SAPPI SOUTHERN AFRICA LIMITED

SAPPI SAICCOR EXPANSION: PROJECT VULINDLELA AND PROJECT STONE

DRAFT BASIC ASSESSMENT REPORT

EDTEA REF: DM/0012/2018

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PRODUCTION TEAM

CLIENT

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Saiccor Mill SHEQ Manager	Craig Daniel

WSP

Environmental Assessment Practitioner	Hilary Konigkramer
Technical and Review Support	Nigel Seed
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Air Quality Specialist	Lisa Ramsay
Acoustic Specialist	Kirsten Collett
Traffic Specialist	Tobie Ueckermann

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

1.1 TERMS OF REFERENCE

WSP Environmental (Pty) Ltd (WSP) was commissioned by Sappi Southern Africa Limited (Sappi) to undertake the required Basic Assessment (BA) Process for the proposed expansion of the Saiccor Mill, located approximately 50 km south of Durban, KwaZulu-Natal. This Draft Basic Assessment Report (BAR) documents the process followed and the findings of the assessment process.

1.2 PROJECT OVERVIEW

Sappi Southern Africa Limited owns and operates the Sappi Saiccor Specialised Cellulose Mill based in Umkomaas, KwaZulu-Natal. The Mill produces elemental chlorine free dissolving wood pulp, primarily for the export market. This product is used as a raw material for the production of clothes, textiles, cellophane wrap, pharmaceutical and household products.

In order to remain globally competitive Sappi needs to expand. After consideration of a number of options, Sappi proposes to increase production at the Sappi Saiccor Mill. The project will take place within the existing Mill boundary. The expansion is proposed to take place in two phases as follows:

- Phase 1 – Project Vulindlela: increased production to 890 000 tons per annum (air dry)
- Phase 2 – Project Stone: increased production to 1050 000 tons per annum (air dry)

Due to the fact that environmental performance is critical to Sappi's global clients and to the communities in the area in which it operates, it is essential that the future expansion has a strong focus on environmental improvement. For this reason, the first phase of the expansion, Project Vulindlela (which means to "open the way") proposes significant improvements in the Mill's environmental performance in numerous areas, in particular improved emissions; reduced water use and effluent generation, and reduced reliance on coal. The Mill operates two different cooking processes, one is a calcium-based and the other is a magnesium-based process. The Mill intends to reduce the calcium cooking process and increase the magnesium based cooking process. Magnesium oxide cooking is considered Best Available Technology (BAT) as it is a closed loop process which does not generate a significant amount of effluent as most of the effluent is recovered.

Project Vulindlela includes an increase in production, which is necessary to assist in funding the numerous environmental improvements. Project Vulindlela, as the name suggests, opens the way for the second phase of the expansion, namely Project Stone. Project Stone proposes a significant expansion in the mills production.

A summary of the key features of each of the proposed expansion phases are presented in **Table 1.1** below.

Table 1.1 Overview of Proposed Expansion Phases

Phase	Overview
Project Vulindlela (Phase 1): **Increased production to 890 000 tons per annum (air dry)**	– Increased woodyard input (timber) – Reduced production from calcium digesters – Additional magnesium digesters – New recovery boiler – New evaporator – New washing and screening plant – Upgrade of bleach plant – Upgrade of pulp machines – Secondary recovery plant – Sulphur dioxide recovery

Project Stone (Phase 2): **Increased production to 1 050 000 tons per annum (air dry)**	– Increased woodyard input and chip screening – Additional magnesium digesters – New turbine to produce power – New evaporator – New washing and screening plant – New bleach plant – New pulp machine – Sulphur dioxide recovery

The following environmental legal requirements are applicable to the proposed expansion project:

- BA process to obtain Environmental Authorisation (EA) in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA), as amended and associated 2014 Environmental Impact Assessment (EIA) Regulations (amended April 2017); and
- Amendment of the Atmospheric Emission Licence (AEL) in terms of the National Environmental Management: Air Quality Act (Act 34 of 2008) (NEM:AQA) and associated regulations.

To facilitate the necessary approvals, it is necessary that the impacts of the proposed project be identified and assessed.

1.3 PROJECT TEAM

1.3.1 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP has been appointed to undertake the BA process for the proposed project. **Table 1.2** outlines the details of the Independent Environmental Assessment Practitioner (EAP) responsible for the BA process, and her expertise. The EAP's Curriculum Vitae is attached in **Appendix A**.

Table 1.2 Details of the Environmental Assessment Practitioner

Name of Consultant	**WSP Environmental (Pty) Ltd**
Contact Person	Hilary Konigkramer
Postal Address	Block A, 1 on Langford Langford Road, Westville, Durban 3629 South Africa
Telephone	031- 240 8860
Fax	086-606 7121
Email	hilary.konigkramer@wsp.com
Expertise to conduct this EIA	Hilary is a Director with 17 years' experience as a consulting social and environmental scientist. She has extensive experience in integrated environmental management in a variety of sectors including petrochemical, paper and pulp, general industrial, commercial and infrastructure. She has a BSoc Sci (Hons) Environmental Management from the University of Natal and is a Certified Environmental Assessment Practitioner. Hilary has thorough working knowledge of current environmental laws and policies and a comprehensive understanding of environmental processes. She has experience in undertaking pre-feasibility assessments, legal reviews, and the co-ordination of a wide range of application processes (Basic Assessment and Scoping and EIA processes, Section 24G rectification, Waste Management License applications and Water Use Licences).

1.3.2 KEY EXPERTS

Specialist input was required in support of the application for EA, namely air quality, surface water and traffic assessments. The details of the key experts that have contributed through undertaking specialist assessments are presented in **Table 1.3**. These independent professionals have no vested interest in the outcome of the BA process and have signed specialist declarations of independence (**Appendix A**).

Table 1.3 Details of Key Experts

Assessment	Key Experts	Company	Sections in Report	Appendix
Air Quality Impact Assessment	Lisa Ramsay	WSP	Section 7.1	D
Environmental Acoustic Impact Assessment	Kirsten Collett	WSP	Section 7.2	E
Traffic Impact Assessment	Tobie Ueckermann	WSP	Section 7.3	F

2 BASIC ASSESSMENT PROCESS

The NEMA EIA Regulations identify the proposed expansion as an activity being subject to a BA Process due to the applicability of the EIA Listing Notice Government Notice Regulation (GNR) 327 (4 April 2017). In order for the project to proceed, an EA is required from the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

2.1 PROCEDURAL FRAMEWORK

As defined in Appendix 1 of the EIA Regulations, 2014, as amended, the objective of the impact assessment process is to, through a consultative process:

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
- The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and, the degree to which these impacts:
    - Can be reversed;
    - May cause irreplaceable loss of resources; and
    - Can be avoided, managed or mitigated.
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
    - Identify and motivate a preferred site, activity and technology alternative;
    - Identify suitable measures to avoid, manage or mitigate identified impacts; and
    - Identify residual risks that need to be managed and monitored.

2.2 REGISTRATION OF APPLICATION FOR EA

The application phase consisted of the completion the appropriate application form as well as the subsequent submission and registration of the application for EA with the EDTEA. The application form was submitted to EDTEA on 23 April 2018. The EDTEA acknowledged receipt of the application in writing on 26 April 2018 and provided the following application reference number: **DM/0012/2018**.

2.3 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the baseline environment was compiled through a combination of desktop reviews and knowledge of the site. Desktop reviews made use of available information including existing reports, aerial imagery and mapping. Site investigations were undertaken to verify the desktop review information.

2.4 IMPACT ASSESSMENT METHODOLOGY

The impact assessment uses a methodological framework developed by WSP to meet the combined requirements of international best practice and the NEMA EIA Regulations. As required by Appendix 1 of the EIA Regulations, the determination and assessment of impacts is based on the following criteria:

- Nature of the impact

- Significance of the impact
- Consequence of the impact
- Extent of the impact
- Duration of the impact
- Probability if the impact
- Degree to which the impact:
  - can be reversed
  - may cause irreplaceable loss of resources;
  - can be avoided, managed or mitigated

Following international best practice, additional criteria have been included to determine the significant effects. These include the consideration of the following:

- **Magnitude**: to what extent environmental resources are going to be affected;
- **Sensitivity of the resource or receptor** (rated as high, medium and low) by considering the importance of the receiving environment (international, national, regional, district and local), rarity of the receiving environment, benefits or services provided by the environmental resources and perception of the resource or receptor); and
- **Severity of the impact**, measured by the importance of the consequences of change (high, medium, low, negligible) by considering inter alia magnitude, duration, intensity, likelihood, frequency and reversibility of the change.

The above definitions given are for guidance only, and not all the definitions will apply to all of the environmental receptors and resources being assessed. Impact significance is assessed with and without mitigation measures in place.

