

DRAFT BASIC ASSESSMENT REPORT
FOR THE PROPOSED
DULLSTROOM WATER TREATMENT WORKS (WTW) UPGRADE

Prepared for:

Nkangala District Municipality
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Submitted to:

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MDEDET REF NO: 17/2/3N-338
SEF REF NO: 505504

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PURPOSE OF DOCUMENT

A period of 40 calendar days **Friday, 14 March 2014 to Tuesday, 29 April 2014** has been provided for the review and commenting phase of the Draft Basic Assessment Report (BAR). All Interested and Affected Parties (I&APs) as well as State Departments have been notified of this review period.

The BAR contains the following information:

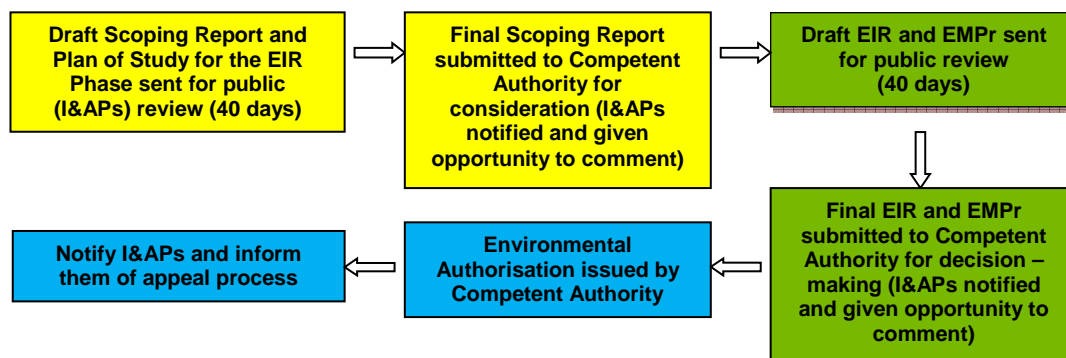
- A description of the proposed project, including project motivation;
- Discussion of applicable alternatives;
- A description of the environment affected by the proposed project;
- The outlined public participation process; and
- The plan of study for the Environmental Impact Reporting (BAR) phase.

The BAR can be viewed at the following venue:

Name of public venue	Name of Contact Person	Contact Number(s)	Viewing Times
Dullstroom Public Library 194 Chunky Mahlangu Drive	Nonki Mboweni	Tel: 013 253 7676	08h00 to 16h30) (Weekdays)

Should you wish to participate in the BAR process by contributing issues of concerns/comments, please register as an I&AP by completing the enclosed Registration and Comment Sheet or you can visit SEF’s website at <http://www.sefsa.co.za>. To register as an I&AP or comment on the project, click on “Stakeholder Engagement”. Select your own username and password and click on the “register” button and complete the compulsory fields to register. Once registered, click on the stakeholder engagement tab, login using your username and password and you may then view the **505504 Dullstroom Water Treatment Works Draft Basic Assessment Report** and associated appendices. Should you have any problems in obtaining the information from the Internet, please feel free to contact SEF for assistance. The flow diagram below highlights the phases in the project where I&APs have the opportunity to participate within the process.

Following the commenting period, the draft Basic Assessment Report will be updated and submitted to the **Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET)** for consideration.



PROJECT SUMMARY	
Project Name	Upgrade of Water Treatment Works in Dullstroom, Mpumalanga.
Preferred Site	Farm Name: Grootsuikerboschkop Parcel No: 124 Portion No: 36
Surveyor-General 21 Digit Code	T0JT00000000012400036
Development Footprint	Approximately 0.5 hectare
Significant Developments/ Infrastructure Height	Upgrade the capacity of the existing Water Treatment Plant from 2MI/d (mega litre per day) to 5MI/d (therefor 1,825MI per annum).
Site Photographs	Refer to Appendix 2
Confirmation of Supply:	
Potable water	N/A
Raw water	Existing Waste Treatment Works supply will be utilised
Sewage	N/A
Electricity	N.A
Solid Waste	N.A

ENVIRONMENTAL ASSESSMENT PRACTITIONER

Strategic Environmental Focus (Pty) Ltd (SEF) is a privately owned company and was formed in 1997 with the objective of providing **expert solutions to pressing environmental issues. SEF is one of Africa’s largest multi-disciplinary consultancies**, offering innovative sustainable environmental solutions to private and public sector clients. With our integrated services approach in the management of natural, built and social environments, and with over a decade of experience, we bring a wealth of knowledge and expertise to each project.

SEF’s Mission

SEF is a national sustainability consultancy which provides integrated and innovative Social, Biophysical & Economic solutions while fostering strategic stakeholder relationships, underpinned by SEF’s core values.

SEF’s Vision

SEF offers holistic and innovative sustainable solutions in response to global challenges.

SEF has assembled a team of professionals, consisting of a core of environmental experts with extensive experience in dealing with Environmental Impact Assessments (EIAs), Public Participation Processes, Architectural and Landscape Architecture, Mining and Environmental Management. SEF also has a team of specialist practitioners such as specialists in Heritage Impact Assessments (HIA), Wetland Delineation and Functional Assessments; Wetland/ Riparian Rehabilitation, Aquatic Assessments; Ecological (Fauna, Avifauna and Flora) Assessment, Visual Impact Assessments (VIAs), Soils and Agricultural Potential Assessments, Socio-Economic Assessments, etc.

SEF is a Qualifying Small Enterprise and a **Level 2 contributor in terms of the Broad Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003)** and has a procurement recognition level of 156%.

SEF commits itself to comply with the requirements and the implementation of a Quality Management System. The Quality Management System will be reviewed and implemented to continually improve efficiency and effectiveness of the organisation. SEF uses a “green” approach to anything we embark on. We believe in using technology to our and the environment’s best advantage. We encourage the use of green alternatives such as telephone and video conferencing instead of travelling for workshops and meetings and CDs instead of printed material, where possible.

The following project team members are involved in this Basic Assessment Reporting process.

Table 1: Project Team Members

Role	Responsibilities	Resource
Project Manager (PM)	Client and authority liaison and overall project management and process review	Carene Kruger
Environmental Manager (EM)	Process and public participation management and compilation of documentation for the BA process	Hanlie van Greunen
Environmental Assistant (EA)	Public participation and project administration assistance	Kagiso Motlhasedi

Ms Carene Kruger

Carene holds a BSc (Honours) Degree in Environmental Management (University of Johannesburg) and is currently completing her Masters in Environmental Management at the University of Pretoria. She has been an Environmental Assessment Practitioner for over 6 years. She is employed as a Project Manager at SEF and has been with the company more than 5 years. Her working experience varies from small to large scale projects pertaining to master planning, commercial, residential, mining and municipal infrastructure projects. Carene has excellent knowledge of the NEMA and has dealt with legal processes such as the Gautrain Variant Assessment High Court Interdict and other appeal processes. She also worked in the United Kingdom as a commercial recycling advisor and has extensive experience in community upliftment projects obtained in Mozambique. Key projects include: Lonmin Platinum EMPR amendment applications, Wonderboom Airport expansion, Gautrain Variant Assessment EIA, SKA- Meerkat infrastructure and Hazeldean Node Master Plan.

Ms Hanlie van Greunen

Hanlie has 8 years of professional experience as a Landscape Technologist and holds a BSc LArch degree. She also completed a BSc Hons degree in Environmental Monitoring and Modeling in 2010. Hanlie spent 5 years in the UK working as a Landscape Architect at a charitable environmental regeneration organisation where she gained skills in community consultation along with the design and implementation of community led landscape projects. Hanlie is currently an Environmental Manager at SEF and has 3 years' experience in environmental management. She is involved in the compilation of Basic Assessments, Scoping Reports, EIA's and EMPR's in terms of NEMA and the MPRDA. Hanlie also conducts visual impact assessment studies (VIA's) for various types of development.

Kagiso Motlhasedi

Kagiso has obtained her BSc Degree in Life and Environmental Sciences with specialization in Geology and Geography (University of Johannesburg) and is currently studying for her Hons degree in Environmental Science (UNISA). She was previously employed as a compliance officer for a waste management company. She is currently employed as an Environmental Assistant at SEF, whereby her duties include the drafting of Basic Assessment reports as well as both Scoping & Environmental Impact Assessment reports. In addition to the above, Kagiso is also actively involved in the development of Water Use License applications and public participation processes as relevant to the National Environmental Management Act (Act No 108 of 1998) and Minerals & Petroleum Resources Development Act (Act No 28 of 2002).

Table 2: Contact Details of Environmental Assessment Practitioner

Name	Contact Details
Ms Carene Kruger	Strategic Environmental Focus (Pty) Ltd Postal Address: PO Box 74785, Lynnwood Ridge, PRETORIA, 0040 Tel: +27 12 349 1307 Fax: +27 12 349 1229 Email: carene@sefsa.co.za

EXECUTIVE SUMMARY

1 INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Nkangala District Municipality to undertake an environmental application process for the proposed upgrade of the Dullstroom WTW on portion 36 of the farm Groot-suikerboschkop.

A Basic Assessment (BA) Reporting process will be conducted for this project based on triggered listed activities within the Environmental Impact Assessment (EIA) Regulations of 2010 (Government Notice (GN) No's 543; 544; 545 and 546) promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as well as the National Water Act (Act No. 36 of 1998).

The purpose of this, the Draft Basic Assessment Report (BAR), is to provide all interested and affected parties (I&APs) with an opportunity to comment and provide input into the process going forward. All comments received during the 40 day review period will be incorporated into the Final Basic Assessment Report (BAR) for consideration by the approving authorities, i.e. the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) and the Department of Water Affairs (DWA).

2 BRIEF PROJECT DESCRIPTION

The Nkangala District Municipality proposes to upgrade the Water Treatment Works (WTW) on portion 36 of the farm Groot-suikerboschkop. The proposed site falls under the jurisdiction of Emakhazeni local municipality, in the Nkangala Region of Mpumalanga and is located adjacent to the municipal Caravan Park in Dullstroom

The Dullstroom WTW abstracts water from the adjacent Dullstroom Municipal dam and distributes the purified water to the Town. The objective of this project is to upgrade the capacity of the existing Water Treatment Plant from 2Ml/d (mega litre per day) to 5Ml/d (therefor 1,825Ml per annum). The work will be undertaken in Phases. The project aims is to ensure a sustained water supply to the ever-expanding community of Dullstroom.

