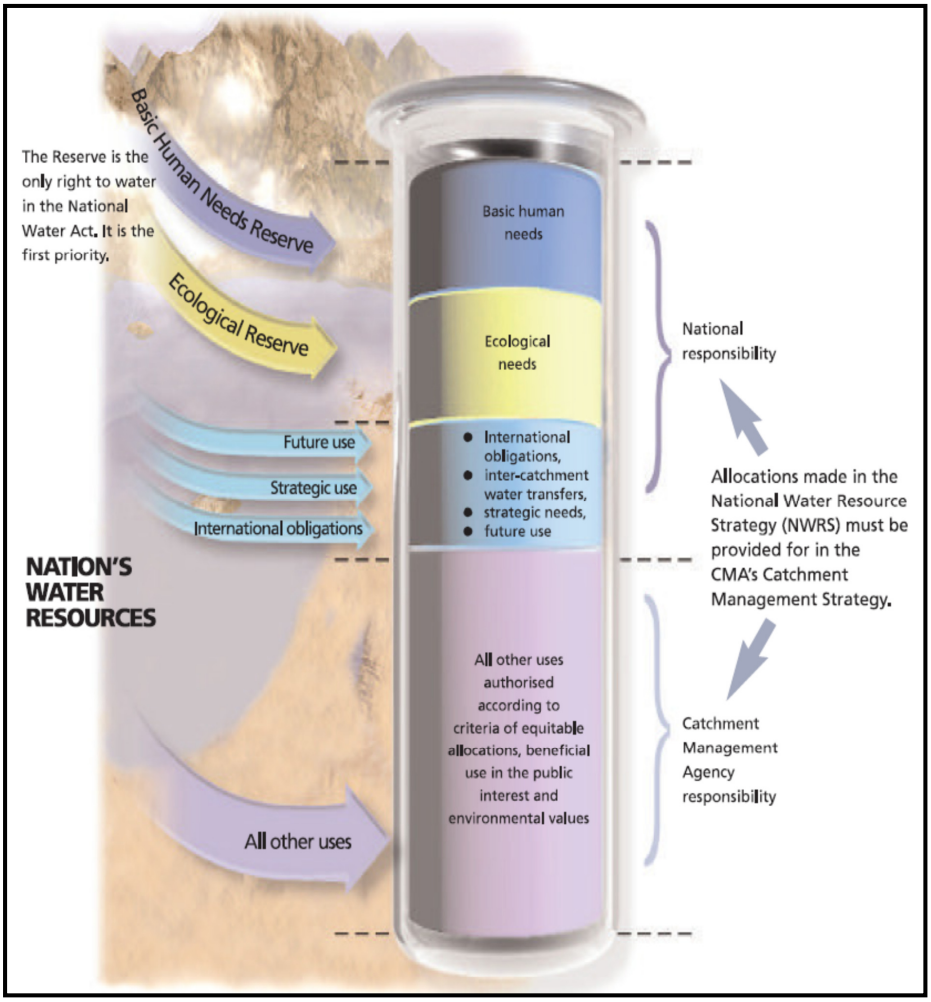

2.5. Mineral and Petroleum Resources Act

The Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) came into effect on May 1, 2004 and governs the manner in which mineral and petroleum resources in South Africa are managed, mined and developed. There are four principal authorizations available under the MPRDA with respect to minerals - a reconnaissance permission, a prospecting right, a retention permit, and a mining right.

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Of importance in terms of construction on roads is that the development, use and rehabilitation of **quarries** and **borrow pits** require a mining permit or right.

In summary, a **mining permit** is applicable when (Section 27(6) of the MPRDA):

- The mining can be done in a 2-year period (renewable for an effective 3 x 1 years thereafter).
- The mining will be done over less than 5 ha in extent.

Application for mining permits are made to regional offices of the Department of Mineral Resources (DMR) and will be issued for a specific mineral if no other permit has been issued for the land and provided the following documents is in order.

- Details of the land and a plan as prescribed by the MPRDA.
- Financial and technical competence in mining as well as for environmental mitigation and rehabilitation.
- Title deeds for the land.
- Details of the mineral and quantity to be removed.
- Identity document and / or business registrations
- An **environmental management plan**; and
- Details of notifications and consultation with the landowner and other stakeholders.

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Note that the competency for the environmental aspects of a mining permit now lies with the Department of Environmental Affairs. The need for a Basic Assessment is triggered by a mining permit:

Activity 21 in GN 327 (Listing Notice 1):
Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource including activities for which an exemption has been issued.

Activity 22 in GN 327 (Listing Notice 1):
The decommissioning of any activity requiring -
(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or
(ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure.

The Department of Mineral Resources and Energy (old DMR) provides several guidelines and templates in the application for mining permits. These include:

- Guidelines for the stakeholder consultations process
- Guidelines for the environmental management plan
- Template for providing the financial and technical competence
- Template: Environmental Management Plan for Small Scale Mining
- Template: Report on Results of Consultation.

In summary a **mining right** is applicable when (Section 23(1) of the MPRDA):

- The mining will be done over an extended period (valid for up to 30 years and application for renewal also possible).
- The mining area is bigger than 5 ha in extent.

Application for mining rights are made to regional offices of the Department of Mineral Resources (DMR) and will be issued for a specific mineral if no other right has been issued for the land and provided the following documents is in order:

- Details of the land and a plan as prescribed by the MPRDA.
- A mining work programme
- Technical competence in mining (according to mining works programme) as well as for environmental mitigation and rehabilitation.
- Financing plan.
- Title deeds for the land.
- List of existing mining rights.
- Social and Labour Plan, including BEE information.
- Details of the mineral and quantity to be removed.
- Identity document and / or business registrations
- An **Environmental Scoping Report and management plan**; and
- Details of notifications and consultation with the landowner and other stakeholders.

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Note that the competency for the environmental aspects of a mining right now lies with the Department of Environmental Affairs. The need for a Full Scoping and EIA is triggered by a mining right:

Activity 17 in GN 325 (Listing Notice 2):
Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

Note that closure is still subject to Activity 22 in GN 327 (Listing Notice 1).

The DMR provides several guidelines and templates in the application for mining permits. These include:

- Guidelines for the mining work programme (including closure and rehabilitation).
- Guidelines for the environmental management programme
- Guidelines for the Scoping Report
- Guidelines for the Social and Labour Report
- Template for the work programme template
- Template for providing the financial and technical competence
- Template: Environmental Management Programme
- Template for Scoping
- Template for BEE
- Template for the Social and Labour Plan

When mining rights are issued, mining must commence with one year or as otherwise authorised. DMR also require an annual report form the holder of a mining right.
When quarries are closed and rehabilitated it is necessary to obtain a closure certificate from the regional DMR office.

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2.6. Other Legislation

Other environmental legislation of importance includes:

- The National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003).
- The National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- The National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008).
- The National Forrest Act, 1998 (Act 84 of 1998).
- Hazardous Substances Act, 1973 (Act 15 of 1973).
- National Veld and Forrest Fire Act, 1998 (Act 101 of 1998).
- Occupational Health and Safety Act, 1993 (Act 85 of 1993).
- The National Heritage Resources Act, 1999 (Act 25 of 1999).
- The National Road Traffic Act, 1996 (Act 93 of 1996).
- The South African National Roads Agency Limited and National Roads Act, 1998 (Act 7 of 1998).

Apart from this National legislation there are numerous Provincial environmental frameworks. As an example, such Provincial frameworks for Gauteng include:

- Nature Conservation Ordinance, 1983 (Ordinance12 of 1983).
- Gauteng Planning and Development Act, 2003 (Act 3 of 2003).
- Noise Control Regulations, 1999.
- Nature Conservation Regulations, 1983.
- Waste Information Regulations, 2004.

As with the Provincial frameworks, consideration also needs to be given to Local (Municipal) regulations and bylaws, especially in terms of waste and land use matters.

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3. The Environmental Impact Assessment

NEMA is set to action through several regulations. In terms of the construction and development environment the most important regulations are the so-called EIA regulations that identify activities subject to an EIA and which explain the EIA methodology.