2.4.1 METHODOLOGY

Impacts are assessed in terms of the following criteria:

a) The **nature**, a description of what causes the effect, what will be affected and how it will be affected

Nature or Type of Impact	Definition
Beneficial / Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Adverse / Negative	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
Direct	Impacts that arise directly from activities that form an integral part of the Project (e.g. new infrastructure).
Indirect	Impacts that arise indirectly from activities not explicitly forming part of the Project (e.g. noise changes due to changes in road or rail traffic resulting from the operation of Project).
Secondary	Secondary or induced impacts caused by a change in the Project environment (e.g. employment opportunities created by the supply chain requirements).
Cumulative	Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

b) The physical **extent**:

Score	Description
1	the impact will be limited to the site
2	the impact will be limited to the local area

3	the impact will be limited to the region
4	the impact will be national
5	the impact will be international

c) The **duration**, wherein it is indicated whether the lifetime of the impact will be:

Score	Description
1	of a very short duration (0 to 1 years)
2	of a short duration (2 to 5 years)
3	medium term (5–15 years)
4	long term (> 15 years)
5	Permanent

d) The **magnitude** of impact on ecological processes, quantified on a scale from 0-10, where a score is assigned:

Score	Description
0	small and will have no effect on the environment
2	minor and will not result in an impact on processes
4	low and will cause a slight impact on processes
6	moderate and will result in processes continuing but in a modified way
8	high (processes are altered to the extent that they temporarily cease)
10	very high and results in complete destruction of patterns and permanent cessation of processes

e) The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale where:

Score	Description
1	very improbable (probably will not happen)
2	improbable (some possibility, but low likelihood)
3	probable (distinct possibility)
4	highly probable (most likely)
5	definite (impact will occur regardless of any prevention measures)

f) The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;

g) The status, which is described as either positive, negative or neutral;

h) The degree to which the impact can be reversed;

i) The degree to which the impact may cause irreplaceable loss of resources; and

j) The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula: S = (E+D+M)*P, where:

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

Overall Score	Significance Rating	Description
< 30 points	**Low**	where this impact would not have a direct influence on the decision to develop in the area
31-60 points	**Medium**	where the impact could influence the decision to develop in the area unless it is effectively mitigated
> 60 points	**High**	where the impact must have an influence on the decision process to develop in the area

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed project's actual extent of impact, and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures, and is thus the final level of impact associated with the development of the Project. Residual impacts also serve as the focus of management and monitoring activities during proposed project implementation to verify that actual impacts are the same as those predicted in this BAR.

2.5 STAKEHOLDER ENGAGEMENT PROCESS

Stakeholder engagement (public participation) is a requirement of the BA process; it consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the BA decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed project. The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the subsequent specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues and solutions.

WSP has undertaken the stakeholder engagement process in accordance with the requirements stipulated in Chapter 6 of the EIA Regulations, 2014, as amended. The stakeholder engagement process employed a number of techniques to establish contact and raise awareness amongst stakeholders with reference to the application. A Stakeholder Engagement Report (SER) is included in **Appendix B**, detailing the projects compliance with the public participation requirements of the EIA Regulations.

2.6 BASIC ASSESSMENT REPORT STRUCTURE

The Draft BAR has been prepared to meet the requirements as described in Appendix 1 of GNR 326 of the NEMA EIA Regulations, 2014, as amended. To demonstrate legal compliance, **Table 2.1** cross-references the sections within the BAR with the requirements of Appendix 1 of EIA Regulations.

Table 2.1: Legal Requirements as detailed in Appendix 1 of GNR 326

Appendix 1 of GNR 326	Description	Relevant Report Section
3(1) (a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	Section 1.3
3(1) (b)	The location of the activity, including: – the 21 digit Surveyor General code of each cadastral land parcel; – where available, the physical address and farm name; – where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 4.2
3(1) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale, or, if it is: – a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or – on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 4.5
3(1) (d)	A description of the scope of the proposed activity, including: – all listed and specified activities triggered and being applied for; and – a description of the activities to be undertaken including associated structures and infrastructure	Section 3 Section 4.5
3(1) (e)	A description of the policy and legislative context within which the development is proposed, including: – an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and – how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 3
3(1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	Section 4.1
3(1) (g)	A motivation for the preferred site, activity and technology alternative	Section 5
3(1) (h)	A full description of the process followed to reach the proposed alternative within the site, including: – details of all the alternatives considered; – details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; – a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 5

	– the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; – the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— – can be reversed; – may cause irreplaceable loss of resources; and – can be avoided, managed or mitigated; – the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; – positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; – the possible mitigation measures that could be applied and level of residual risk; – the outcome of the site selection matrix; – if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and – a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
3(1) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including; – a description of all environmental issues and risks that were identified during the environmental impact assessment process; and – an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 7 Section 8
3(1) (j)	An assessment of each identified potentially significant impact and risk, including— – cumulative impacts; – the nature, significance and consequences of the impact and risk; – the extent and duration of the impact and risk; – the probability of the impact and risk occurring; – the degree to which the impact and risk can be reversed; – the degree to which the impact and risk may cause irreplaceable loss of resources; and – the degree to which the impact and risk can be avoided, managed or mitigated	Section 8
3(1) (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	Section 7
3(1) (l)	An environmental impact statement which contains: – a summary of the key findings of the environmental impact assessment; – a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental	Section 9

	sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and – a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
3(1) (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr).	Appendix G Appendix H
3(1) (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Not applicable
3(1) (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Not applicable
3(1) (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 9
3(1) (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted, and the post construction monitoring requirements finalised	Not applicable
3(1) (r)	An undertaking under oath or affirmation by the EAP in relation to: – the correctness of the information provided in the reports; – the inclusion of comments and inputs from stakeholders and I&APs; – the inclusion of inputs and recommendations from the specialist reports where relevant; and – any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Appendix A
3(1) (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	Not applicable
3(1) (t)	Any specific information that may be required by the competent authority	Not applicable
3(1) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	Not applicable

3 LEGAL FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial, commercial and civil infrastructure developments. The following sections outline summaries of primary national environmental legislative framework and their applicability in respect of the authorisations required for the proposed expansion project.

3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The NEMA provides the environmental legislative framework for South Africa and requires that activities be investigated that may have a potential impact on the environment, socio-economic conditions, and cultural heritage. The results of such investigation must be reported to the relevant authority. Procedures for the investigation and communication of the potential impact of activities are contained in Section 24(7) of the Act.

EIA REGULATIONS 2014, AS AMENDED

On 04 December 2014 the Minister responsible for Environmental Affairs promulgated new EIA Regulations (GNR 982) in terms of Chapter 5 of the NEMA, subsequently these regulations were amended on 4 April 2017 (GNR 326). The EIA Regulations, 2014, as amended, contain three listing notices (GNR 327, 325 and 324) which identify activities that are subject to either a BA or Scoping and EIA in order to obtain an EA. A BA must be completed if the proposed project triggers activities listed in GNR 327 (Listing Notice 1) or GNR 324 (Listing Notice 3).

Table 3.1 outlines the listed activities that are triggered by the proposed project. Based on the determination below**,** activities listed in GNR 327 are applicable to the project and the necessary BA process is being undertaken in order to obtain the required EA.

Table 3.1: Applicable GNR 327 Listed Activities

Listed Activity	Applicability to the Project
Listing Notice 1 (GNR 327)	
Activity 34: The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution, excluding— (i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water or sewage where the capacity will be increased by less than 15000 cubic metres per day; or (iii) the expansion is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will be increased by 50 cubic meters or less per day.	The proposed expansion will require an amendment of the Mill's existing Atmospheric Emission Licence (AEL). The primary activity, which triggers Activity 34, is the proposed new recovery boiler.

Activity 37: The expansion and related operation of facilities for the generation of electricity from a non-renewable resource where – (i) The electricity output will be increased by 10 megawatts or more, excluding where such expansion takes place on the original development footprint; or Regardless of the increased output of the facility, the development footprint will be expanded by 1 hectare of more	A new turbine will be established to produce power. The electrical power produced by the turbine will be more than 10 megawatts as such Activity 37 applies. The power to be produced will be for Sappi's own consumption (i.e. there will be no export of power to the national grid).
Activity 51: The expansion and related operation of facilities for the storage, or storage and handling, of a dangerous good, where the capacity of such storage facility will be expanded by more than 80 cubic metres.	The volume of chemical storage in above ground storage tanks will increase by more than 80m^3.

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT

The NEM:AQA aims to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in South Africa, to prevent air pollution and ecological degradation and to secure ecological sustainable development while promoting justifiable economic and social development. Section 21 provides for the publishing of listed activities for which an AEL is required.

Sappi Saiccor Mill is currently in the possession of an AEL (Ref: **AEL007/S1**), issued by the eThekwini Municipality on 01 July 2017. The AEL is valid until 30 June 2022, and is due for renewal no later than 31 January 2022. The Section 21 listed activities authorised in the AEL are presented in **Table 3.2**.

Table 3.2: Section 21 Listed Activities Authorised in the AEL

Category	Sub-category	Description of listed activity
Category 1: Combustion Installations	Sub-category 1.1: Solid Fuel Combustion Installation	Solid fuel combustion installations used primarily for steam raising or electricity generation
Category 9: Pulp and paper manufacturing activities, including by-product recovery	Sub-category 9.2: Chemical Recovery Furnaces	The recovery of chemical from thermal treatment of spent liquor using furnaces
Category 9: Pulp and paper manufacturing activities, including by-product recovery	Sub-category 9.4: Chlorine Dioxide Plant	Production and use of chlorine dioxide for paper (pulp) production

The proposed expansion project does not trigger additional Section 21 listed activities. The proposed project will require an amendment to the Mill's existing AEL, hence the requirement for an application for AEL amendment as required by NEM:AQA.