The proposed Scope of Work for the entire project is as follows:

- Construction of 2 x 15m Diameter Clarifiers;
- Construction of 2 x Sand Filters;
- Upgrading of Pipework;
- Upgrading of Electrical panels, Pumps and Associated Works;
- Relocation of Raw Water Extraction Pump Station;
- Removal of Old Concrete Structure;
- Provision of 5 No. Off Bulk Flow Meters with Remote Telemetry;
- Construction of a new dosing unit (room);
- Construction of access road and new entrance to the dosing unit (room);
- Upgrading of chlorine dosing unit;
- Refurbishment of Laboratory;
- Supply of Testing Equipment;
- Raising of Clear Water Storage; and
- Raising of the existing dam wall by 4.2m.

3 KEY IMPACTS

The following key impacts were identified:

Biophysical Impacts:

- An increase in the volume of abstraction of a surface water resource that may lead to drought in the dry season;
- Surface water run-off (viz. increased soil erosion) associated with the establishment of hard surfaces and vegetation clearing for the construction of the access road;
- Potential impacts on ground and surface water quality due to hydrocarbon spillages during the construction and operational phase of the development;
- Destruction of flora within the proposed area, stemming from activities such as vegetation clearing and topsoil stripping for the proposed access road; and
- Faunal displacement due to increased level of activity and associated noise.

Socio-Economic Impacts:

- Noise, dust and disturbance during the construction phase;
- Job creation during the construction and operational phases of the proposed project, and
- Ensuring basic service delivery by providing drinking water to residents of Dullstroom and Sakhelwe (township located north-west of Dullstroom).

4 CONCLUSIONS AND RECOMMENDATIONS

In accordance with GN No. 543, the BAR is aimed at describing the proposed activity as well as the receiving environment that may be affected by the proposed project. In accordance with the EIA Regulations, an identification of relevant legislation and guidelines is also given as well as a description of the public participation process that will be followed.

Comments and/ or concerns identified by Interested and Affected Parties (I&APs) during the review period of the Draft BAR will be incorporated into the Final BAR for further investigation. The Final BAR will then be submitted to the MDEDET and DWA for consideration.

The ability to mitigate any of the potential impacts identified in this Draft BAR will also be investigated and summarised into a working/ dynamic Environmental Management Programme (EMPr) for consideration by I&APs and ultimately by the MDEDET and the DWA.

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LIST OF ABBREVIATIONS AND ACRONYMS

BA	Basic Assessment
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
BAR	Environmental Impact Reporting
EMPr	Environmental Management Programme
GN	Government Notice
ha	Hectares
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
MAP	Mean Annual Precipitation
MDEDET	Mpumalanga Department of Economic Development, Environment and Tourism
ME	Mitigation Efficiency
MW	Mega Watt
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
NDM	Nkangala District Municipality
SEF	Strategic Environmental Focus (Pty) Ltd
SFM	Significance Following Mitigation
WOM	Without Mitigation Measures
WM	With Mitigation Measures
WTW	Water Treatment Works

GLOSSARY OF TERMS

Applicant	Any person who applies for an authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in sections 24(5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).
Catchment	A “catchment” means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or points.
Ecology	The study of the interrelationships between organisms and thBAR environments.
Environment	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment	Systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and Basic Assessment Reporting Process.
Environmental Management Programme	A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.
Interested and Affected Party	Any person or groups of persons who may express interest in a project or be affected by the project, positively or negatively.
Key Stakeholder	Any person who acts as a spokesperson for his/ her constituency and/ or community/ organisation, has specialised knowledge about the project and/ or area, is directly or indirectly affected by the project or who considers himself/ herself a key stakeholder.
Stakeholder	Any person or group of persons whose live(s) may be affected by a project.
Study Area	Refers to the entire study area encompassing all the alternatives as indicated on the study area or locality map.
State Department	Any department or administration in the national or provincial sphere of government exercising functions that involve the management of the environment.
Water Treatment Works	Water treatment describes industrial-scale processes that make water more acceptable for an end-use, which may be drinking, industrial, or medical. Water treatment should remove existing water contaminants or so reduce their concentration that their water becomes fit for its desired end-use, which may be safely returning used water to the environment.

SECTION A: INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Nkangala District Municipality to undertake an environmental application process for the proposed upgrade of the Dullstroom WTW on portion 36 of the farm Groot-suikerboschkop

Please refer to details of the Applicant: Mr FR Ntekele, on behalf of Nkangala District Municipality below:

Name of Applicant	Postal Address	Relevant Numbers
Mr FR Ntekele	P.O. Box 437 Middelburg, 1050	Tel: 013 249 2040 Fax: 013 249 2145

A-1 DESCRIPTION OF PROPOSED ACTIVITY

A-1.1 Locality

The Nkangala District Municipality proposes to upgrade the Dullstroom WTW on Portion 36 of the farm Groot-suikerboschkop. The proposed site falls under the jurisdiction of Emakhazeni local municipality in the Nkangala Region of Mpumalanga and is located adjacent to the municipal Caravan Park in Dullstroom. Refer to **Error! Reference source not found.** for the Locality Map.

The Dullstroom WTW abstracts water from the adjacent Dullstroom Municipal dam and distributes the purified water to the Town. The objective of this project is to upgrade the capacity of the existing Water Treatment Plant from 2Ml/d (mega litre per day) to 5Ml/d (therefor 1,825Ml per annum). The work will be undertaken in Phases. The project aims is to ensure a sustained water supply to the ever-expanding community of Dullstroom.

The proposed Scope of Work for the entire project is as follows:

- Construction of 2 x 15m Diameter Clarifiers;
- Construction of 2 x Sand Filters;
- Upgrading of Pipework;
- Upgrading of Electrical panels, Pumps and Associated Works;
- Relocation of Raw Water Extraction Pump Station;
- Removal of Old Concrete Structure;
- Provision of 5 No. Off Bulk Flow Meters with Remote Telemetry;
- Construction of a new dosing unit (room);
- Construction of Access road and new entrance to the dosing unit (room);
- Upgrading of chlorine dosing unit;
- Refurbishment of Laboratory;
- Supply of Testing Equipment;
- Raising of Clear Water Storage; and
- Raising of the existing dam wall by 4.2m.

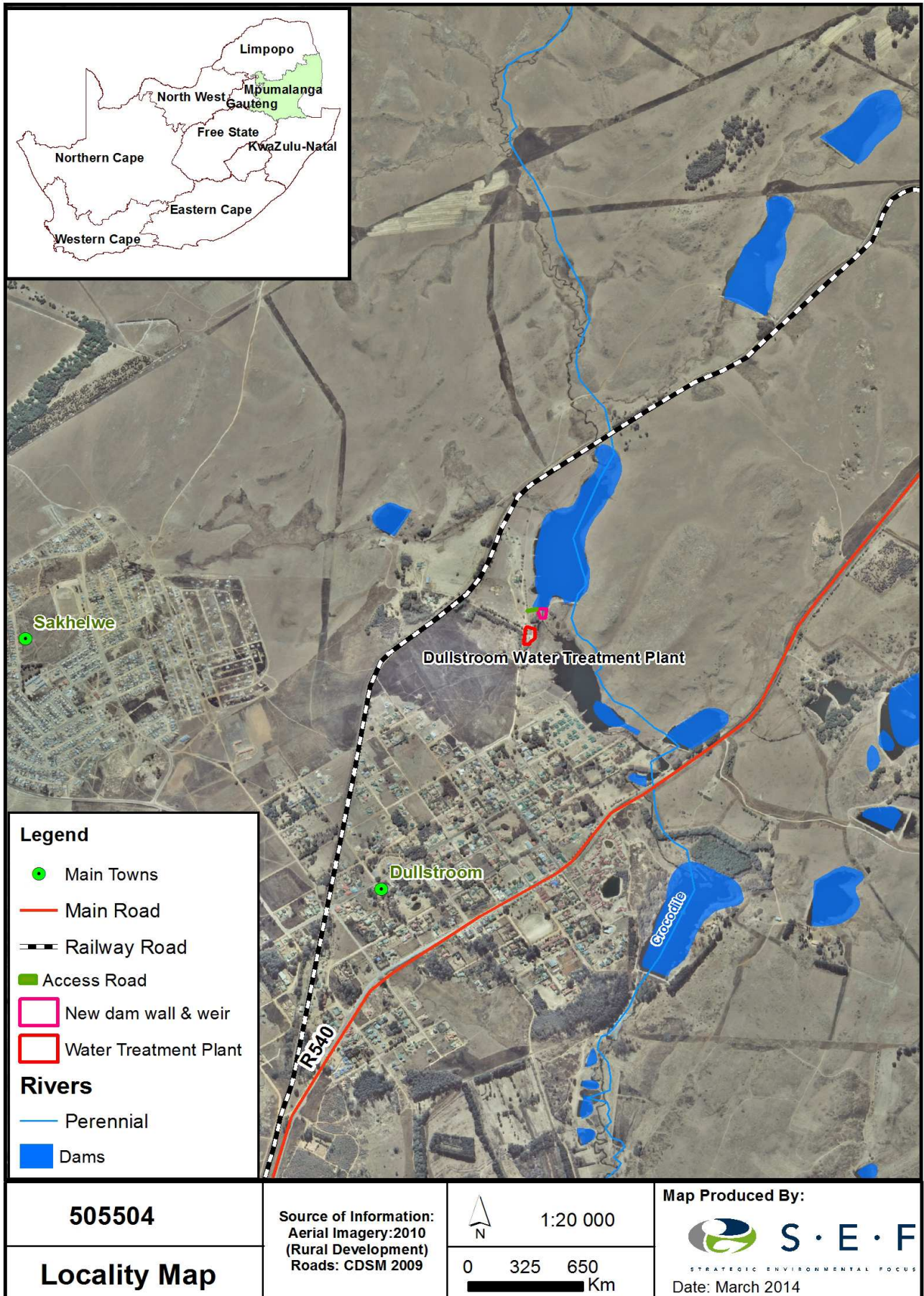


Figure 1: Dullstroom Water Treatment Works Locality Map

The new layout shows the final intake as a flooded suction with a pantograph floating screened intake, feeding through a 300mm pile to a new pump station below the spillway channel. There are three straight pile sections with two manholes with openings at dam crest level. The intake can be closed off and there will be inspection eyes in the manholes. The pump station floor will have to be 1m to 1.5m below ground with a free gravity rain to the downstream dam. A temporary supply will have to be provided through the current bottom outlet. If the 300mm pile is considered too small it is easy to upgrade. These upgrades will ensure a 5ML/day capacity on an 18 hour pump cycle.