The EIA is both a process and a tool for planning and decision-making. In this regard it aims to:

- Integrate environmental considerations into development planning, thereby promoting sustainable development;
- Ensure that environmental and socio-economic benefits and costs of economic development projects are properly accounted for;
- Ensure that unwarranted negative impacts are avoided or mitigated at an early stage in the planning process;
- Ensure that potential benefits are identified and enhanced;
- Carry out environmental and social evaluations of projects in parallel with analyses of technical and economic feasibility;
- Ensure that decision makers are provided with information on environmental costs and benefits to complement information on technical and economic feasibility at key decision points in the development of the project;
- Ensure that all the interested and affected parties participate in the process;
- Provide a framework to carry out mitigation and monitoring;
- Promote inter-sectoral and intra-sectoral linkages; and
- Conserve the social, historical and cultural values of the people and their communities.

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3.1. Definitions

The EIA regulations (as amended in Government Notice 326, 327, 325, 324 in April 2017) define certain definitions that relate directly to the development and maintenance of roads. These definitions are:

"associated structures, infrastructure and earthworks"

means any structures, infrastructure or earthworks, including borrow pits, that is necessary for the development and functioning of a facility or activity.

"dangerous goods" *means goods containing any of the substances as contemplated in South African National Standard No. 10234, supplement 2008 1.00: designated "List of classification and labelling of chemicals in accordance with the Globally Harmonized Systems (GHS)" published by Standards South Africa, and where the presence of such goods, regardless of quantity, in a blend or mixture, causes such blend or mixture to have one or more of the characteristics listed in the Hazard Statements in section 4.2.3, namely physical hazards, health hazards or environmental hazards.*

"development" *means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specific activity, including any associated post development monitoring, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.*

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"expansion" *means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.*

"indigenous vegetation" *refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.*

"linear activity" *means an activity that is arranged in or extending along one or more properties and which affects the environment or any aspect of the environment along the course of the activity, and includes railways, roads, canals, channels, funiculars, pipelines, conveyor belts, cableways, power lines, fences, runways, aircraft landing strips, firebreaks and telecommunication lines;*

"phased activities" *means an activity that is developed in phases over time on the same or adjacent properties to create a single or linked entity, but excludes any activity for which environmental authorisations has been obtained in terms of the Act of the Environmental Conservation Act, 1989 (Act No. 73 of 1989)*

"watercourse" *means –*

(a) a river or spring;

(b) a natural channel in which water flows regularly or intermittently;

(c) a wetland, pan, lake or dam into which, or from which, water flows; and

(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as define in the National Water Act, 1998 (Act No 36 of 1998); and

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a reference to a watercourse includes, where relevant, its bed and banks.

"wetland" *means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.*

3.2. When is an EIA Required?

Government has identified various activities that could pose a potential threat to the environment, and which require an environmental assessment before they can be pursued. These activities have been listed in three regulations, each of which prescribes a specific environmental assessment. These regulations are:

- Government Notice 327 of 2017: Listing Notice 1, which identifies activities subject to a Basic Assessment process.
- Government Notice R 325 of 2017: Listing Notice 2, which identifies activities subject to Scoping and an Environmental Impact Assessment process.
- Government Notice R 324 of 2017: Listing Notice 3, which identifies activities subject to environmental authorisation (by Basic Assessment as a minimum) due to location.

In the construction and maintenance of roads and asphalt plants the most important activities that require an environmental authorisation (as per the Listing Notices) have been depicted below. It remains the responsibility of each person to ensure that all secondary and related activities that may require authorisation have been investigated.

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Listing Notice	No.	Activity	Threshold	Exclusions
List I: GN 327	1 and 2	Electricity generation from renewable / non-renewables	>10 but < 20 megawatt or >1 ha	
	9	Storm / water transfer infrastructure	>1 000 m and 0.36 ID or 120 l/sec	Road reserves and urban areas
	10	Waste water transfer	>1 000 m and 0.36 ID or 120 l/sec	Road reserves and urban areas
	11	Electrical transmission or distribution	Outside urban >33 and <275 kilovolts In urban >275 kilovolts	
	12	Dams, weirs, structures or infrastructure	> 100 sq. meters	Road reserves, urban areas and harbours
	13	Dams	>50000 cubic	
	14	Storage dangerous goods	>80 but less than 500 cubic	
	15	Develop coastal public property	>50 sq. meters	
	16	Desalination	Produce 100 cubic meters per day	
	19	Move material in a watercourse or the sea	10 cubic meters	
	24	Roads	If route determination was authorised Reserve > 13.5 m or 8 m where no reserve exists	Entire road in urban area
	25	Effluent treatment	>2000 and < 15000 cubic per day	
	27	Clearing	More than 1 ha and < 20 ha	Linear activities
	34	Expansion /changes where emissions licence triggered		
	56	Widening of road	> 6m or lengthening more than 1 km where existing reserve > 13.5 m or 8 m where no reserve exists	Urban areas

Commented [SB1]: Die gaan moontlik verander. Daar is nou n Document wat uit is vir Comments of Solar en Energy generation exempt van n EIA. Maar nog in comments period. Selfde vir LN 2 No. 1 en 2

Listing Notice	No.	Activity	Threshold	Exclusions
List II: GN 325	1 and 2	Electricity generation	> 20 megawatt	
	3	Nuclear activities		
	4	Storage and handling dangerous goods	> 500 cubic meters	
	5	Processing, beneficiation or refining of gas, oil or petroleum products	With an installed capacity of 50 cubic metres or more per day.	
	6	Process needing emissions licence		
	8	Airports and runways		
	9	Transmission and distribution of electricity	> 275 kilovolts	
	11	Water transfer	> 50000 cubic meters per day	
	12	Railway lines		
	15	Clearing	greater than 20 ha	
	16	Dams	Wall 5 meter or basin > 10 ha	
	27	i. National Road ii. Provincial Road iii. Road with reserve wider than 30 metres Road catering for more than one lane of traffic in both directions.		

Listing Notice	No.	Activity	Threshold	Exclusions
List III: GN 324	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres.		
	10	Storage and handling of dangerous goods: 30 cubic meters		
	12	Clearing > 300 square meters		
	14	Dams, weirs > 10 square meters and structures and infrastructure >10 square meters		
	18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.		

3.3. The EIA Process

An environmental impact assessment is a process of finding out what harm a development might do to the environment. In the assessment process the main parties are:

- The applicant – applying for authorisation
- The environmental assessment practitioner – undertaking the process
- The component authority – evaluation the process
- Interested and affected parties – providing inputs and comments

An Environmental Impact Assessment (EIA) is defined as a systematic process of identifying, assessing and reporting environmental impacts associated with an activity. An EIA can also be defined as a systematic process of examining the possible or potential environmental effects of a development. In the NEMA EIA regulations, the process has been split into two types of assessment, namely a Basic Assessment process and a Scoping and EIR (S&EIR) process. The difference between the processes relates to the nature of the proposed development in terms of its potential impact on the environment, and this is reflected in the level of detail of the information that is to be collected and accessed.

A Basic Assessment (BA) is the procedure designed for Listing Notices 1 and 3, where the impacts of activities are more generally known. BA is a shorter process with a minimum number of interactions with the CA.

Scoping and EIR (S&EIR) entails a comprehensive environmental impact assessment that includes a Scoping phase and an Environmental Impact Assessment phase. In the Scoping phase, issues are identified, and it includes a plan of study for the EIA. The Environmental Impact Assessment phase assesses issues identified in the Scoping phase. This process is required for all activities in Listing Notice 2 or where the EAP or applicant believes a BA is not sufficient and is granted permission by the CA to carry out a full EIA or where the authorities request an S&EIR following a BA.

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The diagram on the following page graphically illustrates the EIA process, both by means of BA (for activities in Listing Notice 1 and 3) and for S&EIR (for activities in Listing Notice 2).