3.3 NATIONAL WATER ACT

The National Water Act, 1998 (Act 36 of 1998) provides the framework to protect water resources against over-exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment.

The Act defines water source to include watercourses, surface water, estuary or aquifer. A watercourse is defined in the Act as a river or spring, a natural channel in which water flows regularly or intermittently, a

wetland, lake or dam into which or from which water flows, and any collection of water, which the Minister may declare a watercourse.

Section 21 of the Act outlines water a number of categories which require the water user to apply for a Water Use License (WUL) from the Department of Water and Sanitation (DWS). The Section 21 water uses applicable to the existing Sappi Saiccor Mill operations are:

- Section 21 (c): Impeding or diverting the flow of water in a watercourse
- Section 21 (f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- Section 21 (g): Disposing of waste in a manner which may detrimentally impact on a water resource; and
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse.

A WUL application for the existing Sappi Saiccor Mill activities is currently under consideration by the DWS.

Pre-consultation meetings were held with the DWS on 02 and 05 February 2018. At the meeting held on 05 February 2018, DWS advised that the proposed expansion project does not trigger any WUL requirements as it is proposed to occur within the existing Mill footprint on existing hardstanding areas. This was confirmed in writing by DWS on 09 February 2018 (**Appendix B**)

3.4 MAJOR HAZARD INSTALLATION REGULATIONS

The Major Hazard Installation (MHI) Regulations (GNR 692) were promulgated on 30 July 2001 under the Occupational Health and Safety Act (Act 85 of 1993) (OHSA). The MHI Regulations apply to employers who have on their premises a major installation or quantity of substance that may pose a risk that could affect the health and safety of employees and the general public.

The MHI Regulations (GNR 692, 2001) defines a MHI as an installation where:

- more than the prescribed quantity of any substance is or may be kept, whether permanently or temporary; or
- any substance is produced, used, handled or stored in such a form and quantity that it has the potential to cause a major incident.

Sappi Saiccor Mill is designated a MHI due to both the storage and production of substances that have the potential to cause a major incident. In terms of the MHI Regulations, it is necessary for an approved inspection authority (AIA) to undertake a risk assessment at existing MHIs prior to modifications to procedures and capacity.

In support of the expansion project, Sappi is proposing an increase in the above ground storage of various chemicals at the chemical plant. Sappi is therefore required to appoint an AIA to undertake a quantitative risk assessment of the potential impact of the proposed expansion on the MHI risk status of the site. In terms of the MHI Regulations it is necessary to notify the relevant authorities and communities within the vicinity of the installation (via public notice) of the proposed modification of installation. The MHI Risk Assessment (including public notices) is required to be submitted to the eThekwini Municipality and the Department of Labour.

3.5 NATIONAL HERITAGE RESOURCES ACT

The National Heritage Act (Act 25 of 1999) (NHRA) established the South African Heritage Resources Agency (SHARA) in 1999. SAHRA is tasked with protecting heritage resources of national significance. Under Section 38 of the NHRA identifies activities that require that the responsible heritage resources authority be notified and provided with details of the location, nature and extent of the proposed development to determine the necessity for a Heritage Impact Assessment (HIA). The listed activities provided for in Section 38(1) are as follows:

(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) The construction of a bridge or similar structure exceeding 50 m in length;

(c) Any development or other activity which will change the character of a site –

(i) Exceeding 5 000m^2 in extent

(ii) Involving three or more existing erven or subdivisions thereof; or

(iii) Involving three of more erven or divisions thereof which have been consolidated within the past five years; or

(iv) The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) The re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority

The proposed expansion will take place within the existing boundary of the Saiccor Mill on existing hardstanding areas. On consideration of the activities contained within Section 38(1) of the NHRA, is it concluded that the proposed expansion does not require an HIA. WSP will notify the relevant heritage authority, Amafa aKwaZulu-Natali (Amafa) of the proposed expansion project and provide the Draft BAR for their review and comment.

Previous investigations have indicated that there are no heritage resources of significance within the Saiccor Mill property (HIA for Sappi Saiccor Amakhulu Expansion, October 2005).

4 PROJECT DESCRIPTION

4.1 NEED AND DESIRABILITY

The proposed increase in production at the Sappi Saiccor Mill is required by Sappi to respond to the growth in the demand for dissolving wood pulp (chemical cellulose) and therefore maintain its competitive position in the market. The selection of the Saiccor Mill as the site for the company's production increase will ensure Sappi's continued contribution to the South African gross domestic product (GDP), tax revenues, and will provide much needed employment opportunities. Given that the South African GDP contracted by 2.2% in Q1 of 2018, growth in the manufacturing sector is significant to support the South African private sector economy.

The future expansion has a strong focus on environmental improvement. The first phase of the expansion, Project Vulindlela proposes significant improvements in the Mill's environmental performance in numerous areas, in particular improved emissions; reduced water use and effluent generation, and reduced reliance on coal. The Mill operates two different cooking processes, one is a calcium based and the other is a magnesium based process. The Mill intends to reduce the calcium cooking process and increase the magnesium based cooking process. Magnesium oxide cooking is considered Best Available Technology (BAT) as it is a closed loop process which does not generate a significant amount of effluent as most of the effluent is recovered.

Project Vulindlela includes an increase in production, which is necessary to assist in funding the numerous environmental improvements. Project Vulindlela opens the way for the second phase of the expansion, namely Project Stone, which proposes a significant expansion in the mills production.

4.2 PROJECT CONTEXT

4.2.1 LOCATION

The Sappi Saiccor Mill is located on the KwaZulu-Natal South Coast, approximately 50km to the southwest of Durban (**Figure 4.1**). The Mill is located on the southern bank of the Mkomazi River, approximately 3.5 km from the sea and the town of Umkomaas and occupies a total area of approximately 78ha (**Figure 4.2**).

The Sappi Saiccor Mill is located on Portion 656 of Erf 1357, Umkomaas. The property details are included in **Table 4.1**. The mill falls within the southern boundary of the eThekwini Metropolitan Municipality. The Mill can be seen from the N2 freeway as one crosses the bridge over the Mkomazi River.

Table 4.1: Sappi Saiccor Mill Property Details

Property Description	
Province	KwaZulu-Natal
District Municipality	eThekwini Metropolitan Municipality
Local Municipality	eThekwini Metropolitan Municipality
Ward Number	Ward 99
Portion number	Portion 656 of Erf 1357, Umkomaas
SG Code	NOET00000000135700656
Centre Point (estimate)	Latitude: 30°10'57.39"S Longitude 30°46'27.53"E.
Zoning	Heavy Industrial

4.2.2 SURROUNDING LAND USE

The land uses surrounding the Saiccor Mill include small-scale (predominately subsistence) farming, residential areas and natural vegetation. The main residential areas in close proximity to the Mill include Craigieburn, Dlambula, Ilfracombe, Magabeni, and Umkomaas (**Figure 4.3**). Beyond the Mill and surrounds are agricultural activities well as formal and informal housing. **Table 4.2** presents further detail on the surrounding land uses associated with the Mill.

Table 4.2: Surrounding Land Use (AEL, 2017)

Land Use	Details	Approximate Distance (M)	Direction
Residential Communities	Danganya	1100	East
	Magabeni	1500	North West
	Ilfracombe	2250	East
	Craigieburn	3000	South East
	Dlambula	1000	South East
Schools	Umkomaas Drift Primary School	3500	West South West
	Umkomaas Secondary School	3500	South West
	Naidoo Memorial Primary School	3000	South
	Naidooville Primary	3000	South
	Sidelile High School	1800	North North West
	Magabeni Primary Shool	1100	North West
	Sheshisa Primary School	1800	North North West
	Umkomaas Primary School	3500	South East
	Kwa-Dlambula Primary School	1000	East
	Kwa-Gumbi Primary School	2750	South West
Shops	Moodley's Spar	2750	South West
	Umkomaas Spar	3000	South East
	Central Supermarket	3000	South West
Agriculture	Sugarcane	100	North East
		1500	South
		2500	South East
		2500	South West
	Small plantations	400	South
	Extensive plantations	700	South East
	Informal farming	300	South East
Water features	Mkomazi River / Estuary	100	North
		200	North West
		300	East
		550	South East
	Indian Ocean	3500	South East