Refer Figure 2 to for a Layout Plan of activities that triggers this Basic Assessment (i.e. construction of the access road, new raised dam wall and abstraction pipeline).

A-1.2 Surrounding Land Use

To further place the site in context, the land uses within all four major compass directions are described in the table below.

Table 3: Surrounding Land Use Table

Direction	Land Use	Distance (m)
North	Dullstroom Nature Reserve	Directly adjacent
West	Vacant Land	Directly adjacent
South	Vacant Land	Directly adjacent
East	Dullstroom Nature Reserve	Directly adjacent

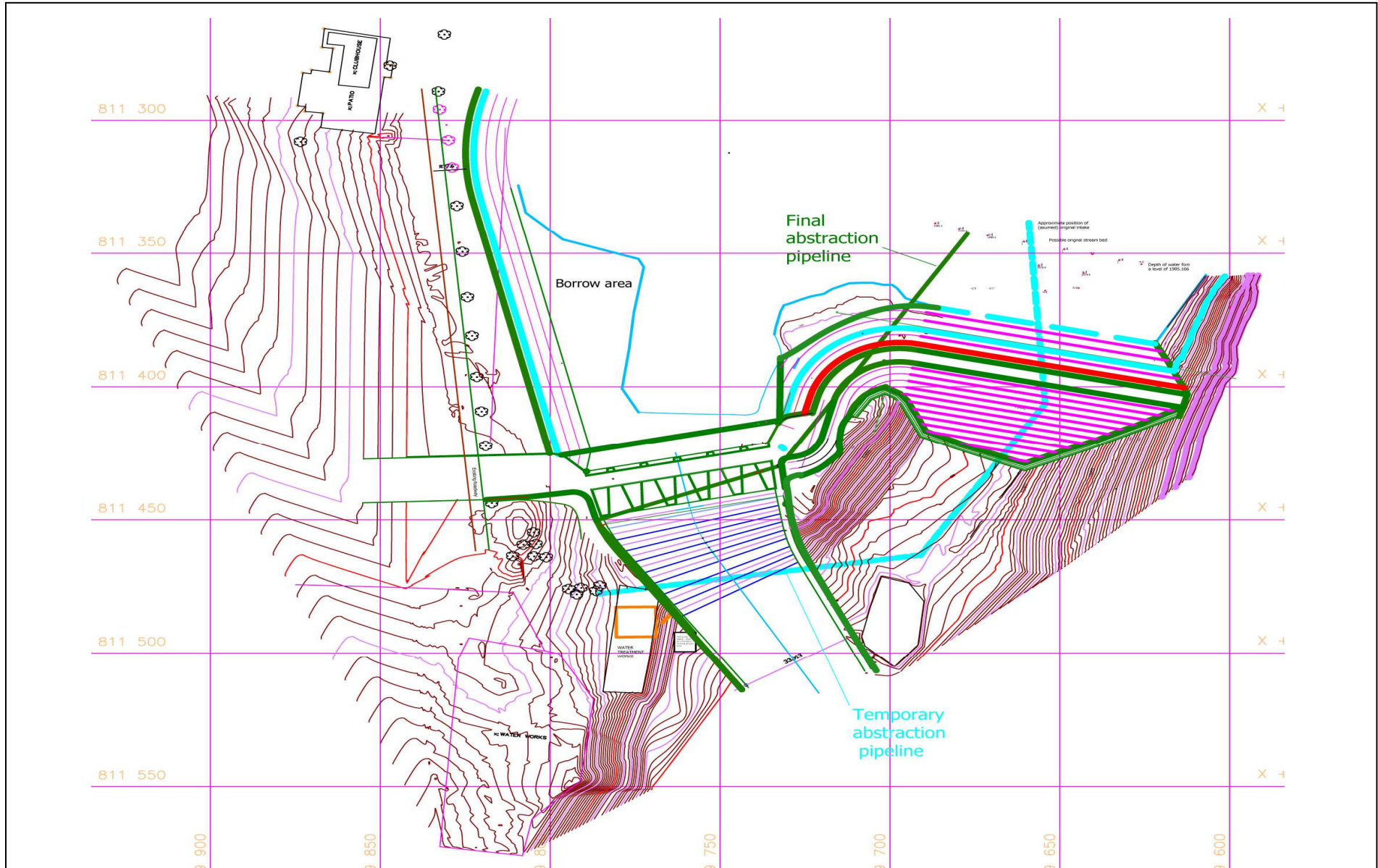


Figure 2: Layout Plan

A-2 LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION

SEF registered the proposed upgrade of the Dullstroom WTW with the MDEDET and the project has been assigned the reference numbers: MDEDET Ref No: 17/2/3N-338. The legislation, guidelines and policies applicable to this project are as follows:

A-2.1 NEMA and the Environmental Impact Assessment Regulations

The EIA Regulations, promulgated under NEMA, focus primarily on creating a framework for co-operative environmental governance. NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by State Departments and to provide for matters connected therewith.

In terms of the EIA Regulations of 2010 and activities listed in GN No. 544 (requiring a Basic Assessment process) the following listed activities are deemed by the EAP to be applicable to the proposed project based on the information provided by the Nkangala District Municipality (Applicant).

Relevant Notice	Activity in terms of the Notice	Activity description
GN R 544 of 18 June 2010	Activity No. 9 The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water - (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more.	The implementation of a new pipeline from the pump station (next to the dam) to the Water treatment Plant.
GN R 544 of 18 June 2010	Activity No. 11 The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square metres in size; (ix) slipways exceeding 50 square metres in size; (x) buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	The construction of a new 5m wide, 1000m long access road (and associated stormwater channels) within 32m of the Dullstroom Municipal Dam. The construction of a weir/bridge at the new raised dam wall – Refer to Appendix 3 Layout Plan.
GN R 544 of 18 June 2010	Activity No. 55 The expansion of a dam where: (i) the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, was originally 5 metres or higher and where the height of the wall is increased by 2,5 metres or more; or where the high-water mark of the dam will be increased with 10 hectares or more.	The Dullstroom Municipal Dam wall will be increased by more than 4.2 meters to an overall height in the excess of 5m.

The above mentioned listed activities are deemed to include activities that could potentially have a detrimental impact on the social and biophysical state of an area and as such, an Environmental Authorisation is required by way of Basic Assessment Reporting (BAR) process.

A-2.2 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways.

Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

The Emakhazeni Local Municipality currently has a Water Use License for Dullstroom of 1.46MI/d. The current abstraction is approximately 2 MI/d and the proposed project will increase the capacity to 5MI/d. The Water Use License will therefore have to be amended as follows:

- 21(a) taking water from a water resource (a 3.54 MI/d increase in capacity);
- 21(c) impeding or diverting the flow of water in a watercourse; (raising the dam wall by 2.4m); and
- 21(i) altering the bed, banks, course or characteristics of a watercourse; and (raising the dam wall by 2.4m)

A-2.3 Water Services Act, 1997 (ACT No. 108 of 1997)

The Water Services Act focuses on the roles and functions of the various water services institutions responsible for providing water and sanitation services. A key aspect of sustainable water and sanitation services is building effective partnerships between these institutions and end-users. This Act, among other things, also provide for the gathering and the distribution of information in a national information system and the promotion of effective water resource management and conservation (<http://www.waternet.co.za>). The Act has been amended by the Water Services Amendment Act, No. 30 of 2004.

The main objectives of the Act are to provide for:

- The right of access to basic water supply and the right to basic sanitation
- necessary to secure sufficient water and an environment not harmful to human health or well-being.
- The setting of national standards and norms and standards for tariffs in respect of water services.
- The preparation and adoption of water services development plans by water services authorities.
- A regulatory framework for water services institutions and water services Intermediaries.
- The establishment and disestablishment of water boards and water services committees and their duties and powers.
- The monitoring of water services and intervention by the Minister or by the relevant Province.
- Financial assistance to water services institutions.
- Gathering of information in a national information system and the distribution of that information.
- The accountability of water services providers.
- The promotion of effective water resource management and conservation.

A-2.4 Municipal Systems Act, 2000 (Act No. 32 of 2000)

The Act focuses on the internal systems and administration of a municipality and covers various matters including:

- Public accountability and community involvement in policy formulation and decision making.
- Guidelines for making bylaws.
- Establishing Integrated Development Plans
- Establishing a performance management system.
- Delivering municipal services.
- Credit control and debt collection.

According to this Act, a “water services authority” is any municipality that has executive authority for water services within its area of jurisdiction in terms of the Municipal Structures Act. This means that the municipality is responsible for ensuring access to water supply and sanitation services. The Act also makes provision for the function to be performed by the municipality itself or any other public or private body, such as a water board, a non-governmental organisation (NGO), a community-based organisation (CBO) or a private sector company, with whom it contracts (Water and Sanitation Business, 2005).

A-2.5 Other Legal Requirements

A-2.5.1 Acts

Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa has major implications for environmental management. The main effects are the protection of environmental and property rights, the change brought about by the sections dealing with administrative law, such as access to information, just administrative action and broadening of the locus standi of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the NEMA. Section 24 in the Bill of Rights of the Constitution specifically states that:

Everyone has the right -

- To an environment that is not harmful to the 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.

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa’s biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

This Act is applicable to this application for environmental authorisation, in the sense that it requires the project applicant to consider the protection and management of local biodiversity.

National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes.

National Heritage Resources Act, 1999 (Act No. 25 of 1999)

This Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares and where linear developments (including pipelines) exceed 300 metres in length. The Act makes provision for the potential destruction to existing heritage sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)

The Act recognises that everyone has a Constitutional right of access to any information held by the state and by another person when that information is required to exercise or protect any rights. The purpose of the Act is to foster a culture of transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect the rights

A-2.5.2 Provincial Policies and/or Guidelines***Integrated Environmental Management (IEM)***

IEM is a philosophy for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels.

The DEA Integrated Environmental Management Information Series guidelines are also considered during this BAR application process.