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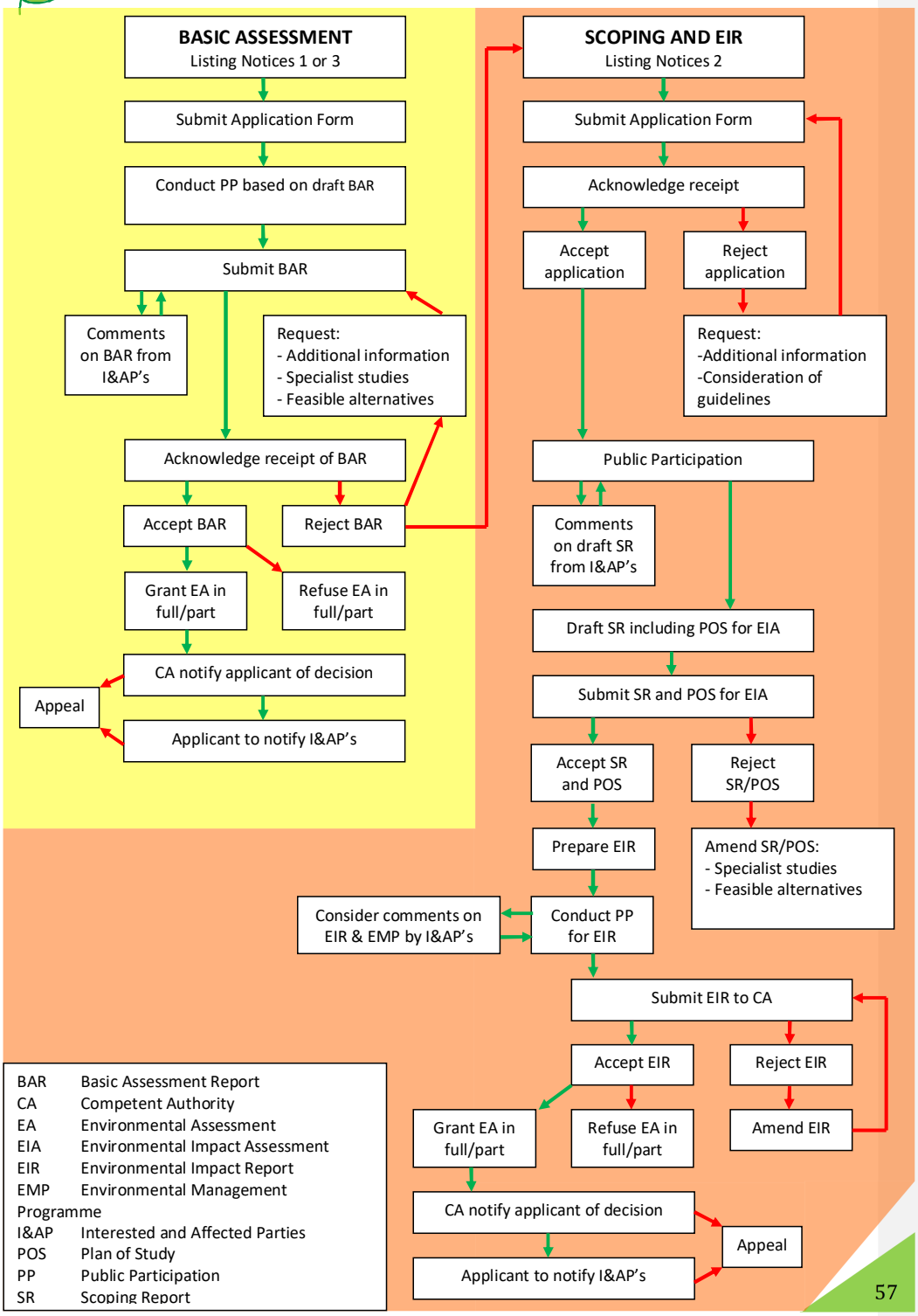
BASIC ASSESSMENT
Listing Notices 1 or 3
Submit Application Form
Conduct PP based on draft BAR
Submit BAR
Comments on BAR from I&AP's
Request:
- Additional information
- Specialist studies
- Feasible alternatives
Acknowledge receipt of BAR
Accept BAR
Reject BAR
Grant EA in full/part
Refuse EA in full/part
CA notify applicant of decision
Appeal
Applicant to notify I&AP's
SCOPING AND EIR
Listing Notices 2
Submit Application Form
Acknowledge receipt
Accept application
Reject application
Request:
-Additional information
-Consideration of guidelines
Public Participation
Comments on draft SR from I&AP's
Draft SR including POS for EIA
Submit SR and POS for EIA
Accept SR and POS
Reject SR/POS
Amend SR/POS:
- Specialist studies
- Feasible alternatives
Prepare EIR
Consider comments on EIR & EMP by I&AP's
Conduct PP for EIR
Submit EIR to CA
Accept EIR
Reject EIR
Grant EA in full/part
Refuse EA in full/part
Amend EIR
CA notify applicant of decision
Appeal
Applicant to notify I&AP's
BAR Basic Assessment Report
CA Competent Authority
EA Environmental Assessment
EIA Environmental Impact Assessment
EIR Environmental Impact Report
EMP Environmental Management Programme
I&AP Interested and Affected Parties
POS Plan of Study
PP Public Participation
SR Scoping Report

3.4. Core concepts in the EIA

3.4.1. Competent Authority (CA)

Various National, Provincial, Local and Secondary Authorities play a role in environmental management in South Africa. The Competent Authority (CA) is that authority who is responsible for receiving and evaluating applications for environmental authorisation. In most cases the Provincial Environmental Departments are the CA's. These are:

Gauteng: Department of Agriculture and Rural Development.

KwaZulu Natal: Department of Economic Development, Tourism and Environmental Affairs.

Limpopo: Department of Economic Development, Environment & Tourism.

Mpumalanga: Department of Economic Development, Environment and Tourism.

Northern Cape: Department of Economic Development, Environment, Conservation and Tourism.

North West: Department of Economic Development, Environment, Conservation and Tourism.

Free State: Department of Economic Development, Tourism and Environmental Affairs.

Eastern Cape: Department of Economic Development and Environmental Affairs.

Western Cape: Department of Environmental Affairs and Development Planning.

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3.4.2. The Environmental Assessment Practitioner (EAP)

A suitably qualified and independent Environmental Assessment Practitioner (EAP) is required to perform the tasks associated with the respective EIA processes. This person must be appointed and remunerated by the applicant wishing to have an activity authorised.

3.4.3. Alternatives

Core to an EIA process is the assessment or evaluation of reasonable and practical alternatives. These could include alternative sites or project locations, layout alternatives, project design alternatives or technology alternatives. In roads this could include the consideration of alternative alignments and alternative technologies.

3.4.4. Public Participation

Public participation (PP) is a compulsory component of any environmental assessment. In PP all the potentially interested and/or affected parties (I&AP's) (including neighbours, local and district authorities, other government departments with applicable jurisdiction, NGO's, communities and the general public) are provided with an opportunity to provide inputs – both positive and negative, into any proposed project that is being subjected to an EIA process. In this process the I&AP's are furnished with project and process related information, provided with sufficient time to submit inputs and comments and informed of decisions taken in the authorisation process, together with information pertaining to their right of appeal to any decision.

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3.4.5. Specialist Inputs and Specialist Studies

Certain potential environmental impacts or complex project designs or processes may require inputs from specialised professionals in an environmental authorisation process. Such inputs may be by means of commentary or by means of specialist studies. These specialist studies both provide clarity around processes and potential impacts and also ensure that adequate information is generated for I&AP's and to enable CA's to make informed decisions.

3.4.6. Environmental Management Programmes (EMPr's)

An essential component of an application for environmental authorisation is the compilation and submission of an Environmental Management Programme (previously called an Environmental Management Plan or EMP). The required content of such plans is explained in the EIA Regulations (R 326 of 2017). The purpose of these EMPr's is to document and plan the management approach that will best achieve the avoidance and minimisation of potential environmental impacts in phases of construction, operation and decommissioning.

Refer to Appendix B.