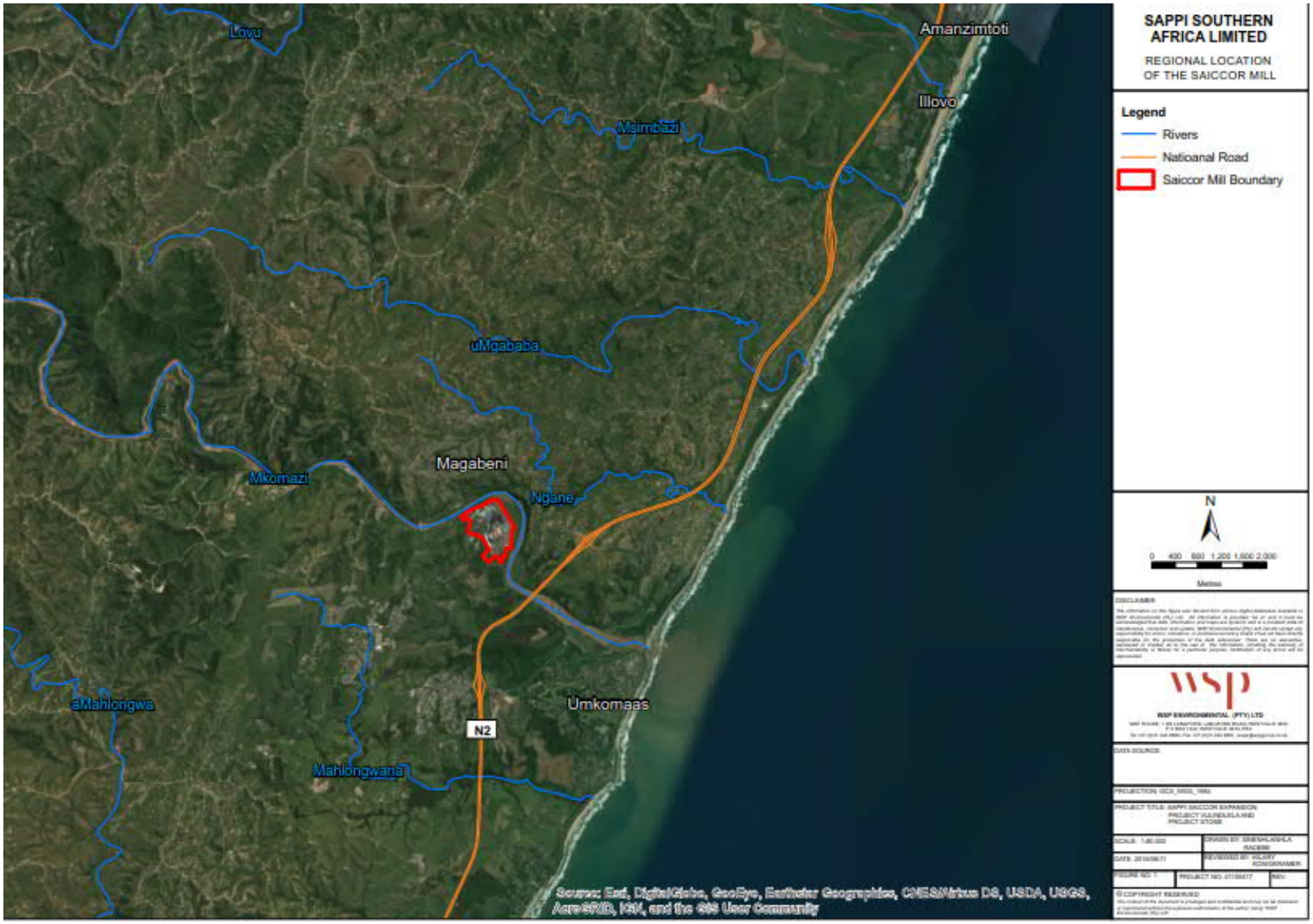

Figure 4.1: Regional Location of the Saiccor Mill

Figure 4.2: Location of the Saiccor Mill

Figure 4.3: Proximity of Residential Receptors to the Sappi Saiccor Mill

4.3 OVERVIEW OF PREVIOUS EXPANSIONS

There have been a number of expansions to the Saiccor Mill over the past 10 years. A brief summary of the more significant and most recent Mill modifications is provided below.

4.3.1 PROJECT AMAKHULU

The Mill was expanded in 2008 through the implementation of Project Amakhulu. The Mill received the necessary environmental approval for an increase of the mill production by 230 000 to 810 000 tons per annum (air dry). The primary component of Project Amakhulu was the installation of eleven new magnesium digesters to facilitate the production increase. A new chipping line, bleach plant, evaporator plant, recovery boiler and associated turbine, pulp drying machine and various ancillary infrastructure were included in the scope of the project to support the installation of the new magnesium line. Various operational constraints have prevented the Mill from reaching the anticipated production of 810 000 tons per annum (air dry).

4.3.2 PROJECT MORRIS LITE

Project Morris Lite is essentially a "debottlenecking" project that seeks to improve the operational efficiency of the Mill within the scope approved for Project Amakhulu. The debottlenecking project will facilitate a minor capacity increase from 773 500 to 783 000 tons per annum (air dry). The project includes the following operational improvements: upgrade of bleach plant pumps and motors, upgrade of pulp machine, automation of hypo and caustic dilution, and an increase in capacity of the chlorine dioxide plant due to a change in technology.

Project Morris Lite does not trigger the requirement for an environmental authorisation, permit or licence in terms of the primary environmental legislation in South Africa. It has been confirmed that the project does not require an EA in terms of the NEMA EIA Regulations. The Mill's existing AEL requires that all changes to the Mill be approved by the AEL Licencing Authority, eThekwini Municipality. An Atmospheric Impact Report (AIR) has been prepared and submitted to the eThekwini Municipality in order to meet this licence requirement.

The implementation of Project Morris Lite represents the current baseline on which this proposed expansion project - Project Vulindlela and Project Stone – is being considered and assessed.

4.4 NON-TECHNICAL PROCESS DESCRIPTION

The Sappi Saiccor Mill is the largest manufacturer of elemental chlorine free dissolving wood pulp (speciality cellulose), primarily for the export market. This product is used as a raw material in textiles, cellophane wrap, pharmaceuticals and household products.A simplified description of the current pulp manufacturing process at the Saiccor Mill is provided below (**Figure 4.4**).

WOOD HANDLING AND CHIPPING

Wood is the source of fibre for the pulp products at Sappi Saiccor. The debarked wood arrives at the mill by road or rail as logs. Logs are unloaded onto stockpiles in the woodyard or directly to conveyors to be transported to chippers. Logs are chipped to an adequate size and blown onto chip piles where they are stored until required.

COOKING LIQUOR PRODUCTION

Two types of cooking liquor processes are used at Sappi Saiccor, namely calcium bisulphite and magnesium bisulphite. Both types of cooking liquors are produced on site for their respective cooking processes.

COOKING, WASHING AND SCREENING

The woodchips are cooked in large vessels, known as batch digesters. The woodchips are fed and packed into the digesters, following which cooking liquor is added from the base of the digester. The digester is then

pressurised and steam added to bring the digester to the correct temperature for cooking. The cooking process separates fibre from lignin, which is the binding material in wood.

When the cooking process is complete the cooking chemicals and dissolved organic material (referred to as spent liquor) is removed from the pulp via a washing process. The produced calcium and magnesium pulps are washed and screened before proceeding to the bleaching stage.

The magnesium bisulphite cooking process is a closed loop process which does not generate a significant amount of effluent due to the chemical recovery process that takes place. The spent magnesium bisulphite liquor is concentrated and combusted in a chemical recovery boiler where the inorganic chemicals are recovered to make new cooking liquor.

The spent calcium bisulphite liquor is sent to LignoTech SA, located adjacent to the Saiccor Mill. LignoTech SA receives and processes a portion of the effluent from the calcium cooking process for the recovery of calcium lignosulphonate (a product that has multiple uses including as dispersing agents for concrete and pesticides; a binding agent for animal feeds and briquettes, and dust suppression). The remaining calcium bisulphite liquor is disposed of via the Mill's marine outfall.

BLEACHING

The product of the cooking process is pulp (referred to as brown stock), which is washed and screened, is then bleached using a range of chemicals. A five stage bleaching process is carried out to ensure complete delignification of the pulp and to ensure that the pulp meets customer specifications and requirements. This process is elemental chlorine free.

CLEANING, DRYING AND PACKAGING

The last stage in the production process is the final cleaning and drying of the pulp in the pulp machines or 'continuas'. These form the pulp into a continuous sheet which is dried. The sheet is then cut and baled or reeled into sizes suitable for transportation. All product is transported by road from the Mill.