National Spatial Biodiversity Assessment

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

Protected species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

A-2.5.3 Provincial and Municipal By-laws

The Emakhazeni Local Municipality and Nkangala District municipalities have developed local bylaws and various policies relating to waste disposal, water, economic development, etc. The Nkangala District Municipality (Applicant) will ensure that such policies and bylaws, as far as possible, will be adhered to.

A-2.5.4 Development Strategies

According to the Municipal Systems Act (MSA) of 2000, all municipalities have to undertake an Integrated Development Plan (IDP) process to produce IDP's. As the IDP is a legislative requirement it has a legal status and supersedes all other plans that guide development at local government level. In terms of Section 26(e) of

the Municipal Systems Act (Act 32 of 2000), every municipality is also required to formulate a Spatial Development Framework (SDF) as a part of its IDP.

The following Development Strategies will be applicable to the proposed project:

Government Sphere	Applicable Development Strategy
District	Nkangala District Municipality reviewed Integrated Development Plan 2013 - 2014
District	Nkangala District Municipality Spatial Development Framework 2012 - 2013
Local	Emakhazeni Local Municipality Integrated Development Plan 2012/13 – 2016/17, including the Spatial Development Framework (Section E)

A-3 NEED AND DESIRABILITY OF THE PROJECT

Dullstroom is a small town with a large township, Sakhelwe, located to the north west of the town. The joint population of Dullstroom and Sakhelwe was estimated at 5,764 in 2006. This population has increased significantly over the past few years and is expected to increase to 13 371 by 2030. This increase is driven by growth in the tourism sector within and around the town.

The design capacity of the Dullstroom Water Treatment Works (WTA) has a capacity of 2 MI/d which currently exceeds the capacity of the raw water pumping system. The objective of this project is to upgrade pumping system as well as the capacity of the existing Water Treatment Plant from 2MI/d to 5MI/d in order to provide drinking water to the growing population of Dullstroom and Sakhelwe.

This project will enable the Emakazeni Local Municipality to fulfil their mandate in terms basic service delivery.

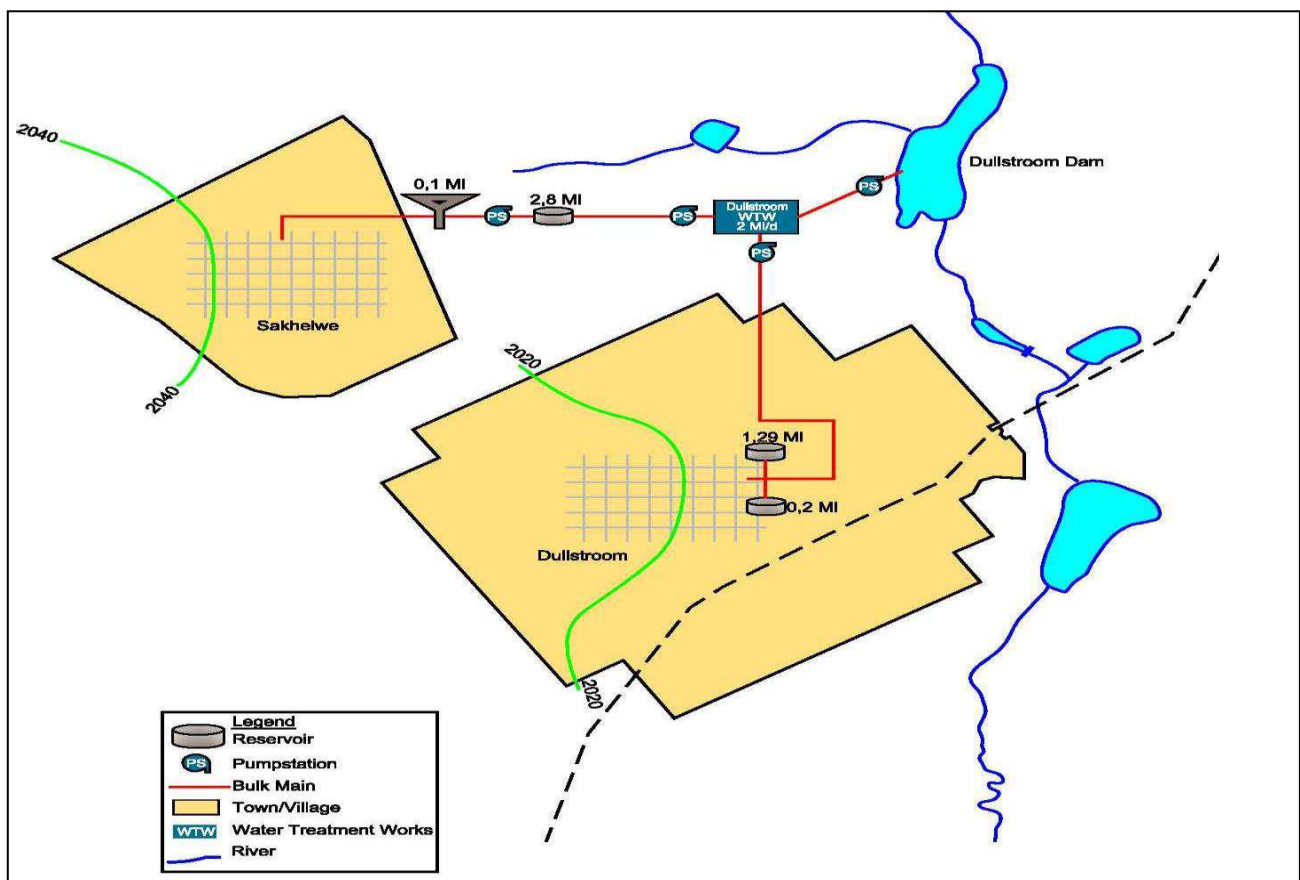


Figure 3: Schematic layout of the existing bulk water supply scheme

SECTION B: THE RECEIVING ENVIRONMENT

In order to assess the potential impacts of the proposed upgrade of the Water Treatment Works on the receiving environment, one needs to first assess the baseline conditions found over the study area. Using this *Status Quo* one can then, broadly speaking, determine the likely impacts that will emanate from a specific development typology on a well-defined receiving environment.

B-1 BIOPHYSICAL ENVIRONMENT

B-1.1 Climate

According to the Wetland-Verloren Nature Reserve website (www.ewisa.co.za) Dullstroom lies in the summer rainfall region of South Africa and has a unique micro-climate, because of its high altitude (2075m above sea-level) it is often colder than the surrounding areas, and can be entirely closed in by mist. "The weather has a tendency to change rapidly, often giving rise to "four seasons in one day". The average summer temperature is in the region of 22 Degrees Celsius. In winter it is not unusual to see the temperature dropping below freezing point". From: <<http://www.ewisa.co.za>>.

The Wetland-Verloren Nature Reserve website (www.ewisa.co.za) further states that Dullstroom normally receives about 839mm of rain per year, with most rainfall occurring during summer. "The highest rainfall for a month was measured in January 1998 when a total of 212mm was measured. In terms of snow, the best years were 1996 and 1997 when a snowfall of 12mm was measured on 16 July 1996 and 10mm was measured on 28 May 1997". From: <<http://www.ewisa.co.za>>.

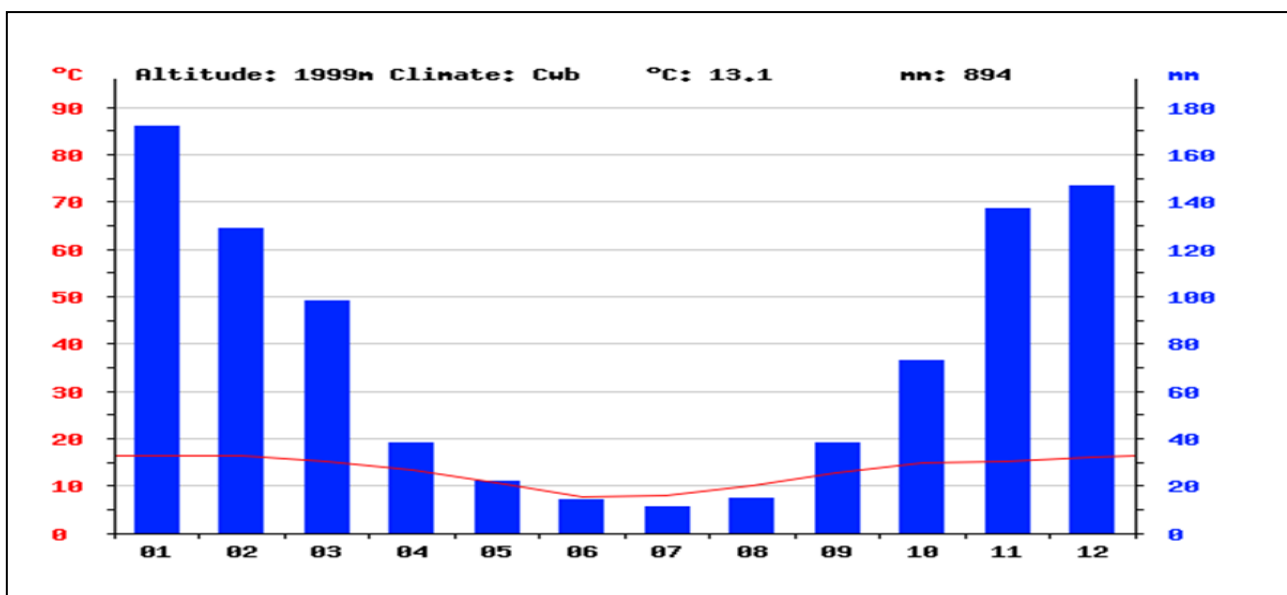


Figure 4: Average Monthly Temperature and Rainfall

B-1.2 Geology

The area is underlain by two types of rocks, namely sedimentary rocks and intrusive igneous rocks. The Dullstroom Formation of South Africa is part of the Bushveld Magmatic Province (BMP), a voluminous suite of Precambrian magmatic rocks that includes the intrusive rocks of the Bushveld Complex and the nearby extrusive units of the Rooiberg Group. Most of the isotopic age dates acquired for these intrusive and extrusive magmatic rocks range from 2 Ma to 2052, 48 Ma. The Dullstroom Formation is most completely exposed in the south-eastern part of the BMP and represents an approximately 1±2 km thick sequence of

laterally continuous, basaltic to andesitic volcanic flows inter-bedded with subordinate felsic volcanic units and thin sedimentary strata.