3.4.7. Environmental Authorisations

At the completion of all the required submissions, the CA may issue an environmental authorisation that will contain a summary of the factors that have led to the decision, a description of the authorised activities and various conditions of authorisation to which the applicant or holder of the authorisation is legally bound. Below is a general layout of matters that may be contained in an environmental authorisation:

- The Decision
- Decryption of the Authorised Activities
- The Scope of the Authorisation, that may include:
    - Identification of authorised alternative

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- The Conditions of Authorisations that may include matters such as:
  - Call to compliance
  - Property specific authorisation
  - Changes to the authorised activities to be communicated in writing
  - Commencement dates and notifications
  - Call to compliance to other legislation
  - Vegetation clearing measures
  - Drainage management measures
  - Integrated Waste Management Measures
- Notification of authorization to I&AP's indications of appeal provisions
- Acceptance and compliance to the EMP
- Monitoring, recording of incidents and auditing
- Appointment and duties of the ECO
- Reporting to authorities
- Closure and decommissioning
- Specific conditions, which could include:
  - Soil and ground water contamination prevention measures
  - Training and induction
  - Bitumen and fuel storage area
  - Vegetation rehabilitation measures
  - Drop height limitation measures
  - Material stockpile measures
  - Site drainage design and pollution prevention measures
  - All developments are restricted to the site footprint
  - No exotic plants to be used during rehabilitation
  - No burning of waste on site
  - No 'ready-mix' concrete to be spilled or disposed of on site
  - Spill control measures
  - No burial of any material on or off the site
  - All access roads to be well maintained and free of dust.
- General matters:
  - Copy of authorisation on site
  - Notifications of authorities

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3.4.8. Appeal

Any person or organisation has the right to appeal a decision made by a CA in the granting or refusing of an environmental authorisation, including sections and or conditions of such authorisations. In this regard it is the responsibility of the applicant and/or the appointed EAP to inform all I&AP's of decisions taken in the environmental authorisation process and to ensure that these parties understand the appeal procedures.

Refer to Government Notice R 993 of December 2014 - National Appeal Regulations as amended by Government Notice R205 of March 2015 - National Appeal Amendment Regulations.

3.4.9. Duration of an EIA process

Feedback from CA's on aspects of the environmental authorisation processes (both BA and S&EIR) are subject to specific timeframes. Given these timeframes and the time it takes an EAP to prepare all the aspects in an environmental authorisation process, a BA process may take 197 – 247 days to complete, while a S&EIR may take 300 – 350 days. These timelines may be extended by inadequate submissions, information shortages, appeals and requirements for other authorisations. The considerable time required for an environmental authorisation process makes it essential for project developers to commence with the applications well before the desired project commencement date. No development may take place prior to the issue of the environmental authorisation.

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4. Checklist of Authorisations

Following is basic checklist that can be followed to ensure that any project or development in the construction and maintenance of roads and asphalt plants is in compliance with the set of environmental legislation. This is a basic checklist and the responsibility of ensuring comprehensive compliance remains with the developer.

Aspect or Question	
Is the requirement for an environmental authorisation triggered?	Basic Assessment activities – Listing Notice 1 Full Scoping and EIA activities – Listing Notice 2 **Remember sensitive environments!!**
Is a water use authorisation required?	Applicable to all abstraction, activities in streams, dams and watercourses and to the contamination of water.
Is a waste licence required?	Applicable when large volumes of waste are stored, treated or disposed of. Also applicable to the handling of hazardous waste.
Is an atmospheric emissions licence required?	Applicable to non-temporary asphalt plants but remembering that temporary asphalt plants have specific monitoring and reporting requirements.
Is dust generation excessive?	Dust monitoring and reporting is required.
Is a mining permit or right required?	Applicable to all borrow pits
Are there any heritage matters involved (buildings older than 60 years or artefacts)?	Involve a heritage specialist to determine further requirements.
Are there any protected or sensitive areas nearby?	Involve an environmental specialist or assessment practitioner to determine the need for further authorisations.
Is rehabilitation by re-vegetation required?	Ensure that acceptable species are used by involving an botanical or rehabilitation professional.

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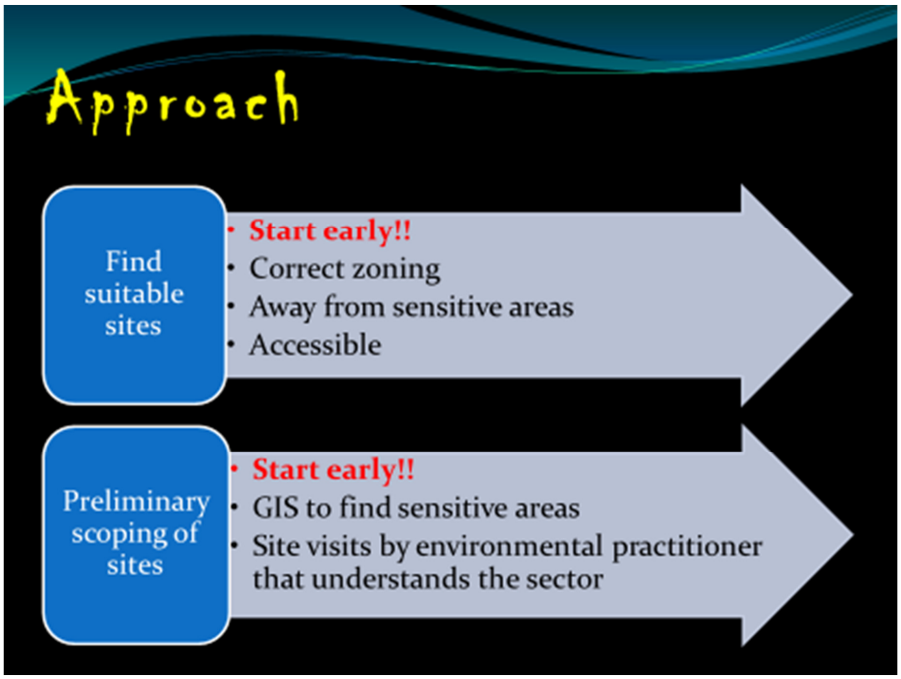
Has compliance with provincial and local legal frameworks been checked?	Check with provincial and local authorities.
Is the activity in a coastal area?	Compliance to the Integrated Coastal Management Act may be required. Involve an environmental assessment practitioner.

The authorisation process should be incorporated into a wider planning framework:



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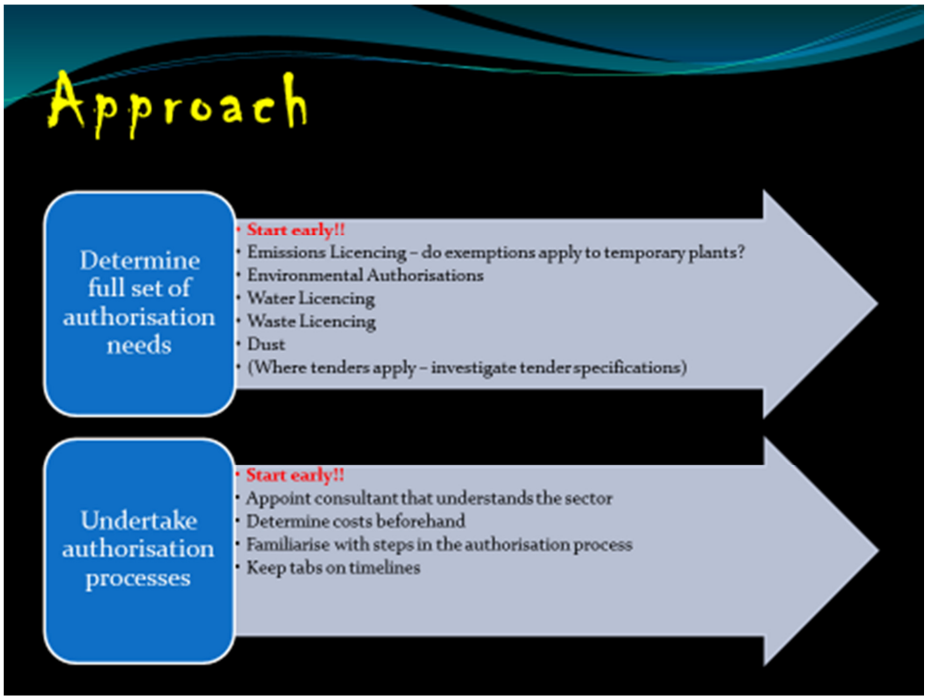
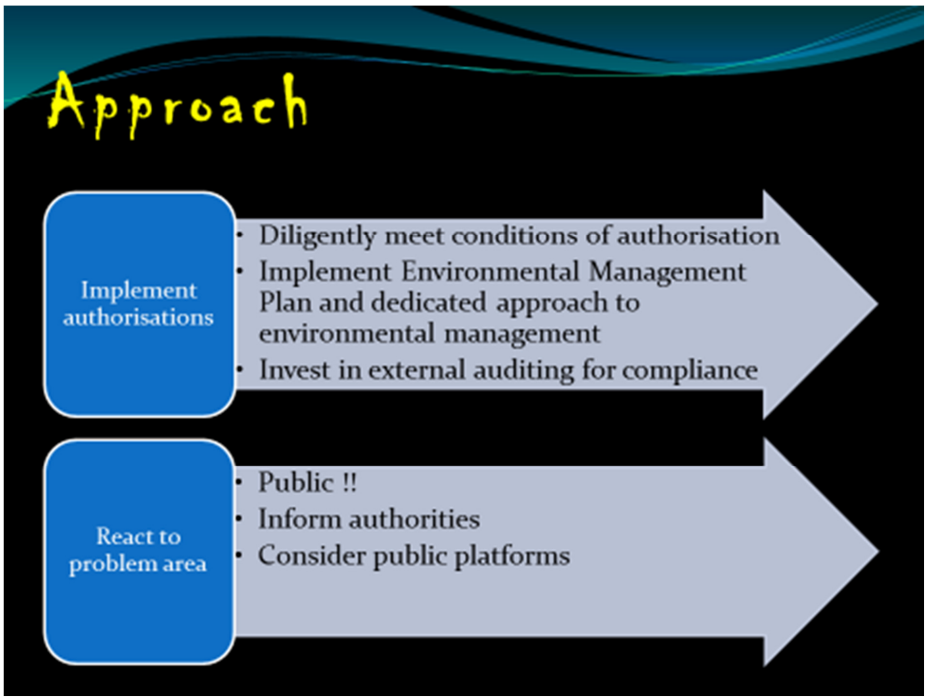

Approach
Determine full set of authorisation needs
• Start early!!
• Emissions Licencing – do exemptions apply to temporary plants?
• Environmental Authorisations
• Water Licencing
• Waste Licencing
• Dust
• (Where tenders apply – investigate tender specifications)
Undertake authorisation processes
• Start early!!
• Appoint consultant that understands the sector
• Determine costs beforehand
• Familiarise with steps in the authorisation process
• Keep tabs on timelines


Approach
Implement authorisations
• Diligently meet conditions of authorisation
• Implement Environmental Management Plan and dedicated approach to environmental management
• Invest in external auditing for compliance
React to problem area
• Public !!
• Inform authorities
• Consider public platforms

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5. The Environmental Manager or Officer

The requirement for an environmental manager (EM) or environmental control officer (ECO) is often stipulated in the environmental authorisation or could also be a contractual obligation. The roles of the EM or ECO include:

- Taking charge of all environmental matters, usually in an advisory capacity but also with due cognisance that legal compliance may equip such a person with authority outside of the regular chain of command.
- Implementing the conditions of authorisations, the EMP, contractual obligations and codes as they apply.
- Checking compliance.
- Environmental awareness and training.
- Interaction with environmental authorities (and clients).
- Checking and auditing on activities.
- Identifying problem areas.
- Providing advice and solutions.
- Keeping, updating and maintaining an environmental management record and filing system.
- Assisting with method statements.
- Following through corrective actions.
- Following through disciplinary actions and environmental penalties if they apply.
- Reporting to authorities, the public or clients as applicable.

In all instances the need for independence of the environmental manager (EM) or environmental control officer (ECO) must be established to ensure credibility and the meeting of any statutory provisions in this regard.

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6. Environmental Management Toolkit

There are various environmental management tools that are used in the construction and maintenance of roads and asphalt plants. These are discussed in the sections that follow:

6.1. Authorisations

In Section 3.4.7 above the typical content of an environmental authorisation has been depicted. The conditions contained in such an authorisation are legally binding and should be used as the primary guideline towards ensuring compliance with the environmental statutory frameworks.

6.2. Contract Specifications

The environmental authorisation is often supported by specific environmental matters contained in a construction project contract and its associated specifications, which may include a section dedicated to environmental specifications.

6.3. Environmental Management Programmes

Together with the environmental authorisation, the EMPr is often a legally binding document. In terms of the current legislation, the EMPr must include the following information:

- Details of the practitioners who prepared the EMPr and the expertise of the practitioner to prepare the EMPr.
- Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified, including environmental impacts or objectives in respect of:
    - Planning and design.
    - Pre-construction and construction activities.
    - Operation or undertaking of the activity.
    - Rehabilitation of the environment.

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- A detailed description of the aspects of the activity that are covered by the EMPr.
- An identification of the persons who will be responsible for implement the EMPr.
- Proposed mechanisms for monitoring compliance with and performance assessment against the environmental EMPr and reporting thereon.
- As far as is reasonably practicable, measures to rehabilitate the environment affected by the activity, which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures.
- A description of the manner in which it intends to:
    - Modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation.
    - Remedy the cause of pollution or degradation and migration of pollutants.
    - Comply with any prescribed environmental management standards or practices.
    - Comply with any applicable legal provisions regarding closure, where applicable.
    - Comply with any legal provisions regarding financial provisions for rehabilitation, where applicable.
- Time periods within which the measures contemplated in the EMP must be implemented.
- The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking the operations.
- An environmental awareness plan describing the manner in which:
    - The applicant intends to inform their employees of any environmental risk which may result from their work.
    - Risks must be dealt with in order to avoid pollution or the degradation of the environment.

The prerequisite content of an EMPr is depicted in Appendix 4 of the EIA Regulations (GN R 326 of December 2017). This has been attached as Appendix B hereto.

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6.4. Environmental Method Statements

Environmental Method Statements is a procedure for the documenting of an approach to a matter or aspect that could pose environmental impacts and for which adequate details in not provided in the EMP. A typical Method Statement will provide details related to:

- Description of the work to be undertaken or the situation (what)
- Identification of the potential environmental impacts
- Location of the works or the situation (where)
- Responsible parties in the works (who)
- Methodology of the works (how)
- Timing of the works (when)
- Declarations and signatures of authority

Method Statements are typically signed off by a resident engineer, but can also be signed off by authorities, accepted by the public or interested parties or used in internal best practice procedures. Method Statements should be filed and referenced in audit procedures and as a baseline for post-works determination of effectiveness.