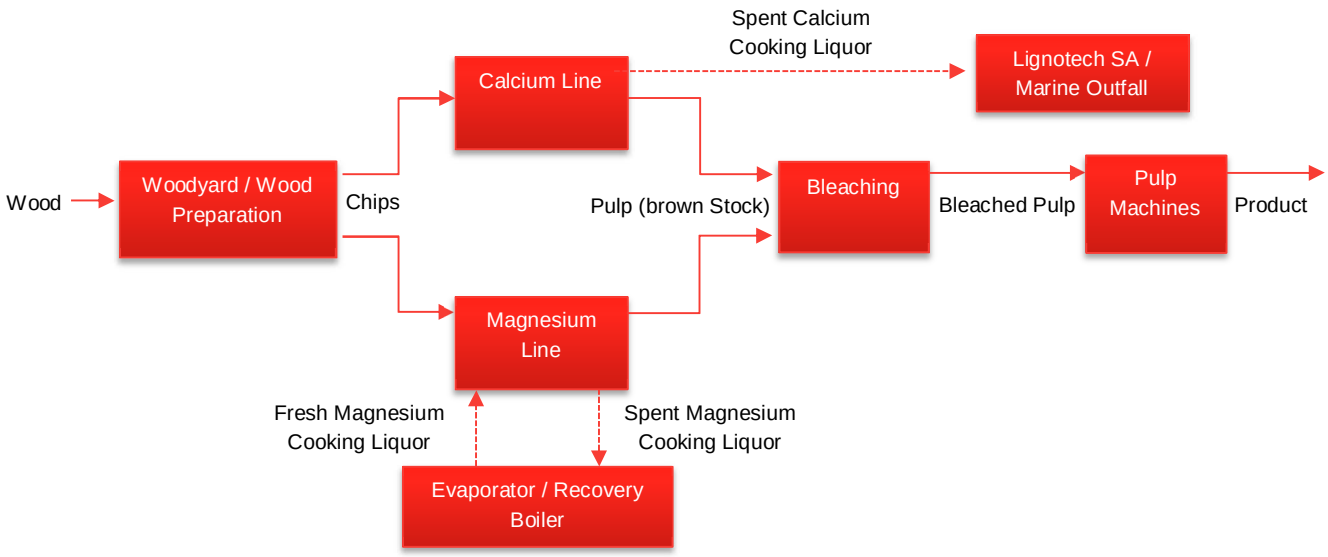

Figure 4.4: Simplified Process Diagram

There are various utilities at paper mills that provide the necessary services to the production process. At the Mill, these include:

- Water treatment plant;
- Effluent collection system and marine disposal pipeline;
- Coal boilers to produce heat and steam used in the process; and,
- Steam turbines, which produce electricity required by the Mill.

4.5 DETAILED DESCRIPTION OF CURRENT PROCESS AND PROPOSED EXPANSION ACTIVITIES

4.5.1 WOOD HANDLING AND CHIPPING

BASELINE

Debarked logs arrive at the mill by road or rail and are either unloaded into stockpiles in the woodyard or directly into a water flume, which transports the logs to the jack ladders (conveyors), where they are high pressure washed before being conveyed to the chippers. The logs are chipped and blown to the chip piles providing a storage buffer to ensure an uninterrupted supply to the digesters. Chips are recovered from the stockpiles and then conveyed by chip conveyors to the silos.

The Mill has four operational chippers, namely Chipper 3, 4, 5 and 6. Sappi is currently upgrading the woodyard and a new wood chipper (designated Chipper No. 7) is currently being installed. Once Chipper 7 is installed, Chipper 3 and 4 will be decommissioned.

PROPOSED ACTIVITIES:

1. **Woodyard input:** The mass of debarked timber logs being transported to the Mill and processed through the woodyard will increased by approximately 25% from 2 881 440 to 3 848 261 tons per annum (wet).
2. **Wood Chipping**: The installed wood chipping capacity in the woodyard is adequate for the increase in log throughput associated with the project. With the proposed installation of Chipper 7 and associated decommissioning of Chipper 3 and 4, Chipper 5, 6 and 7 will be in active service with a total capacity of 700 tons per hour. There will be a gradual increase in the storage capacity and footprint of the existing woodchip stockpile.
3. **Chip Conveyors and Storage Silos**: Two new chip conveyors linking the woodyard to the existing digesters will be installed in order to accommodate the increase in chip throughput. In addition, two new chip storage silos will be installed at the digester area.

4.5.2 CALCIUM LINE

BASELINE

The cooking liquor used in the calcium line is calcium bisulphite produced from molten sulphur and limestone ingredients. The generation of the calcium bisulphite liquor involves the controlled combustion of sulphur to produce a gas mixture containing sulphur dioxide (SO_2). The SO_2 gas mixture is passed to the waste heat boiler where energy is recovered from the gas by generating steam inside a fire-tube boiler. The gas is then cleaned and cooled before it is fed into the absorption towers, where the SO_2 is reacted with a cold lime slurry to produce the calcium bisulphite liquor. The raw cooking liquor is allowed to settle and is filtered to remove unreacted limestone and silica. The liquor is further strengthened by gas released from the digesters, in the SO_2 recovery plant.

In the calcium digesters, the woodchips are cooked in batches under elevated pressure and temperature resulting in various chemical reactions and the generation of pulp and spent cooking liquor. The pulp is transferred to a

washing/screening plant where it is washed in various stages to remove dissolved lignosulphonates, hemicellulose and other organic compounds, as well as knots and other unwanted material. Washing filtrate is sent to effluent management system / marine disposal. Spent cooking liquor is piped to LignoTech SA for the recovery of lignosulphonate; the remnant liquor is returned to Sappi Saiccor for marine disposal.

PROPOSED ACTIVITIES

1. **Calcium Digesters**: The production of pulp from the calcium digesters will be reduced by removing five of the existing eleven digesters from service. The remaining six digesters will continue to operate in order to maintain the supply of spent cooking liquor to LignoTech SA (dry solids feed requirement to LignoTech SA is 410 tons per day) to ensure their continued lignosulphonate production. The calcium line pulp washing and screening facilities will continue to operate but at a reduced capacity due to the reduction of pulp generation through the line.

4.5.3 MAGNESIUM LINE

BASELINE

The cooking liquor used in the magnesium line is magnesium bisulphite. The woodchips are cooked in digesters in batches under elevated pressure and resulting in various chemical reactions and the generation of pulp and spent cooking liquor. Pulp is transferred to low density storage towers and then through de-knotters and a staged washing plant. Wash water from the first washer stage is collected for subsequent processing in the recovery plant; the balance is sent to effluent management system / marine disposal.

Currently, the Mill has two magnesium lines, known as MgO1 and MgO2. In the magnesium lines, the liquor circulates in an essentially closed loop process, where the cooking chemicals are almost completely recovered. During the recovery process, the dissolved organics present in the spent cooking liquor are combusted in a recovery boiler for steam generation. Spent cooking liquor is known as black liquor at Sappi Saiccor. The black liquor is recovered and thickened in evaporators prior to combustion in the recovery boiler.

The boiler flue gas contains mainly magnesium oxide (MgO) fly ash and SO_2, which are both recovered and used in the preparation of fresh MgO cooking liquor. The recovered MgO ash is washed to remove soluble impurities, mixed with hot water, and moved to the slaking tanks for the makeup of fresh magnesium bisulphite cooking liquor. Where necessary, make-up MgO is added. The SO_2 contained in the flue gas is reacted with magnesium hydroxide resulting in the generation of raw cooking liquor. The raw cooking liquor is further fortified in a strengthening tank using SO_2 from the digesters to produce fresh magnesium bisulphite cooking liquor.

Steam from the recovery boiler is used to generate power and steam for use in processes throughout the Mill.

PROPOSED ACTIVITIES

1. **Magnesium Digesters**: A new MgO digester line (to be designated MgO3) will be installed. The line will consist of thirteen new 285m^3 MgO digesters, which will be installed in stages as production throughput ramps up (initially eight, followed by another five).
2. **Pulp Washing and Screening Plants**: Two new pulp washing and screening plants will be installed to accommodate the additional pulp from MgO3. As with the digesters, the new plants will be installed in phases as production throughput ramps up.
3. **Black Liquor Evaporators**: Two new evaporator plants will be installed in order to concentrate the additional black liquor generated by MgO3. The plant technology will be either mechanical vapour recompression (MVR) or multiple effect evaporator (MEE). The final selection of the technology type is largely immaterial for the purposes of the environmental impact assessment process as they are largely closed-loop. The plants are modular and constructed in phases as production ramps up.
4. **Recovery Boiler**: An additional recovery boiler will be installed to recover magnesium chemicals from the additional black liquor that will be generated from MgO3. The recovery boiler is proposed to have a capacity of 1300 tds/d generating 270 tons per hour of steam.

5. **SO_2 Recovery**: A new SO_2 recovery plant will be incorporated into the design of MgO3. The sulphur recovery process involves five stages where SO_2 in the recovery boiler flue gas is reacted with magnesium hydroxide. In addition, the Mill has committed to an upgrade of the existing SO_2 recovery plant at MgO2 (this is not a component of Project Vulindlela or Project Stone, but rather an operational initiative). The upgrade of the existing MgO2 SO_2 recovery Plant involves the upgrade from four to five reaction stages in order to increase SO_2 recovery.
6. **Magnesium Bisulphite Cooking Liquor Make-up Plant**: A new plant will be installed to support the new MgO3 line. This plant will produce fresh magnesium bisulphite cooking liquor from the MgO fly ash and SO_2 generated by the new recovery boiler.

4.5.4 BLEACHING

BASELINE

Mixed pulp from the magnesium and calcium lines are subjected to five bleaching stages with washing and thickening between each stage. The bleaching stages include 1) oxygen delignification; 2) chlorine dioxide delignification; 3) alkali extraction to control hemicellulose and β-cellulose content; 4) chlorine dioxide brightening; and 5) hypochlorite for viscosity control.

Wash water flows through the bleaching process in a counter current direction (to the flow of pulp) in such a way that it is used for washing in previous stages. The final bleached pulp is washed with demineralised water. Final filtrate is sent to effluent management system / marine disposal.

PROPOSED ACTIVITIES

1. **Upgrade existing Bleaching Plants**: Initially the existing bleaching plants designated as No. 3 and No.4 will be upgraded in order to meet the increase in pulp generation.
2. **New Bleaching Plant**: As the pulp generation increases, a new bleaching plant (to be designated No. 5) will be installed. The new plant will utilise the same five bleaching stages as the existing plant.
3. **Chemical Storage**: Additional storage capacity will be required for hydrogen peroxide (H_2O_2), sodium hypochlorite (NaClO) and sulphuric acid (H_2SO_4).