B-1.3 Soil

Most of the soils are leached, because of the influence of the climatic conditions in the area. The quartzite soils are sandy, light textured, and shallow; while the underlying rock is covered with ferricrete, causing a high water table in the wet season. The shale soils are mostly shallow, sand/clay/loam soils with a red colour. The diabase soils are shallow, dark-brown soils with high silt content.

B-1.4 Flora

According to the website, www.dullstroom.biz, the area has a rural area covered largely by Highveld type grass (85%), with some bush and forest (5%) and cultivated land (10%). Furthermore the website states that Dullstroom has a sub-Alpine climate (regarded as unique in South Africa) and combined with the high annual rainfall is responsible for the varied and abundant flowering plants in the area. From. "It is said that over 200 different species of wild flowers grow naturally in and around Dullstroom. Outside of the village area, one sees a vast array of wild flowers - gladioli, wahlenbergias, osteospermums and pelargoniums. On the outlying farm areas, along the rivers, it is not uncommon to come across tree-ferns - some over 100 years old. Around the rock outcrops it is not uncommon to see 3 varieties of arum lily - the white *Zantedeschia aethiopica*, the pink *Zantedeschia rehmanii*, and the beautiful golden *Zantedeschia petlandii*, unique to the Steenkampsberg range. One of the most striking plants in the area is the bright pink lily *Brunsvigia radulosa* - known to many as the "tumble weed" - with a huge head of bright pink flowers which can measure over 60cm across. The flower eventually dries and breaks off, and the wind blows it away, scattering seeds as it tumbles. Under the rocks the striking red flower of the *Streptocarpus dunii* may be found, with its solitary red leaf, measuring up to 50cm in length". From: <<http://www.dullstroom.biz/dullstroom>>.

B-1.5 Fauna

The website, www.dullstroom.biz, also states that dullstroom is part of the Steenkampsberg range, which is home to many interesting mammals, from the seldom seen forest shrew, through the cape clawless otter, to oribi and grey rhebuck. "The Steenkampsberg is home to an interesting variety of mammals, including a few small antelope species, and is one of the last strongholds of oribi in South Africa. Grey duiker are fairly common, and mountain reedbuck, grey rhebuck and steenbok are still to be seen on the grasslands. A few members of the cat family are occasionally spotted, including serval cats, civets, African wild cats and caraculs. Black-backed jackal are fairly common in the area, and brown hyaena and aardwolf are sometimes spotted at night. Porcupines and armadillos are common, but seldom seen, as are bush-pigs - a variation of the European wild boar. Both South African otter species, the cape clawless, and the smaller spotted-necked otter are widespread over the Steenkampsberg plateau. They tend to move around, but unfortunately they are considered pests to trout farmers, and are often hunted as such. The Steenkampsberg provides large areas of almost perfect habitat to a varied range of bird-life. The unique micro-climate of the area makes this home to some species not seen elsewhere on the Highveld. Over 150 bird species have been recorded in the area, including recent immigrants introduced by man's intervention - plantations, trout dams fields and gardens. Waterbirds account for a large portion of the bird population, including herons, rails crakes, Egyptian geese, spurwing geese, kingfishers, coots, sacred ibis and whiskered terns. The wetlands are home to all 3 species of crane found in South Africa - all of them on the endangered list. The birds of the open grassland include larks, pipits, cisticolas, finches, bustards, cranes, bald ibis and francolin. Birds of prey most often seen in the area include steppe- and jackal buzzards, snake eagles, long-crested eagles, fish eagles and secretary birds. Bird-watchers frequent the area for a glimpse of some rare bird species, including all 3 species of South African cranes, Stanley's bustard, and the extremely rare and shy white-winged flufftail". From: <<http://www.dullstroom.biz/dullstroom>>.

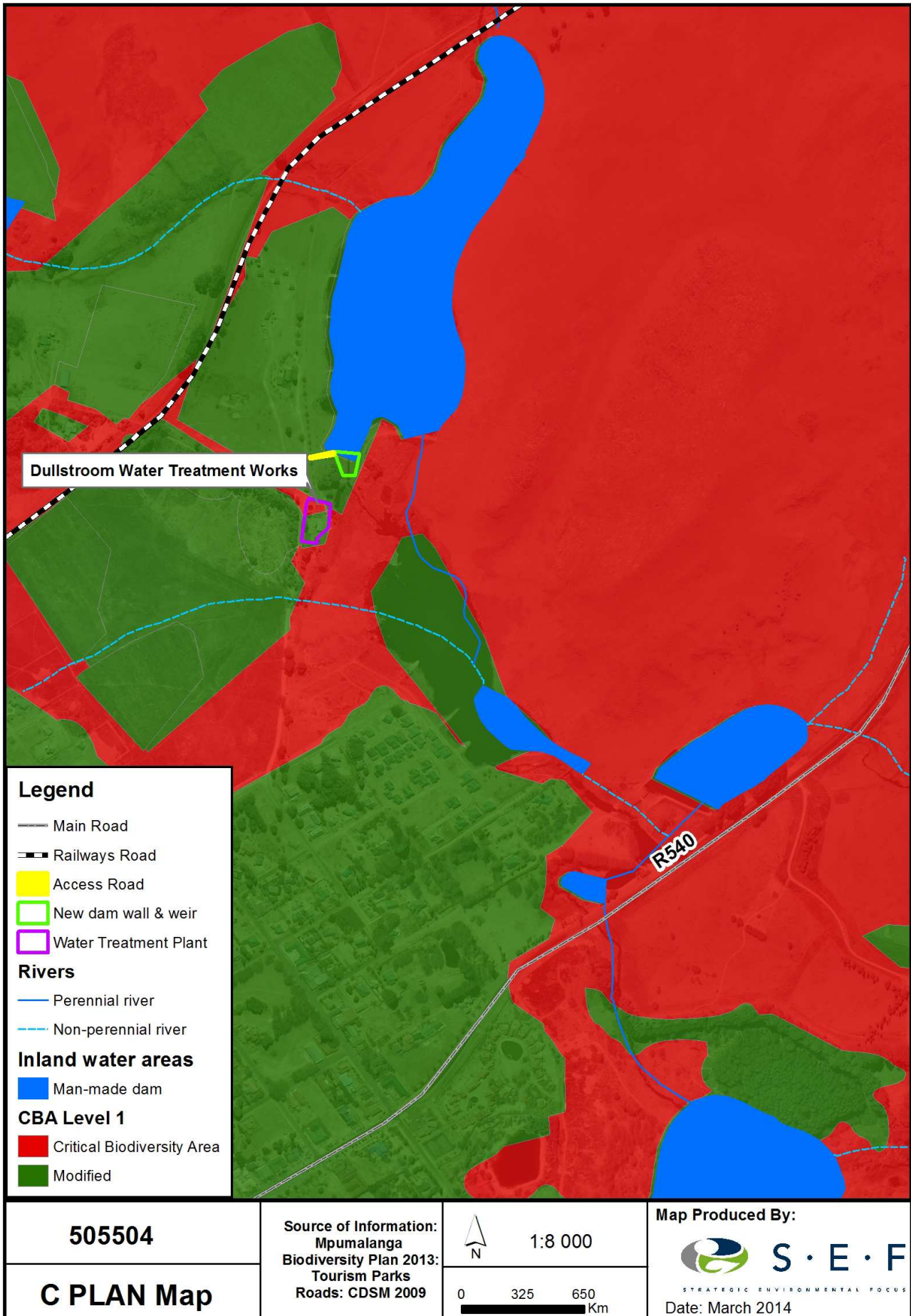


Figure 5: Sensitivity Map (Mpumalanga Conservation Plan)

B-1.6 Surface water (hydrology)

The Dullstroom dam is situated on the Crocodile river in the tertiary catchment X21A. Catchment in relation to watercourse or watercourses or part of a watercourse, means the area from which any rainfall will drain into the watercourses or part of a watercourse through surface flow to a common point or points. [Source: National Water Act (Act No. 36 of 1998)]

The catchment area is approximately 33.21 km² and drains predominantly from north to south. The longer of two rivers feeding the dam is approximately 8.2km long. The average slope along the longest river is 1.8% with slopes varying from 10% upstream in the mountain areas to 2.7% on the hilly areas and 1.3% towards the lower reaches.