6.5. Contingency Plans

Contingency planning revolves around designing actions and approaches that will be taken in the event of environmental emergencies. Examples hereof are:

- Contingency plan for hydrocarbon spills
    - Identify spill source and stop if possible
    - Identify people at risk (remove) and cordon area off
    - Identify risk of fire and take steps to address (increase fire control measures)
    - Contain spilled material if possible
    - If required contact local emergency response units
    - Treat with on-site bioremediation materials if scale allows

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  - Inform authorities
  - Contact professional waste/spill treatment company if required
  - Monitor clean-up and removal
  - Rehabilitate contaminated area
- Contingency plan for fire
- Contingency plan for legal compliance matters
- Contingency plan for flooding

6.6. Codes of Practice

Certain companies develop internal environmental codes and standard practices. As important as these are (particularly in achieving compliance to certification schemes and standards), they do not surpass and cannot be in conflict with legally underpinned environmental authorisations, the EMP (if authorised) and legal contracts that contain environmental specifications. Typical codes of practice include (amongst others):

- Codes for the prevention and management of fire
- Codes for waste disposal and management
- Codes for sampling and monitoring

6.7. Industry and Other Standards

Several industry related environmental standards have been developed, some of which are widely used and accepted and some of which have a lower degree of merit. Some of these standards include:

- South African National Standards (SANS).
- The Committee of Land Transport Officials (COLTO) Standard Specifications also contain many aspects related to responsible environmental management.
- ISO 14001 and other ISO standards.
- Standards associated with organisations such as the South African Bitumen Associations (SABITA), SARF and others.
- Greenroads South Africa

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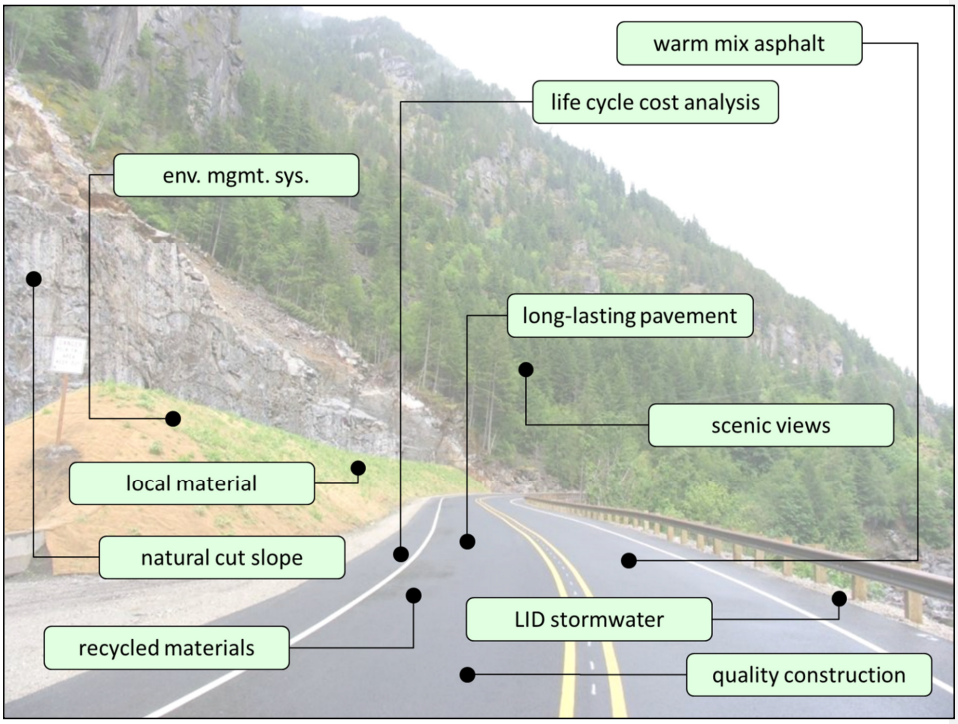
TOWARDS GREENER CONSTRUCTION



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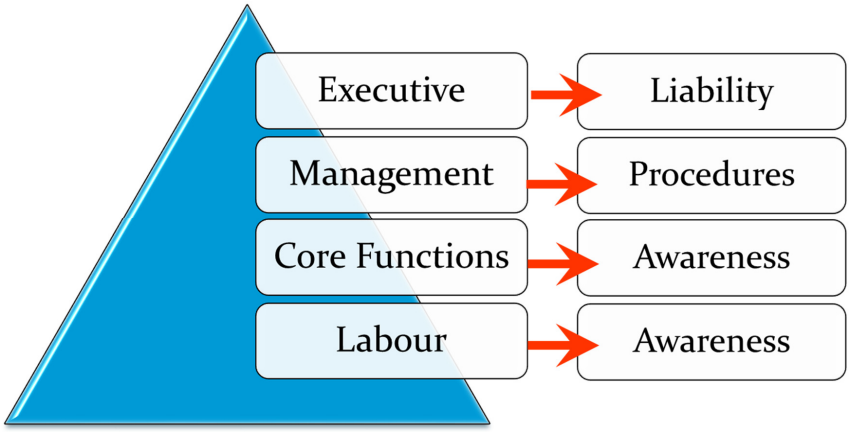
6.8. Environmental Awareness Training



The provision of environmental training and basic environmental induction is often a condition of environmental authorisations. The basic principles of environmental awareness training are:

- Awareness starts with self-worth and self-esteem and self-realisation
- Awareness relies on knowledge of why and how to conduct oneself
- Awareness relies on care and knowledge of circumstances
- Awareness is most effective if its relevant
- Be sensitive to language and level of education
- Consider venue, time of day, materials and displays
- Use basic do's and don'ts but don't apply in in a dictatorial manner
- Where possible use incentives
- Repeat training is required
- Keeping of an attendance register is a legal requirement
- Subcontractors must be subjected to environmental training

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ENVIRONMENTAL INDUCTION

Why are we doing this

- We have a legal obligation – South African laws

- We have an obligation to the environment
- We have an obligation to the communities in the area
- We have an obligation to ourselves
- We have an obligation to each other
- We have an obligation to future generations

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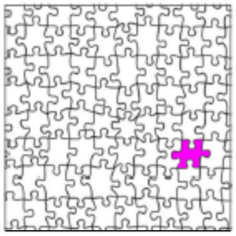

- How does one deal with BIG issues?
- One person at a time.
- Look at:
  - AIDS
  - Apartheid
  - The Soccer World Cup
  - Saving the Environment

What is the *environment*

- The air you breath.
- The ground under you.
- The sunshine you stand in.
- The rain.
- The food you eat.
- The people around you.

What is an EIA

- A process to determine the impact of an activity on the environment
- A process that was used to determine the impacts of the Warden Asphalt Plant on the environment
- A process to make sure that the environment is protected for all of us
- A process that that keeps going
- A process to make you aware of the environment

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What is an *authorisation*

- After an EIA the Government says:

"OK", but make sure you look after the environment"

Many conditions attached to the authorisation

What is in the *authorisation*

- Protect the water
- Comply with an Environmental Management Plan
- Appoint an Environmental Control Officer (ECO)
- Minimise, contain and re-cycle waste
- Storage and handling of fuel
- Manage air quality
- Monitor and report

What can I do?

- Realise that the environment will become the most important world issue in the future.
- Think about the environment.
- Think about you litter
- Think about the air you breath
- Act like the environment belongs to you

Litter and rubbish

- Use dustbins
- Ask for more bins
- Don't think someone else will clean after you
- Pick up the litter
- Cigarette butts
- People littering are littering YOUR environment

Smoke, smell and pollution

- Assist in keeping dust levels low.
- Keep an eye out on smoke and pollution
- Report problems

Materials Handling

- Handle fuel with care
- Prevent spillage
- Make sure valves are closed
- Don't leave open fuel unattended
- Make sure safety equipment is in place
- Know what to do in an emergency

HEATH AND SAFETY ISSUES

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Toilets

- Don't make our work place a toilet.
- Keep toilets the way you want them when next you need them.
- Report lack of toilets.
- Report miss-use.

Fire

- No unattended fires.
- Cigarette butts (smoking areas).
- Report fires immediately

Stormwater and Erosion

- Don't leave it for someone else
- Check your area after rains
- Fix it before someone tells you to fix it

Social, Access, Natural Features

- Don't leave the contract site (onto farms)
- Treat all people with respect.
- Report all complaints
- Don't damage natural features

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TOWARDS GREENER CONSTRUCTION

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6.9. Environmental Monitoring

Environmental monitoring is a prerequisite of most environmental authorisations and part and parcel of good environmental management practice. Environmental monitoring systems must be:

- Transparent
- Repeatable
- Accurate and unbiased
- Continuous or at least with a specified timeframe
- Useful in terms of data meaningfulness and impact
- Sufficiently sensitive
- Cost effective

Some aspects that could be included in environmental monitoring in the asphalt sector include:

- A range of air quality constituents
- Noise
- Impacts on local water bodies
- Traffic
- Worker exposure
- Climate

6.10. Checklists and Audits

Checklists and audits are commonly used environmental tools through which compliance and the implementation of good environmental practices can be checked and monitored over time. Many different types of audits exist in environmental management, the most common of which are compliance audits that could also be a legal requirement as a condition of an environmental authorisation. A compliance audit consist of a procedure by which a particular project's compliance can be checked against the compliance framework that consists of possible environmental

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authorisations, EMP's and/ or contractual obligations and contractual specifications related to environmental matters.