4.5.5 CLEANING, DRYING AND BALING

BASELINE

Bleached pulp is cleaned and drying of the pulp takes place in the pulp machines. The pulp machines form the pulp into a continuous sheet and dry the sheet. The pulp is then cut and baled in the baling line into sizes suitable for transportation.

PROPOSED ACTIVITIES

1. **Upgrades to Pulp and Baling Machines:** A range of upgrades will be made to pulp and baling machines including: a) upgrading the C3 drying radiator; b) upgrading of C4 by installing a shoe press to replace the existing 3rd press; c) upgrading of the approach flow system, secondary screening, winder, roll handling and baling to meet the increased production; and d) upgrading of the drying capacity on C4 by speeding up the circulation air fans of the pulp dryers.
2. **New Pulp Machine:** A new pulp machine may be required to support the increased production (to be designated C6).

4.5.6 POWER GENERATION

BASELINE

Currently there are four steam driven turbo-generators with combined electricity generation capacity of 98 megawatts (electrical) (MWe) (

Table 4.3).

Table 4.3: Existing Power Generation Units

Unit Designation	Steam Source	Power Output (MWe)
TG6	Coal Fired Boiler	13.75 MWe
TG7	Coal Fired Boiler	13.75 MWe
TG4	Recovery Boiler MgO1	24.6 MWe
TG5	Recovery Boiler MgO2	45.9 MWe
TOTAL		**98 MWe**

PROPOSED ACTIVITIES

a) **Steam Turbo-generator**: A new 40-50 MWe steam turbo-generator will be installed in order to utilise the additional steam from MgO3. The additional electrical generation capacity will increase in the Mill's total generation capacity to 138-148 MWe.

4.6 LAYOUT

The location of the infrastructure that is directly related to the NEMA listed activities being applied for have been defined (**Figure 4.5**), namely:

- Facilities or infrastructure that requires the amendment of the Mill's existing AEL: new recovery boiler
- Facilities for the generation of electricity from non-renewable resources: new turbine to produce power.
- Facilities for the storage of dangerous goods: the new above ground chemical storage tanks.

4.7 CONSTRUCTION ACTIVITIES

The construction period associated with each of the proposed expansion phases is anticipated to take place over a period of 18 – 24 months. The construction process will follow industry standard methods and techniques. Key activities associated with the construction process are described in **Table 4.4**.

Table 4.4: Construction Activities

Activity	Description
Contractor's facilities and materials lay-down areas	These will be located within laydown areas either inside the existing Mill premises, or immediate adjacent to the Mill on land owned by Sappi. Activities within these areas are likely to include: – Temporary offices and administration facilities (e.g. containers, portable cabins). – General materials storage and laydown areas. – Construction of chemicals storage facilities (oil, grease, solvents etc.) and associated infrastructure (bunds, secured / roofed areas etc.).

	– Above ground fuel storage (e.g. gas, oil / petrol) – it is unlikely that volumes would be stored in quantities exceeding 9000L which is considered sufficient for normal construction site requirements. – Workshops / areas (e.g. welding, mechanical repair, electrical etc.). – Change-houses, chemical toilets and showering facilities (linked to conservancy tanks – removal of contents by exhauster vehicle and disposal at permitted facility or to existing Sappi ablution facilities). – Temporary waste storage areas; these shall be established and managed in accordance with Environmental Management Programme (EMPr) requirements.
Sourcing of construction materials and equipment	– Bulk materials (aggregate, cement, steel etc.) will be sourced from existing lawful commercial sources; there will be no direct mining, harvesting or extraction of natural resources. – Where possible, equipment will be sourced locally based on the latest South African Rand / US Dollar (or other) exchange rate. Equipment will be purchased outside of South Africa where this makes commercial sense.
Decommissioning of equipment	– Decommissioning of the equipment including calcium digesters as well as all associated pumps and pipework, etc.
Excavation and earthworks	Sappi has confirmed that the activities associated with Project Vulindlela and Stone will take place within existing hardstanding areas. Subject to the determination of founding specifications for the new plant and equipment to be constructed, it is envisaged that earthworks will be required. This is likely to entail: – Removal of existing surfacing material (concrete, asphalt etc.) which could involve excavation below ground level. – Levelling and compaction using heavy machinery / earthmoving equipment – it is noted that the topography within the Mill is flat, therefore no major cut/fill or earth spoiling will be required. There will be some cut and fill associated with the new proposed Bleach Plant. – Potential for excavations and trenching in order to prepare foundations and laying of below ground level equipment (cables, pipes, sumps, drainage etc.). – Piling / drilling depending on the identified construction / founding technique.
Use of general mechanical equipment	This will be undertaken within construction areas and includes the use of generators, cutting and welding equipment, compressors etc.
Working Hours	Due to the heavy industrial nature of the Mill, it is not envisaged that daytime working hours would need to be adhered to; the exception would be in the case of excessively noisy activities which would be limited to normal daytime working hours if practical.

Sappi has identified areas that will be used as construction laydown areas (**Figure 4.6**).

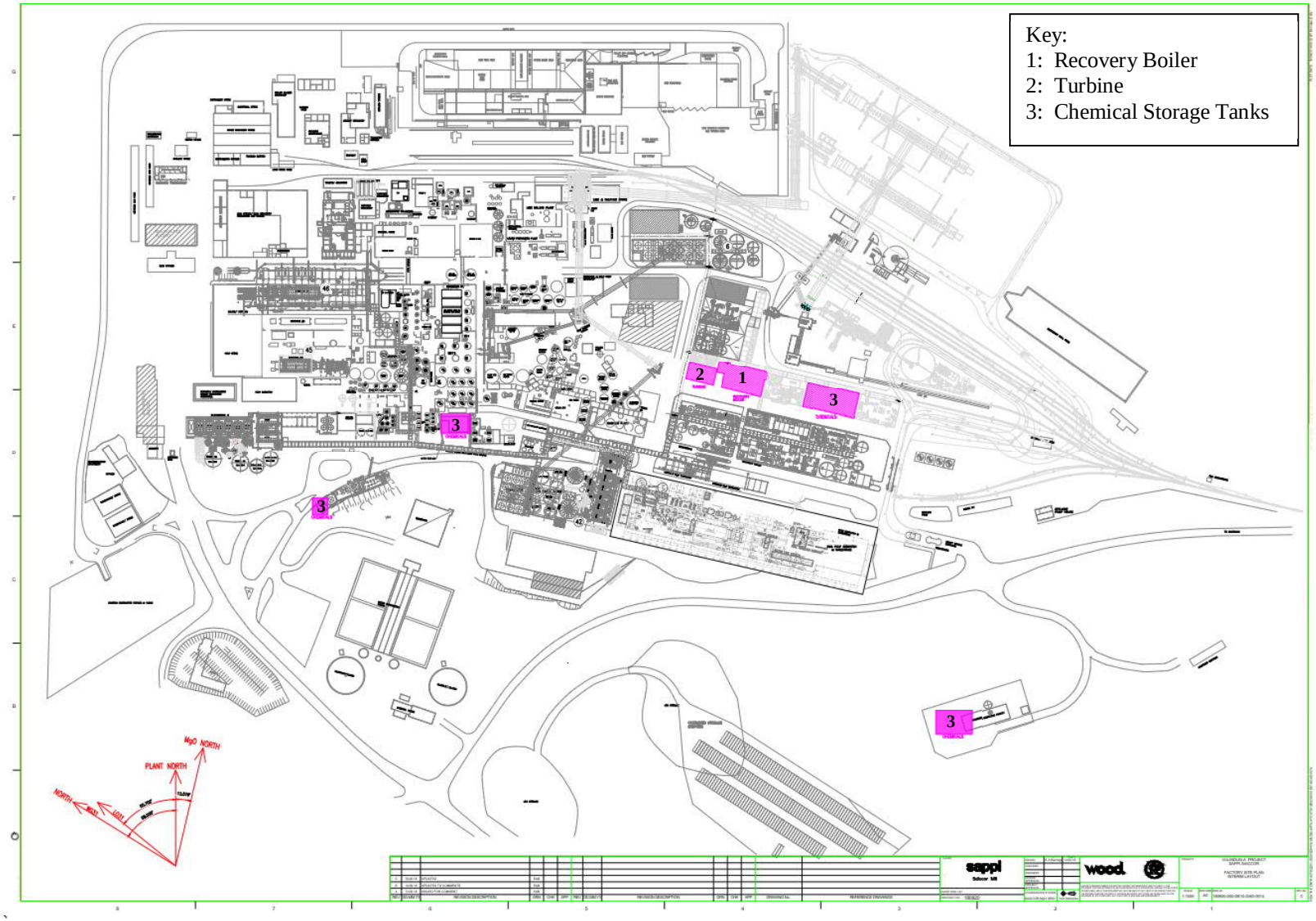

Figure 4.5: Layout Plan Illustrating Project Components Requiring Environmental Authorisation