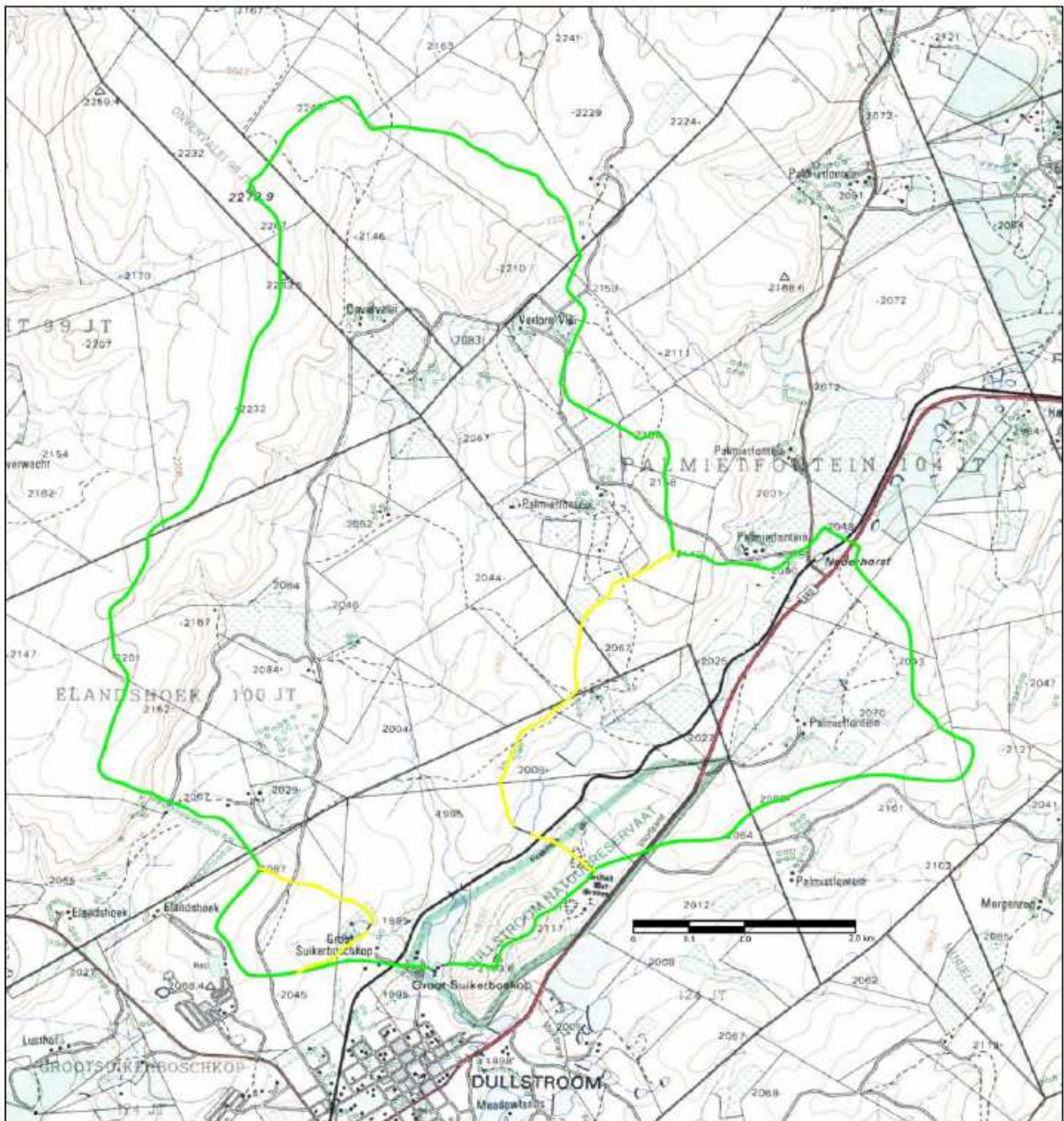


Figure 6: Tertiary catchment (X21A) (Source: Scipp Engineering Feasibility Report)

B-2 SOCIO-ECONOMIC ENVIRONMENT

B-2.1 Heritage

According to the website, www.geocaching.com, Dullstroom dates back to the early 1880s when Dutch Settlers made their way to the place of *eternal mist*. “The town’s European heritage is evident in its wonderful array of deciduous trees - birches, lindens, cherry and many other varieties planted here over a century ago. The architecture of the village of Dullstroom is a mixture of 19th and 20th century building designs with numerous listed buildings such as the Dutch Reformed Church in the centre of the town”. From: <http://www.geocaching.com/geocache/>.

“Today, Dullstroom is an important tourist destination, well-known for fly-fishing. Tourists are attracted to the village’s aesthetic value and the stonekraals or stone formations (ruins circa 1846) in the Verloren Valei Reserve nearby. The Verloren Valei reserve was proclaimed a Provincial Nature Reserve in 1983. It comprises an area of 5,891 ha and is 2049 m to 2214 m above mean sea level. Conservation of the site is particularly important when considering the impact of forestry, agriculture and the fly-fishing industry in the surrounding areas” From: <http://www.geocaching.com/geocache/>.

B-2.2 Socio-economic

Mpumalanga literally means "the place where the sun rises". Mpumalanga lies in eastern South Africa, north of KwaZulu-Natal and bordering Swaziland and Mozambique. It constitutes 6.5% of South Africa's land area. In the north it borders on Limpopo, to the west Gauteng, to the southwest the Free State and to the south KwaZulu-Natal. The capital is Nelspruit (recently renamed to Mbombela).

Mpumalanga Province is divided into three municipal districts, which are further subdivided into 17 Local Municipalities. Dullstroom is situated within the Nkangala District Municipality and the Emakhazeni Local Municipality. Emakhazeni Local Municipality is situated in the heart of Mpumalanga, covering a total of 4 736km² with a total of about 47 216 people and eight wards. It is bordered by Mbombela Local Municipality on the east and Middelburg Local Municipality on the west. It is one of the six municipalities that fall within the Nkangala District Municipality, and was formed through the amalgamation of four former Transitional Local Councils (TLCs) namely Belfast, Dullstroom, Machadodorp and Waterval Boven.

There are four nature reserves in the area, namely the Tullach-Mohr Reserve on the eastern boundary of the area, the Dullstroom Nature Reserve situated north of Dullstroom and the Verloren Valley Nature Reserve situated in the north of Emakhazeni. Lastly, the Ntsinini Nature Reserve is situated east of Emgwenya (Waterval Boven).

Dullstroom, also known as Emnotweni is a small town in Mpumalanga province, South Africa, and is one of South Africa's premier flyfishing destinations. Dullstroom was established in 1883 by Dutchman Wolterus Dull to settle Dutch immigrants. The element stroom, 'stream', refers to the Crocodile River nearby. One of the coldest towns in South Africa, Dullstroom is the only place in the country where beech and elm trees grow; they were planted by Dutch colonists.

According to Statistics South Africa Census 2011 data, the total area for Dullstroom is 30.40 km² with a population size of 558 (18.35 per km²). Dullstroom has a total of 203 households (6.68 per km²). From the total population, 50.54% are female and 49.46% are male. The majority of the population is White Persons (84.23%), followed by 8.06% Black African Persons and 7.35% Indian or Asian Persons (Census 2011). English (50.72%) and Afrikaans (42.11%) is most widely spoken within the area, with a small number of persons speaking Sesotho (1.97%) and isiNdebele (1.97%) (Census 2011).

SECTION C: BASIC ASSESSMENT REPORTING PROCESS

This section provides a summary of the technical process to be followed for this Basic Assessment Reporting (BAR) process. The entire process is outlined in the flow diagram below:

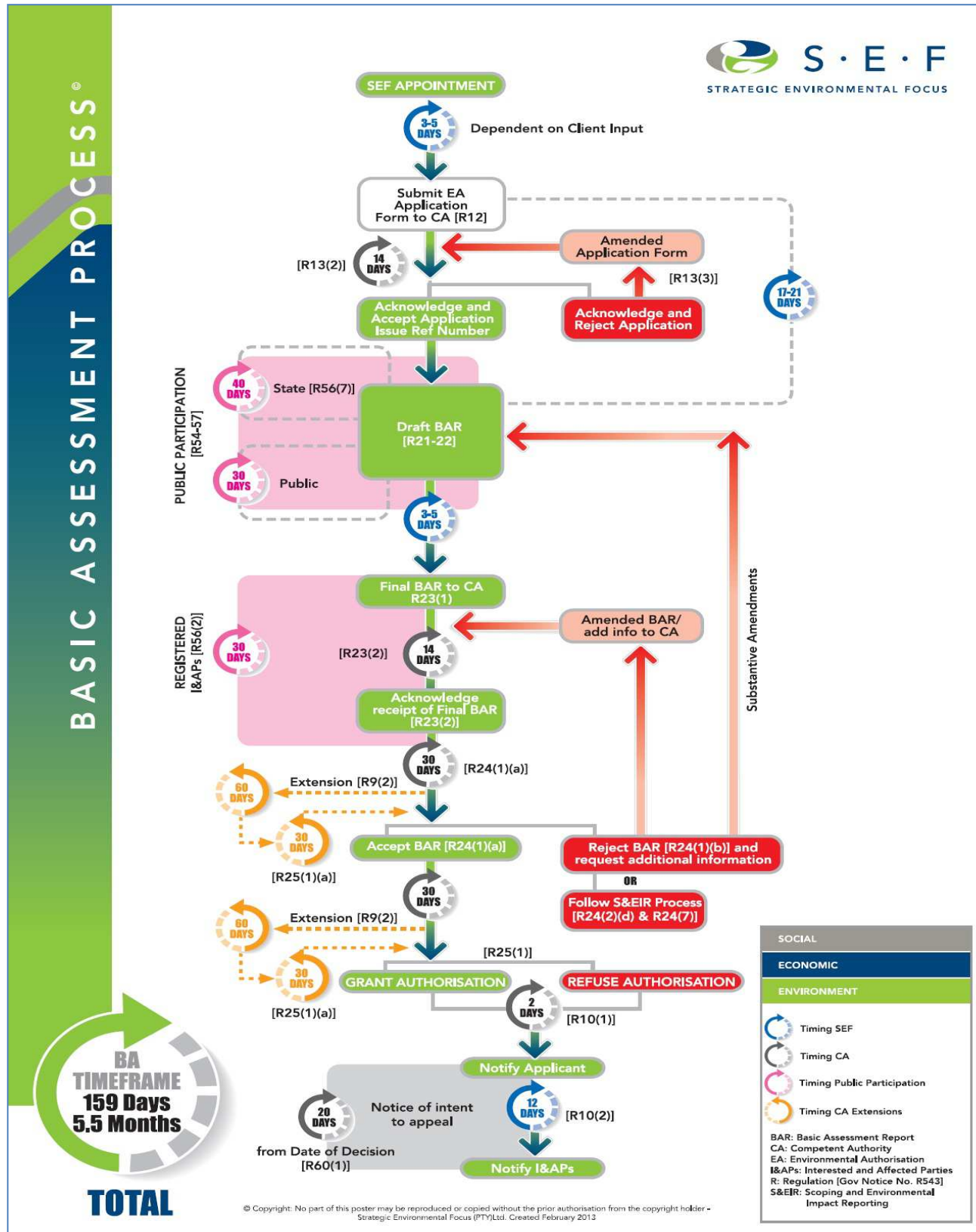


Figure 7: Flow Diagram of the Basic Assessment Process

C-1 APPLICATION FOR AUTHORISATION

The application form informing the Department of intent to obtain an environmental authorisation was submitted to the MDEDET on 15 January 2014. The project was subsequently registered and assigned the MDEDET project reference number 17/2/3N-338.

C-2 PUBLIC PARTICIPATION PROCESS

The principles of NEMA govern many aspects of the Basic Assessment Reporting process, including consultation with I&APs. These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, to allow them to comment and ensure the participation of historically disadvantaged individuals, including women, the disabled and the youth.

The principal objective of public participation is thus to inform and enrich decision-making. This is also the key role in the scoping phase of the process.

C-2.1 Identification of Interested and Affected Parties

I&AP's representing the following sectors of society have been identified in terms of Regulation 55 of the EIA Regulations R543 of 2010 (see Appendix 5 for a complete preliminary I&AP distribution list):

- Provincial Authorities;
- Local Authorities;
- Ward Councillors;
- Parastatal/ Service Providers;
- Non-governmental Organisations;
- Local forums/ unions; and
- Adjacent Landowners.