It is good practice to associate audits and general environmental management with comprehensive photographic records and notes that apply to any particular environmental situations.

A basic checklist-based audit has been attached as Appendix D to serve as a baseline example.

6.11. Managing Environmental Incidents

Contractors are legally obliged to record and report major environmental incidents such as major spills, large fires or water pollution should. Neglect to inform authorities of such incidents could lead to legal action and prosecution. The keeping of an incidents register is often a condition of authorisation in many environmental authorisations.

An incident procedure (see contingency plans below) and response plan should be drawn up and implemented to incorporate the following aspects:

- All legally required health and safety measures must be in place, emergency contact numbers of all response agencies and authorities displayed clearly on site and people identified with whom the responsibility lays in the event of environmental incidents.
- At detection of an environmental incident the responsible person must be notified immediately.
- When safe to do so, measures must be taken to stem the incident and causative factors as apply.
- Where possible and provided no immediate damage can be caused to the environment, contingency plans should be referenced to formulate a strategy for dealing with the matter.
- The strategy must be implemented by means of resource allocation and where required emergency responses services should be alerted for assistance.

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- All major incidents must be recorded in an environmental incidents register with details of the nature thereof, the date and the steps taken in dealing with the matter.
- It must be established whether the incident has caused non-compliance in terms of any authorisations, licences, permits and contract. If so, these compliance frameworks must be checked for any prescriptive measures and particularly reporting requirements.
- All applicable authorities must be informed as soon as possible. Where required, authorities can be invited to inspect the incident
- Incident analysis should be done after an incident has been addressed. The analysis should look into the cause and the manner in which the incident was resolved. This analysis should be recorded in the incidents register.
- Where required a post-incident audit or investigation of the environmental damage may be required.
- Actions must be taken to prevent the incident from reoccurring and, if necessary, a contingency plan should be developed, or existing plans updated.
- The content of an incident register should be subjected to any auditing regime that may apply.

6.12. Managing of Environmental Complaints

The keeping of a complaints register is often a condition of authorisation in many environmental authorisations.

A complaints register and procedure should be implemented as follows:

- All complaints must be recorded in a complaints register with details of the nature of the compliant, the person or organisation that lodged the complaint, the date and the name of the responsible person dealing with the complaint.
- The compliant must be fully investigated. Further clarity may also be obtained from production and environmental records, from employees, from third party specialists or from the complainant.
- A strategy to deal with the compliant must be formulated, documented in the complaints register and communicated to the complainant.
- The formulated strategy must be implemented by the allocation of resources.

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- The effects of the strategy should be monitored and modified if need be.
- Once the situation leading to the compliant has been resolved, the complainant must be informed. The date hereof should be recorded in the complaints register.
- Actions must be taken to prevent the situation from reoccurring and, if necessary, a contingency plan should be developed.
- If a situation leading to a compliant cannot be resolved under normal production conditions, an amicable solution should be devised with inputs from the complainant.
- If required, the relevant authorities should be involved in the resolve of a compliant.
- The complaints register must be reviewed regularly to ensure that all complaints have been dealt with effectively.
- The content of a complaints register should be subjected to any auditing regime that may apply.

6.13. Authorities and the Public

Environmental aspects related to the management of authorities and the public for are:

- Make use of a stakeholder based Environmental Monitoring Committee.
- Provide contact details for the public and deal with complaints in a comprehensive manner.
- Adopt an “open-book” policy related to environmental management.
- Keep a comprehensive environmental management filing system and complaints register system.
- Update authorities on matters of importance and “partner” with local authorities.
- Be open to public suggestions.

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6.14. Environmental Registers

To assist all contractors and specifically the responsible environmental managers (EM) or environmental control officers (ECO), the following checklist of environmental management files and registers that should be kept on individual project, has been compiled:

- Assessments, Studies and Reference Materials
- Environmental Authorisation and Contractual Obligations
- Environmental Management and other Plans
- Environmental Codes of Practice
- Environmental Training and Inductions Programme and Register
- Environmental Method Statements
- Environmental Contingency Plans
- Monitoring Programmes and Results
- Audit Programmes and Results
- Environmental Monitoring Committee / Public Interaction
- Environmental Complaints Register
- Environmental Incidents Register
- Agendas and Minutes
- Correspondence

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7. Selected Environmental Practices

The environmental practices that are implemented in construction and development of roads and asphalt plants can be contained in a well written EMPr. However, certain important environmental practices related to the development and maintenance of roads and asphalt plants are discussed here in point form.

7.1. Water Management

Environmental aspects related to water management in the development and maintenance of roads includes:

- Stormwater management:
  - All materials and works to be protected against stormwater damage.
  - Contamination of stormwater by means of fines and chemicals should be prevented.

  - Fuels and chemicals should be stored so that stormwater and flooding does not pose a risk.
  - Oil and silt traps to be used at all fuel dispensing and other sensitive areas.
  - Stormwater cut-off tranches must be adequately stable to prevent erosion.
  - Erosion control measures to be used where required to prevent stormwater damage.
  - Where stormwater damage occurs this must be repaired and mitigated as soon as possible.

- Management of water abstraction:
  - Ensure that abstraction is legally authorised
  - Ensure that abstraction is within allowed for limits
  - Ensure that water is not polluted

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- Water crossings:
  - Consider the need for environmental authorisations
  - Programme in terms of seasonality
  - Implement water monitoring regime

- Water for construction and dust:
  - Water for dust is an on-going requirement
  - Consider binders or stabilisers where possible
  - Prevent runoff when watering for dust
  - Consider wind direction
  - Consider seasonality for works in dust prone areas
  - Use water sparingly

- Wash bays:
  - Design for capture of water and contaminants
  - Impervious flooring
  - Lead via oil and silt traps
  - Recycle water where possible

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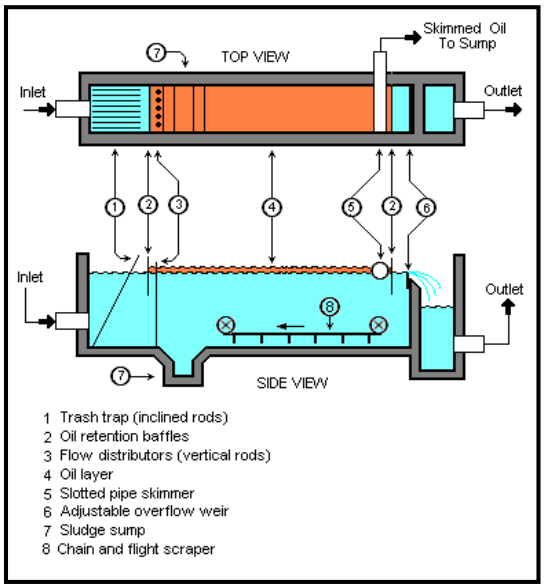

7.2. Soil, Stockpiles, Borrows and Spoils

Environmental aspects related to soil management in the development and maintenance of roads includes:

- Dust controls (*see above*)
- Erosion controls (*see above*)
- Preservation of topsoil
  - Topsoil preservation from all work areas as practically possible
  - Stockpiles to be limited in height
  - Protection from stormwater
  - Protection from alien vegetation infestation

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- Other stockpiles:
  - Protection from wind and stormwater
  - Position in relation to works and prevailing wind

- Borrow pits and spoil sites
  - Consider legal obligations (mining permits and rights)
  - Erosion control
  - Aesthetic impact
  - Rehabilitation measures – infrastructure removal, contour shaping, rip access roads, topsoil and fertilisers, soil compaction, re-vegetation and weed control
  - Obtaining closure certificates from DMR for borrow pits

7.3. Storage and Handling of Aggregates

Environmental aspects related to the storage and handling of aggregates in the asphalt sector:

- Yard planning and position in relation to wind, ease of access, neighbouring residents or business.
- Consideration of practical haulage routes and practical feeder routes to the plant.
- The use of covers over haulage vehicles and over unused stockpiles.
- The restriction of stockpile height and prevention of “drift”.
- Stormwater protection as above.
- Planning around drop heights
- Possibility of containment of cold feed areas and use of dust suppression methods.
- Management of dust fractions expelled from plant – return to process or supplier or alternative means of disposal.