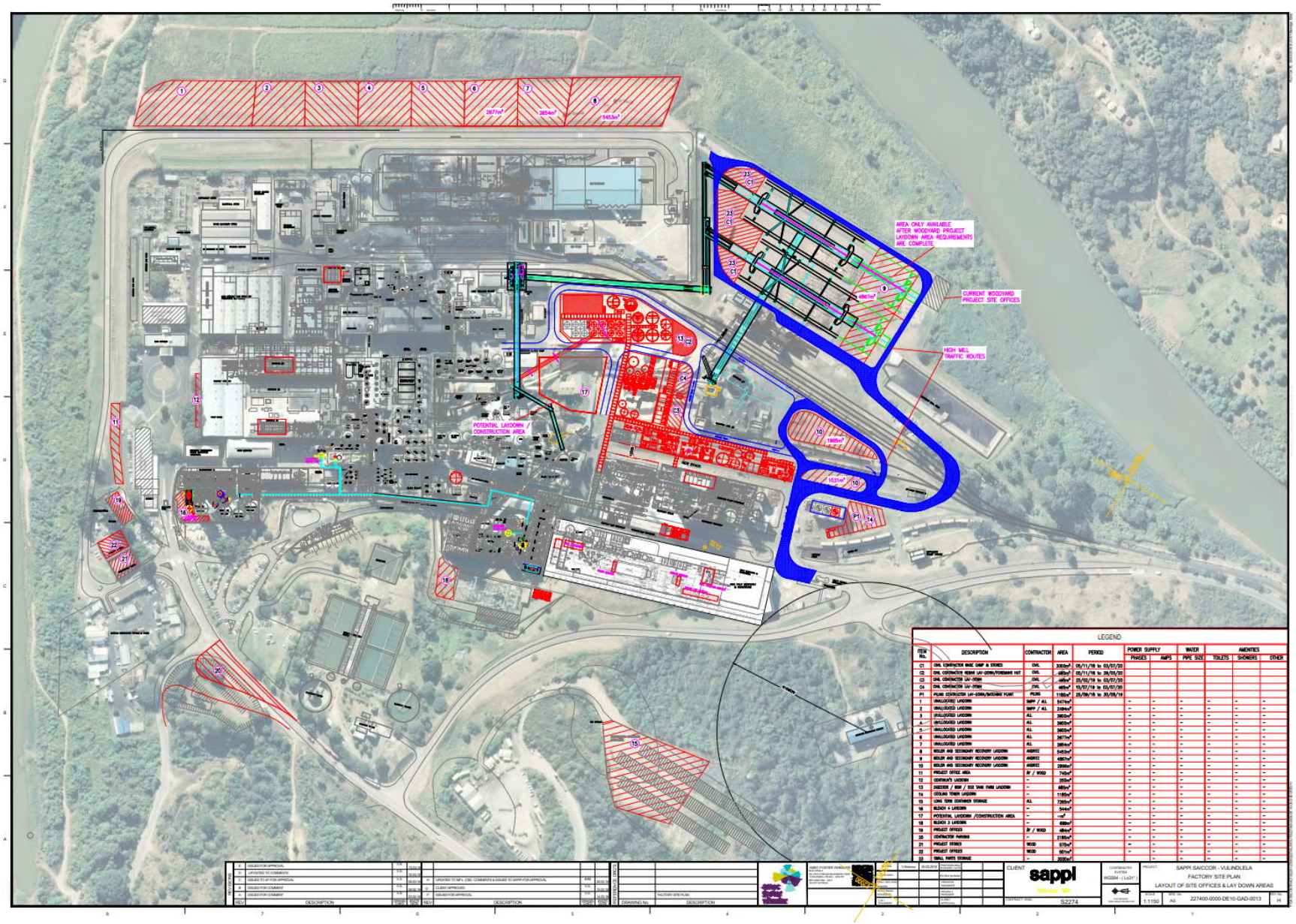

Figure 4.6: Proposed Construction Laydown Areas (indicated with red hatching)

5 ALTERNATIVES

The EIA Regulations stipulate the requirement to identify and consider alternatives. Site, layout and process alternatives are outlined below. In addition, the implications of the no-project alternative have been considered.

5.1 SITE ALTERNATIVES

Project Vulindlela and Project Stone are proposed to occur within the existing boundary of the Sappi Saiccor Mill site. The proposed additional infrastructure, equipment and processes are inextricably linked to the existing facility, therefore there are no feasible or reasonable site alternatives.

5.2 LAYOUT ALTERNATIVES

The regulated activities will take place within the existing Mill footprint on existing hardstanding areas. The layout is based on the optimal use of space within the existing Mill boundary, specifically integration into the existing mill circuit for easy transfer of product and utilities (steam, water, effluent, etc.). The layout is determined by a number of factors including namely availability of the required footprint for the new equipment and ease of integration to existing equipment; as well as construction and maintenance requirements.

Due to the nature of the design process, minor adjustments to the layout plan are likely to be made as the project progresses through the detailed design phase. The location of the infrastructure that is directly related to the NEMA listed activities being applied for have been defined (**Figure 4.5**) as described in **Section 4.6**.

5.3 PROCESS ALTERNATIVES

The design of the project has been undertaken by international consultancy, AF Consult (Sweden). The AF engineering team considered the existing Mill operations and identified the most technically feasible alternative for increasing the Mill's production – as presented in this report.

A summary of process related alternatives are presented in **Table 5.1**.

Table 5.1: Summary of Process Alternatives

Alternative	Description	Evaluation
Increased production through increase in one of the two cooking processes	Sappi Saiccor utilises two different types of cooking processes, one is a calcium based, whilst the other is a magnesium based process. Increased production can be achieved through an increase in one of these two processes.	The calcium cooking processes generates effluent that requires disposal via the Mill's marine outfall. Increasing calcium based production is not in line with the Mills environmental improvement objectives. Magnesium oxide cooking is preferred as it is considered Best Available Technology (BAT) as it is a closed loop process which does not generate a significant amount of effluent as most of the effluent is recovered.
Recovery Boiler Options	Sappi undertook an evaluation of boiler alternatives. There is only one available option.	In the absence of reasonable and effective alternatives, the recovery boiler selected for the expansion project is considered the only alternative.

Turbine capacity	Various turbine capacities were considered to support the power generation requirements of the proposed production increase.	The proposed turbine capacity is 40-50 MWe. This capacity has been selected to be the most optimal for the project requirements.
Quantity of chemicals stored in above ground storage tanks	The option exist to maintain the current chemical storage on site or reduce the extent to which this storage is increased.	The proposed expansion project could be implemented with the current (or a partial increase in) chemical storage on site. The implication would be that the Mill would have to significantly increase tanker deliveries in order to support the expansion project. This is not preferred due to logistical and safety considerations.

5.4 NO-PROJECT ALTERNATIVE

The no-project alternative is the option of not expanding the Saiccor Mill through the implementation of the project. In this option the status quo will be retained and the following benefits associated with the expansion project will not be realised:

- Significant environmental improvements, in particular improved emissions; reduced water use and effluent generation; and reduced reliance on coal. Whilst these could theoretically be achieved with a reduced project scope (i.e. limited to improvements in the unit processes that emit criteria pollutants) it would be economically unviable without an associated production increase to facilitate financing of the improvements required.
- Reduction in reliance on the state utilities and therefore improved business sustainability due to 1) increase in on site power generation (and associated reduction in power drawn from national grid); and 2) reduction in water consumption.
- Increase in the revenue streams associated with the sale of the additional product. This in turn will impact on the tax revenue to the South African government.
- Employment opportunities, generated during both the construction and operational phase.

The no project alternative would mean that the inherent efficiencies obtained from upgrading production capacity at the same time as reducing atmospheric emissions would be lost. Therefore, the no project alternative is not considered to be reasonably viable.

6 ENVIRONMENTAL BASELINE

6.1 LOCAL METEOROLOGY

TEMPERATURE AND RAINFALL

Air temperature affects plume buoyancy as well as the development of inversion and mixing layers, while rainfall is an important pollutant removal mechanism, particularly in the case of particulate matter. **Figure 6.1** presents the monthly average, minimum and maximum temperatures and total monthly rainfall experienced at Sappi Saiccor from 2014 to 2016. Data was sourced from the modelled MM5 dataset as temperature and rainfall data was not available from the local Sappi meteorological stations.

Clear seasonal variations are evident in the temperature and rainfall values. The area typically receives higher rainfall during the summer months due to increased convection and cloud formation. Furthermore, greater levels of moisture are advected from the ocean during these warmer months. Monthly average summer temperatures range from 19 to 23°C with winter temperatures ranging from 15 to 18°C.