C-2.2 Public Announcement of the Project

The project was announced on **Friday, 14 March 2014** in the following manner (see Appendix 5 for public announcement documentation):

- Publication of media advertisements (in English) in a regional newspaper;
- On-site notices (in English) advertising the Basic assessment reporting process were placed on and around the site, as well as in the public venue where reports were made available for review and comment; and
- Distribution of letters by fax/ by hand/ post/ email to I&APs including Registration and Comment Sheets.

C-2.3 Public Review of the Draft Scoping Report

I&APs and relevant State Departments have the opportunity to raise issues either in writing, by telephone or email on the Draft Basic Assessment Report (BAR) and Environmental Management Programme (EMP) for a period of 40 days (**Friday, 14 March 2014 to Tuesday, 29 April 2014**). The availability of the Draft BAR and EMP was announced by means of personal letters to all the registered I&APs on the distribution list, as well as by the media advertisement in a regional newspaper.

In addition, the Draft BAR and EMP was distributed for comment as follows:

- Left in the Dullstroom Public Library;
- Hand-delivered/ couriered to the relevant authorities; and
- Posted on SEF's website at <http://www.sefsa.co.za>

C-2.4 Final Basic Assessment Report

The Final BAR and EMP will be updated with comments and/or concerns raised by I&APs during the commenting period of the Draft BAR and EMP. The Final BAR will be submitted to the MDEDET and registered I&APs simultaneously for review and comment for a period of 30 days. Registered I&AP's will be advised to submit any comments on the Final BAR and EMP directly to the MDEDET prior to the lapsing of the 30 day review period.

C-2.5 Meetings

Public and/ or Stakeholder meetings will be arranged as and when required.

SECTION D: APPROACH TO ASSESSMENT OF IMPACTS

The EAP will provide an outline of the approach used in the study. Assumptions and sources of information will also be clearly identified.

D-1.1 Impact Identification and Assessment

The EAP must make a clear statement, identifying the environmental impacts of the various phases and management of the proposed mine development. As far as possible, the EAPs must quantify the suite of potential environmental impacts identified in the study and assess the significance of the impacts according to the criteria set out below. Each impact will be assessed and rated. The assessment of the data must, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgements based on his/ her professional expertise and experience.

D-1.2 Assessment Procedure: Proposed Impact Assessment Methodology

For the purpose of assessing impacts during the BAR phase of the project to follow, the project will be divided into three phases from which impacting activities can be identified, namely:

Construction Phase:	All the construction related activities on site, until the contractor leaves the site.
Operational Phase:	All activities, including the operation and maintenance of the proposed mine.
Decommissioning Phase:	All activities, including the decommissioning of the proposed mine development.

The activities arising from each of these phases will be included in the impact assessment tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them.

The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure.

Extent The physical and spatial scale of the impact.	Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
	Site	The impact could affect the whole, or a significant portion of the site.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
	National	The impact could have an effect that expands throughout the country (South Africa).
	International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.

Duration The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.	Short Term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
	Short-Medium Term	The impact will be relevant through to the end of a construction phase.
	Medium Term	The impact will last up to the end of the development phases, where after it will be entirely negated.
	Long Term	The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
Intensity Is the impact destructive or benign, does it destroy the impacted environment, alters its functioning, or slightly alter the environment itself?	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Probability The likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.	Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).
	Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.
	Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.
	Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.
	Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

Mitigation – The impacts that are generated by the mine can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the mine considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

Determination of Significance – Without Mitigation – Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance will be rated on the following scale:

No significance: The impact is not substantial and does not require any mitigation action;

Low: The impact is of little importance, but may require limited mitigation;

Medium: The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels; and

High: The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

Determination of Significance – With Mitigation – Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation will be rated on the following scale:

No significance: The impact will be mitigated to the point where it is regarded as insubstantial; **Low:** The impact will be mitigated to the point where it is of limited importance;

Low to medium: The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;

Medium: Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw;

Medium to high: The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels; and

High: The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

Assessment Weighting – Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project’s life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it will be necessary to weigh and rank all the identified criteria.

Ranking, Weighting and Scaling – For each impact under scrutiny, a scaled weighting factor will be attached to each respective impact. The purpose of assigning such weightings serve to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist’s element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance (See Figure 8 below):

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2	Low to medium 2	Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4	Medium to high 4	Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Figure 8: Description of Bio-Physical Assessment Parameters

Identifying the Potential Impacts Without Mitigation Measures (WOM) – Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by thBAR assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1: Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x
Weighting Factor

Identifying the Potential Impacts With Mitigation Measures (WM) – In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.

Mitigation Efficiency (ME) – The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2: Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency
Or
WM = WOM x ME

Significance Following Mitigation (SFM) – The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact will, therefore, be seen in its entirety with all considerations taken into account.

D-1.3 Integration of Specialist’s Input

In order to maintain consistency in the impact assessment, it is suggested that all potential impacts to the environment (or component of the environment under review) should be listed in a table similar to the example shown below (more than one table will be required if impacts require assessment at more than one scale). The assessment parameters used in the table should be applied to all of the impacts and a brief descriptive review of the impacts and thBAR significance will then be provided in the text of the specialist reports and consequently in the BAR. The implications of applying mitigation are reviewed in Section C-2.4 below.

Table 4: Example of an Impact Table

Nature		Status	-
Impact source(s)			
Affected stakeholders			
Magnitude	Extent		
	Intensity		
	Duration		
	Reversibility		
	Probability		
Significance	Without mitigation		H
	With mitigation		L
Confidence			

D-1.4 Mitigation Measures

Mitigation measures will be recommended in order to enhance benefits and minimise negative impacts and they will address the following:

- Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable

reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an “educated guess” based on his/ her professional experience;

- Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;
- Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and
- Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented. The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.

Once the above objectives have been stated, feasible management actions, which can be applied as mitigation, must be provided. A duplicate column on the impact assessment tables described above will indicate how the application of the proposed mitigation or management actions has reduced the impact. If the proposed mitigation is to be of any consequence, it should result in a measurable reduction in impacts (or, where relevant, a measurable benefit).

SECTION E: ASSESSMENT OF IMPACTS

E-1 IDENTIFICATION OF IMPORTANT ENVIRONMENTAL IMPACTS

The key environmental impacts listed in the following section have been determined through:

- Legislation; and
- Experience of the Environmental Assessment Practitioner (EAP).

The following issues were initially identified and, amongst others, will be carried forward into the BAR phase for further investigation and assessment:

E-1.1 Key Impacts

Biophysical Impacts:

- An increase in the volume of abstraction of a surface water resource that may lead to drought in the dry season;
- Surface water run-off (viz. increased soil erosion) associated with the establishment of hard surfaces and vegetation clearing for the construction of the access road;
- Potential impacts on ground and surface water quality due to hydrocarbon spillages during the construction and operational phase of the development;
- Destruction of flora within the proposed area, stemming from activities such as vegetation clearing and topsoil stripping for the proposed access road; and
- Faunal displacement due to increased level of activity and associated noise.

Socio-Economic Impacts:

- Noise, dust and disturbance during the construction phase;
- Job creation during the construction and operational phases of the proposed project, and
- Ensuring basic service delivery by providing drinking water to residents of Dullstroom and Sakhelwe.

E-2 BIOPHYSICAL IMPACTS

E-2.1 Increased volume of abstraction

Impact source(s)	Increase in abstraction of water from a surface water resource in order to supply the growing population with drinking water.	Status	-
Nature of impact	Potential drought during dry months which in turn may affect aquatic functionality of the dam.		
Reversibility of impact	As the area is known for its high rainfall the impact is reversible.		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Surrounding and downstream land owners		
Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	Medium – 3	
	<i>Duration</i>	Short – Medium Term - 2	
	<i>Probability</i>	Possible – 2	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+2) \times 2 = 20$ Low - Medium	L - M

	<i>With mitigation</i>	$WOM \times ME = WM$ $20 \times 0.8 = 16$ Low	L
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Mitigation Measures:

- Raise awareness to save water amongst residents of Dullstroom and Sakhelwe;
- Conduct regular monitoring of the water supply infrastructure to ensure that there are no leakages or wastage;
- Return treated waste water (from Dullstroom and Sakhelwe) to the Dullstroom Dam; and
- Ensure that the proposed maximum abstraction capacity of 5Ml/d is not exceeded.

Significance of the impact:

The significance of this impact, without mitigation, is regarded to be **medium to low** due to the high rainfall of the catchment. Implementation of the above mitigation measures will decrease the significance even more so that it becomes **Low**.

E-2.2 Increased Soil Erosion

Impact source(s)	<ul style="list-style-type: none"> • Increased volume of surface water run-off associated with the establishment of hard surfaces and vegetation clearance for the access road. • High rainfall 	Status	-
Nature of impact	An increased level of soil erosion during the construction and operational phases.		
Reversibility of impact	The impact is reversible through the implementation of appropriate mitigation measures.		
Degree of irreplaceable loss of resource	High		
Affected stakeholders	Surrounding land owners and downstream users		
Magnitude	<i>Extent</i>	Site - 2	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Long term - 4	
	<i>Probability</i>	Likely – 3	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+5+4+3) \times 5 = 70$ Medium - High	M - H
	<i>With mitigation</i>	$WOM \times ME = WM$ $70 \times 0.4 = 28$ Low - Medium	L - M

Mitigation Measures:

- Utilise structures e.g. gabions to halt erosion advance, capture sediments and raise water level where necessary.
- Stabilise eroding stream banks: Sloping and re-vegetation of banks to reduce erosion hazard.
- Increase surface roughness around access road by re-vegetating as soon as possible.
- The ground should be compacted, stabilised and re-vegetated after construction is complete so as to prevent excessive erosion of loose soil.

Significance of the impact:

The significance of this impact, without mitigation, is regarded to be **medium - high** due to the increased volume of surface water run-off. Implementation of the above mitigation measures will decrease the significance to **low – medium**.