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7.4. Storage and Use of Bitumen and Asphalt

Environmental aspects related to the handling of bitumen and asphalt:

- Bunding of all storage tanks
- Consideration of fugitive emissions
- Remediation of emissions
- Containment of spills and on-site spill response materials
- Waste plan for dealing with waste and reject bitumen and asphalt – re-use and recycling.
- The keeping of a disposal register in terms of waste
- Application of MSDS's
- Use of environmentally responsible products like Sasolwax Bituglide
- Use of SANS
    - SANS 10228: 2010 The identification and classification of dangerous goods.
    - SANS 10231: 2010 Transportation of dangerous goods - operational requirements.
    - SANS 10368: 2007 Transportation of low-hazard goods in bulk.

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7.5. Storage and Use of Fuels

Environmental aspects related to fuel management in the development and maintenance of roads includes:

- Storage
  - Establish need for an environmental authorisation
  - Bunded area to contain spills
  - Lockable
  - Fire prevention methods and fire safety in place
  - Shut off valves
  - Hard surface for refuelling areas (with oil separator)
  - Remedial products available
  - According to MSDS

- Use
  - Prevent spillage and leakage
  - Responsible person in attendance
  - Leak proof mobile fuel transporting (use drip trays)
  - Disposal and treatment of contaminated soils

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7.6. Dealing with Waste

Construction produces various waste streams, which can be categorised as follows:

- General waste (akin to domestic waste related to eating, office work etc.)
- General organic waste from landscape maintenance
- Sewerage and waste water
- General construction waste (concrete, stone and disused construction materials)
- Hazardous waste materials and chemicals

Waste management must be formalised to ensure that it does not cause pollution and potential environmental degradation:

- General waste must be collected into suitable water, wind and animal proof waste containers and removed to a disposal site on a regular basis.
- General waste should be separated into glass, paper and plastics so that these can be recycled. Emptying out of waste containers must be regular to prevent overfilling. Disposal must be done at recognised water disposal sites.
- Waste should not be allowed to litter construction sites.
- A culture of waste reduction, collection and disposal must be instilled with all employees by means of guidance and education.
- Vegetation matter from landscaping activities must be removed to a suitable disposal site or composted for later use.
- No waste should be buried or burned.
- Hazardous waste (e.g. expired chemicals) must be disposed of via an approved hazardous waste disposal site. Oil and grease may be disposed of via provision to a commercial third party for recycling

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7.7. Air Quality Management

Aspects related to the management of air quality maters for asphalt plants include:

- It is recommended that odours and gaseous emissions be controlled by:
  - Diverting vented emissions to the burner for destruction.
  - By careful site layout planning and containerisation of odour emitting processes such as blending.
  - Installing ozone generators at fugitive emission areas or by installing atomized neutralizing sprays if required.
  - Using odour controlling agents such as Ecosorb.
  - To reduce sulphur dioxide emissions, low sulphur fuels should be used for the combustor.
  - To reduce NO_x emissions, fuels lower in nitrogen may be considered, however, at temperatures greater than 1300°C, conversion from high-nitrogen fuels to low-nitrogen fuels may not substantially reduce NO_x emissions as thermal NO_x contributions will be more significant. Consequently, NO_x emissions are generally inversely related to CO.

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7.8. Rehabilitation Measures

Environmental aspects related to rehabilitation in the development and maintenance of roads includes:

- Rehabilitate as soon after completion of works as possible
- Ensure all infrastructure is removed
- Take regard of seasonality
- Ensure topography is aligned
- Return preserved topsoil and fertilise of required
- Rip and break compacted soils
- Re-vegetate with seed and species appropriate to the area
- Implement weed control where required

7.9. Road Reserve Management

Environmental aspects related to environmental management of road reserves include:

- Runoff and erosion management should be implemented in road reserves.
- Vegetation should be maintained by periodic cutting and burning where appropriate. Cutting and burning should be done with due consideration of seasonality.
- Road reserves must not become a fire hazard to neighbouring properties.
- Road reserves must be adequately fenced off.
- Road reserves should be vegetated with appropriate plants species and where practical, these should be indigenous and serve purposes of soil stabilisation, shading, aesthetics and screening.

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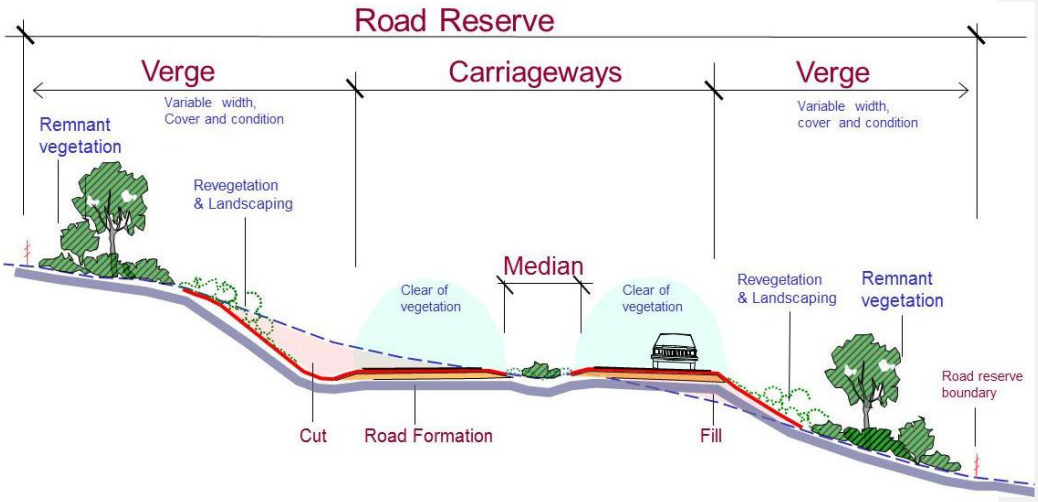
- Alien vegetation should be controlled in all road reserves.
- Litter disposal and litter removal should receive attention in road reserves.



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8. Carbon Footprinting

For the purpose of this short course certain important aspects of carbon foot printing are highlighted in bullet form.:

- Carbon trading (credits) is now an active and established international practice.
- Carbon management is here to stay, due to:
  - The international drive (COP 17)
  - The scale of the sector
  - Legislation
  - Global warming
  - The social conscience
- Current carbon taxes include levies on electricity and vehicle tax.
- Number of environmental taxes are being contemplated (Budget Speech)
- National Climate Change Response Paper (2011)
- Significant submitters report GHG emissions to national inventory
  - JSE Carbon Disclosure Project
  - King III reporting
- A carbon footprint is the total set of GHG emissions caused directly or indirectly by an individual, organization, event or product.
- Steps in a carbon footprinting exercise:
  - Establish an emissions boundary, goals and a reporting timeframe
  - Collect activity data
  - Calculate GHG emissions (emission factors)
  - Mitigation measures = cost savings and less taxation

GHG Emissions = Activity Data x GHG Emissions Factors

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9. Integration of Environmental Management

Environmental management in construction has become such a significant key element that the integration thereof into all spheres of planning, project development, management and company strategy has become paramount. Following are a few bullets to illustrate into which spheres of traditional mainstream processes the need for environmental management practices have become important:

- In client relations and company profiles
- In prospecting and sourcing
- In project tender processes
- In project planning
- In project execution
- In costing
- In rehabilitation

10. Conclusion

The primary objective of this course revolves around equipping people involved in the construction, development and maintenance of roads and asphalt plants with the required background to understand the environmental management matters of the sector and in so doing to contribute towards a more environmentally sustainable road and asphalt sector and the reduction of potential environmental impacts.

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