E-2.3 Impacts on soil and surface water quality

Impact source(s)	Hydrocarbon and other chemical spillages.	Status	-
Nature of impact	Potential impacts to soil and surface water during the construction and operational phases of the proposed activities.		
Reversibility of impact	The impact is reversible through the implementation of appropriate mitigation measures.		
Degree of irreplaceable loss of resource	Medium		
Affected stakeholders	Surrounding and downstream land owners		
Magnitude	<i>Extent</i>	Regional - 4	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Long term - 4	
	<i>Probability</i>	Possible – 2	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(4+5+4+2) \times 3 = 45$ Medium	M
	<i>With mitigation</i>	$WOM \times ME = WM$ $45 \times 0.4 = 18$ Low	L

Mitigation Measures:

- Construction should preferably take place during the dry season.
- All construction and operational vehicles and equipment should be kept in good working condition.
- All construction and operational vehicles should be parked in demarcated areas when not in use and drip trays should be placed under vehicles to collect any spillages/ leaks.
- All hydrocarbons (oils, diesel etc.) must be banded to 110% capacity of its volume.

Significance of the impact:

The significance of this impact, without mitigation, is regarded to be **medium** due to the possibility of Hydrocarbon spillages polluting the soil and surface water. Implementation of the above mitigation measures will decrease the significance to **low**.

E-2.4 Impacts on Flora

Impact source(s)	Vegetation clearance and construction of the access road roads and new pipeline.	Status	-
Nature of impact	Destruction of vegetation and stripping of topsoil on site during the construction phase.		
Reversibility of impact	The impact is irreversible for the access road footprint but reversible for adjacent impacted natural/ areas to remain undeveloped.		
Degree of irreplaceable loss of resource	High		
Affected stakeholders	n.a		
Magnitude	<i>Extent</i>	Site - 2	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Short – Medium Term - 2	
	<i>Probability</i>	Likely – 3	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+5+2+3) \times 4 = 48$ Medium	M

	<i>With mitigation</i>	$WOM \times ME = WM$ $48 \times 0.6 = 29$ Low - Medium	L - M
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Mitigation Measures:

- Limit vegetation clearance to only those areas affected by the construction activities. This will also prevent the activity footprint from expanding outside the site boundaries
- An ecological management plan must be implemented for the construction phase
- The maintenance manager must monitor the landscaped/vegetated areas to prevent alien plant invasion.
- All threatened and protected plants must be cordoned off as no-go areas during the construction period
- Implement an alien invasive monitoring plan to prevent the colonisation and spread of alien invasive plant species into the disturbed soils
- An independent Environmental Control Officer (ECO) should be appointed to oversee all construction and mining activities;
- Plant rescue and relocation should be conducted by a suitably qualified botanist with proven relocation experience
- No open fires should be allowed in areas containing natural vegetation, especially during the dry season;
- Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas;
- Stripped topsoil must be protected for re-use.
- Seeds from existing surrounding vegetation must be collected and used for re-vegetation of cleared areas.

Significance of the impact:

The significance of this impact, without mitigation, is regarded to be **medium** due to the proposed clearance of vegetation for the access road. Implementation of the above mitigation measures will decrease the significance to **low – medium**.

E-2.5 Impacts on Fauna

Impact source(s)	Disturbance and or destruction of animals due to increased activity during construction.		Status	-
Nature of impact	Migration and possible mortality of animals.			
Reversibility of impact	The impact is reversible through the implementation of appropriate mitigation measures.			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	n.a			
Magnitude	<i>Extent</i>	Site- 2		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Short – Medium Term - 2		
	<i>Probability</i>	Probable–1		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+5+2+1) \times 4 = 40$ Medium		M
	<i>With mitigation</i>	$WOM \times ME = WM$ $40 \times 0.4 = 16$ Low		L

Mitigation Measures:

- An independent Environmental Control Officer (ECO) should be appointed to oversee all construction and mining activities;
- Construction activities should commence during the winter months to minimise the impacts on breeding fauna;
- Any faunal species located on the site, which cannot relocate themselves (e.g. burrowing mammals and reptiles), should be moved in an ecologically acceptable manner to a more suitable location. This should be undertaken by a faunal relocation expert;
- No fires should be allowed on site, especially during the dry season; and
- Access roads must be formalised and use of existing roads and tracks where feasible must be made, rather than creating new routes through naturally vegetated areas.

Significance of the impact:

The significance of this impact, without mitigation, is regarded to be **medium to high** due to the disturbance and/or destruction of animals due to increased activity during construction. Implementation of the above mitigation measures will decrease the significance to **low – medium**.

E-3 SOCIO-ECONOMIC IMPACTS**E-3.1 Noise, dust and disturbance during the construction phase**

Impact source(s)	Unpaved roads, earthworks and other construction activities	Status	-
Nature of impact	Increased levels of noise and dust. Disturbance in terms of recreational use (i.e hiking, fly-fishing, cycling etc.) of the Suikerboskop Nature Reserve		
Reversibility of impact	The impact is irreversible but can be mitigated to a large extent		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Surrounding land owners		
Magnitude	<i>Extent</i>	Site - 3	
	<i>Intensity</i>	Medium – 3	
	<i>Duration</i>	Short to Medium Term – 2	
	<i>Probability</i>	Highly likely – 4	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+4) \times 4 = 48$ Medium	M
	<i>With mitigation</i>	$WOM \times ME = WM$ $56 \times 0.8 = 38$ Low to Medium	L - M

Mitigation Measures:

- Dust fallout must be monitored throughout construction;
- Dust suppression methods such as watering of unpaved roads must be implemented;
- All vehicles and machinery must be kept in good working condition and the construction activities must be kept to daytime hours (i.e. between 08:00 and 17:00); and

- All routes used for recreation activities must be kept clear and be made safe by implementing appropriate signage, lighting and guarding where necessary.

Significance of the impact:

The significance of this impact, without mitigation, is regarded to be **medium** due to the possibility of noise dust and disturbance caused by the construction activities. Implementation of the above mitigation measures will decrease the significance to **low – medium**.

E-3.2 Job creation

Impact source(s)	Upgrading of the Dullstroom Water Treatment Works (Construction)		Status	-
Nature of impact	Job creation			
Reversibility of impact	n.a			
Degree of irreplaceable loss of resource	n.a			
Affected stakeholders	Local and regional communities			
Magnitude	<i>Extent</i>	Regional- 3		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Short to Medium Term – 2		
	<i>Probability</i>	Likely – 3		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+2+3) \times 5 = 65$ Medium to high		M - H
	<i>With mitigation</i>	n.a		-

Significance of the impact:

Temporary jobs will be created during the construction phase. This will positively impact on the surrounding community and local economy due to possible skills development and income generation. This impact is predicted to have a **medium to high positive significance**.

E-3.3 Improved Basic Service Delivery

Impact source(s)	Upgrading of the Dullstroom Water Treatment Works (Construction)		Status	-
Nature of impact	Improvement of the Emakazeni Local Municipalities mandate to deliver basic services (water supply) to residents of Dullstroom and Sakhelwe.			
Reversibility of impact	n.a			
Degree of irreplaceable loss of resource	n.a			
Affected stakeholders	Local and regional communities			
Magnitude	<i>Extent</i>	Regional- 3		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Likely – 3		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+3) \times 5 = 80$ High		H

	<i>With mitigation</i>	<i>n.a</i>	
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Significance of the impact:

The Emakazeni Local Municipality has a mandate to fulfil that requires the supply of drinking water to all residents. Currently the Dullstroom Water Treatment Works does not have the capacity to supply water to the ever-expanding population of Dullstroom and Sakhelwe Townshp. The proposed upgrade of the WTW infrastructure and raise of the Dullstroom Dam Wall will increase the capacity of the water supply scheme and enable the Emakazeni Local Municipality to fulfil its basic service delivery mandate. This impact will therefore have a **high positive impact significance**.

SECTION F: CONCLUSION AND RECOMMENDATIONS

In accordance with GN No. 543, the BAR is aimed at describing the proposed activity as well as the receiving environment that may be affected by the proposed mine expansion. In accordance with the EIA Regulations, an identification of relevant legislation and guidelines is also given as well as a description of the public participation process that will be followed.

In conclusion, the BAR established the scope of the proposed project throughout its phases, as well as its key impacts on the receiving and surrounding environments. The project motivation has also been described.

Comments and/ or concerns identified by Interested and Affected Parties (I&APs) during the review period of the BAR will be incorporated into the Final Basic Assessment Report for further investigation. All comments received on the Final Basic Assessment Report will also be forwarded to the MDEDET and the DWA for consideration.

Impact	Significance without mitigation	Significance with mitigation
Key Impacts		
An increase in the volume of abstraction of a surface water resource that may lead to drought in the dry season.	Medium to Low	Low
Surface water run-off (viz. increased soil erosion) associated with the establishment of hard surfaces and vegetation clearing for the construction of the access road.	Medium to High	Low to Medium
Potential impacts on ground and surface water quality due to hydrocarbon spillages during the construction and operational phase of the development.	Medium	Low
Destruction of flora within the proposed area, stemming from activities such as vegetation clearing and topsoil stripping for the proposed access road.	Medium	Low to Medium
Faunal displacement due to increased level of activity and associated noise.	Medium	Low
Noise, dust and disturbance during the Construction Phase.	Medium	Low to Medium
Job creation during the construction and operational phases of the proposed project		Medium to High Positive
Ensuring basic service delivery by providing drinking water to residents of Dullstroom		High Positive

SECTION G: REFERENCES

- Audit on Dullstroom Water Treatment Plant submitted to Emakhazeni Local Municipality, (May 2011).
- Development of Water Reconciliation strategy for all towns in the Eastern Region Nkangala District Municipality: First order Reconciliation Strategy for Dullstroom and Sakhelwe (June 2011).
- Fauna and Flora. Website: <http://www.dullstroom.biz/dullstroom/> [Date accessed: 27 February 2014].
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- Raising of Dullstroom Dorp se Dam Preliminary Design Repot, by Scipp Engineering, (February 2014).
- Nkangala District Municipality Scope of Works / Preliminary Design Report for Contact No 2122/14 Emakhazeni Local Municipality: Upgrade of Water Treatment in Dullstroom and Licensing Application Phase 01, (October 2013).
- Wetland-Verloren Nature Reserve <http://www.ewisa.co.za> [Date accessed: 27 February 2014].

SECTION H: APPENDICES

Appendix 1: Locality Map

Appendix 2: Photograph Plate

Appendix 3: Layout Plans

Appendix 4: Authority Correspondence

Appendix 5: Public Participation

Appendix 6: Feasibility Study

Appendix 7: Environmental Management Programme