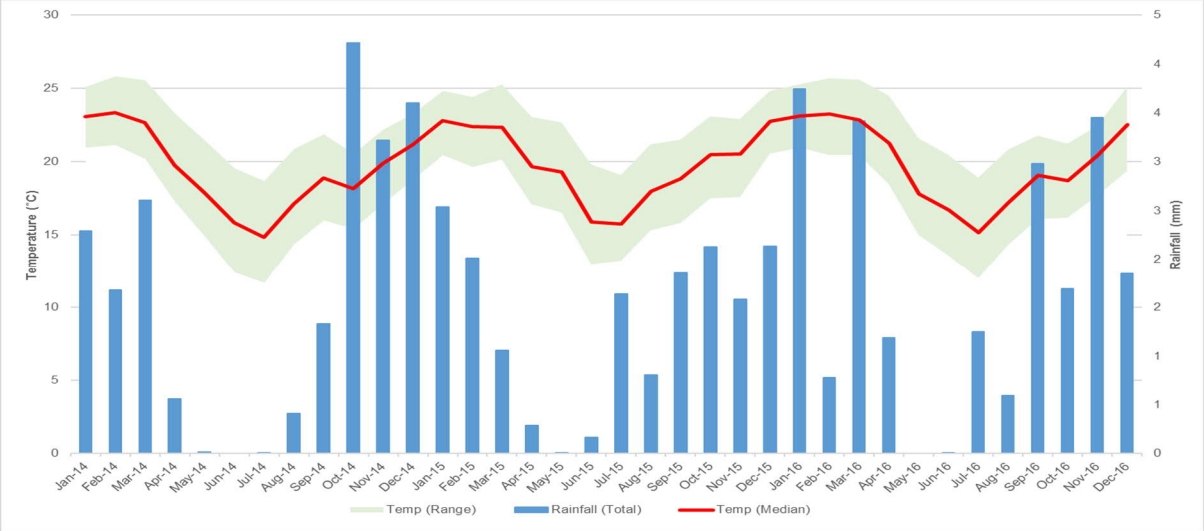

Figure 6.1: Total monthly rainfall and maximum, average and minimum temperatures for 2014 to 2016 (MM5 data)

WIND SPEED AND DIRECTION

Winds affect the horizontal and vertical dispersion of air pollutants away from their source. The prevailing winds in the study region are north-easterly and south-westerly. The north-easterly winds are associated with high atmospheric pressure and fine weather systems whilst the south-westerly winds are associated with the passage of coastal low pressure systems and cold fronts and, therefore, inclement weather.

Wind roses are useful for illustrating the prevailing meteorological conditions of an area, indicating wind speeds and directional frequency distributions. In the following wind roses, the colour of the bar indicates the wind speed whilst the length of the bar represents the frequency of winds blowing from a certain direction (as a percentage).

The period (2014 -2016) wind rose plots for the eight meteorological stations (**Figure 6.2**) located within a 5 km radius of Sappi Saiccor are presented in **Figure 6.3**. Winds at most stations indicate both south-westerly and north-easterly wind components. At the Drift, Magabeni and Umkomaas meteorological stations, a clear westerly wind component is also evident. Highest average wind speeds are experienced from the south-south-west at Craigieburn, Dlambula, Ilfracombe, Magabeni, Naidooville and Saiccor Village; east-north-east at Umkomaas; and north-east at Drift.

Figure 6.4 presents the annual, day and night wind roses for 2014 to 2016 from the MM5 dataset. Winds originate predominantly from the north-east with key west-north-westerly and southerly components. During the day, winds from the north-east prevail with a smaller southerly component. Winds during the day are on average stronger than at night, with winds greater than 8 m/s experienced from both the north-east and south. At night, the north-easterly wind component diminishes and the westerly to west-north-westerly wind component is introduced. This west-north-westerly component has the highest average wind speed at night.

Figure 6.5 presents the seasonal wind rose plots for spring (September to November), summer (December to February), autumn (March – May) and winter (June – August) from the MM5 data. Stronger winds are generally experienced during spring and summer compared to autumn and winter. North-easterly and southerly winds dominate during summer and spring, while during winter and autumn, a strong westerly wind component is evident and the southerly and north-easterly components diminish. The westerly wind component is associated with a land breeze, more predominant during winter months.

6.2 AIR QUALITY

There is currently no background data collected for public health purposes in the region of the Saiccor Mill. Sappi Saiccor's ambient monitoring stations are positioned to monitor the impact of the Mill's emissions (**Figure 6.2**). **Table 6.1** presents the 2016 monitoring data in respect of ambient concentrations of SO^2 with compliance with the National Ambient Air Quality Standards (NAAQS) indicated.

Table 6.1: Current SO_2 Ambient Monitoring Data (2016)

Station	Monitoring Annual Average (2016) (µg/m³) [NAAQS : 50 µg/m³]	Monitoring 24-hour Average (2016) (µg/m³) [NAAQS : 350 µg/m³]		Monitoring 1-hour Average (2016) (µg/m³) [NAAQS : 125 µg/m³]	
		P100	P99	P100	P99
Magabeni	**6.77**	**38.62**	**17.41**	360.25	**43.01**
Dlambula	**47.31**	**297.62**	**189.43**	1253.02	455.76
Ilfracombe	**16.17**	**194.34**	**177.51**	914.38	403.26
Umkomaas	**41.04**	**290.19**	**200.83**	1175.29	436.62
Saiccor Village	**10.67**	**116.16**	**101.02**	1129.44	478.43
Naidooville	**12.35**	**111.49**	**57.38**	752.16	126.23
Craigieburn	**11.35**	**65.92**	**44.28**	484.05	**106.13**
Drift	**27.51**	**264.05**	**146.44**	1990.98	236.59

P100 values are the worst case average concentrations
P99 values are the 99th percentile average concentrations
NAAQS compliant
NAAQS non-compliant

Figure 6.2: Location of air quality and meteorological monitoring stations

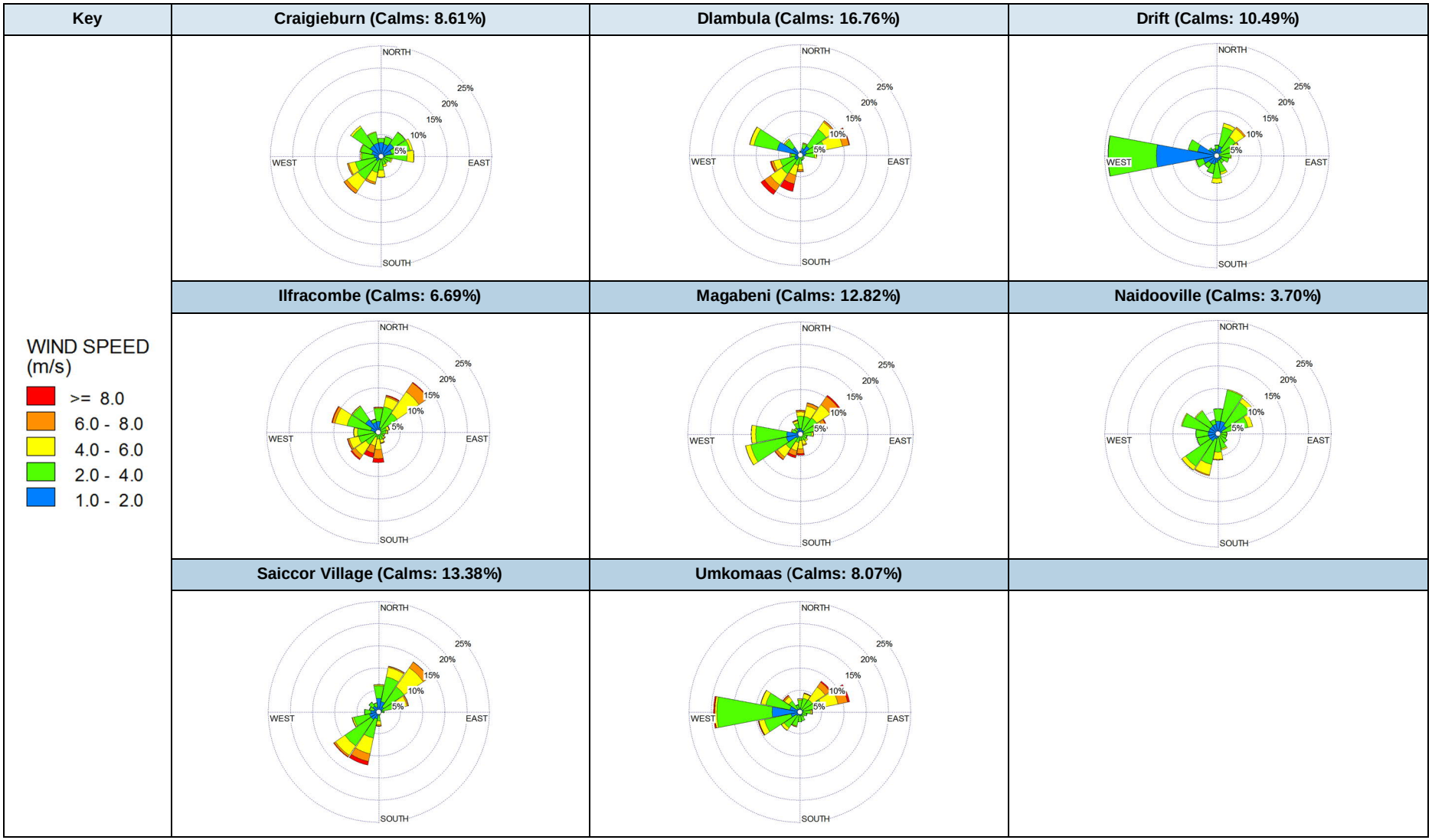

Figure 6.3: Period (2014-2016) wind rose plots from the eight local meteorological stations

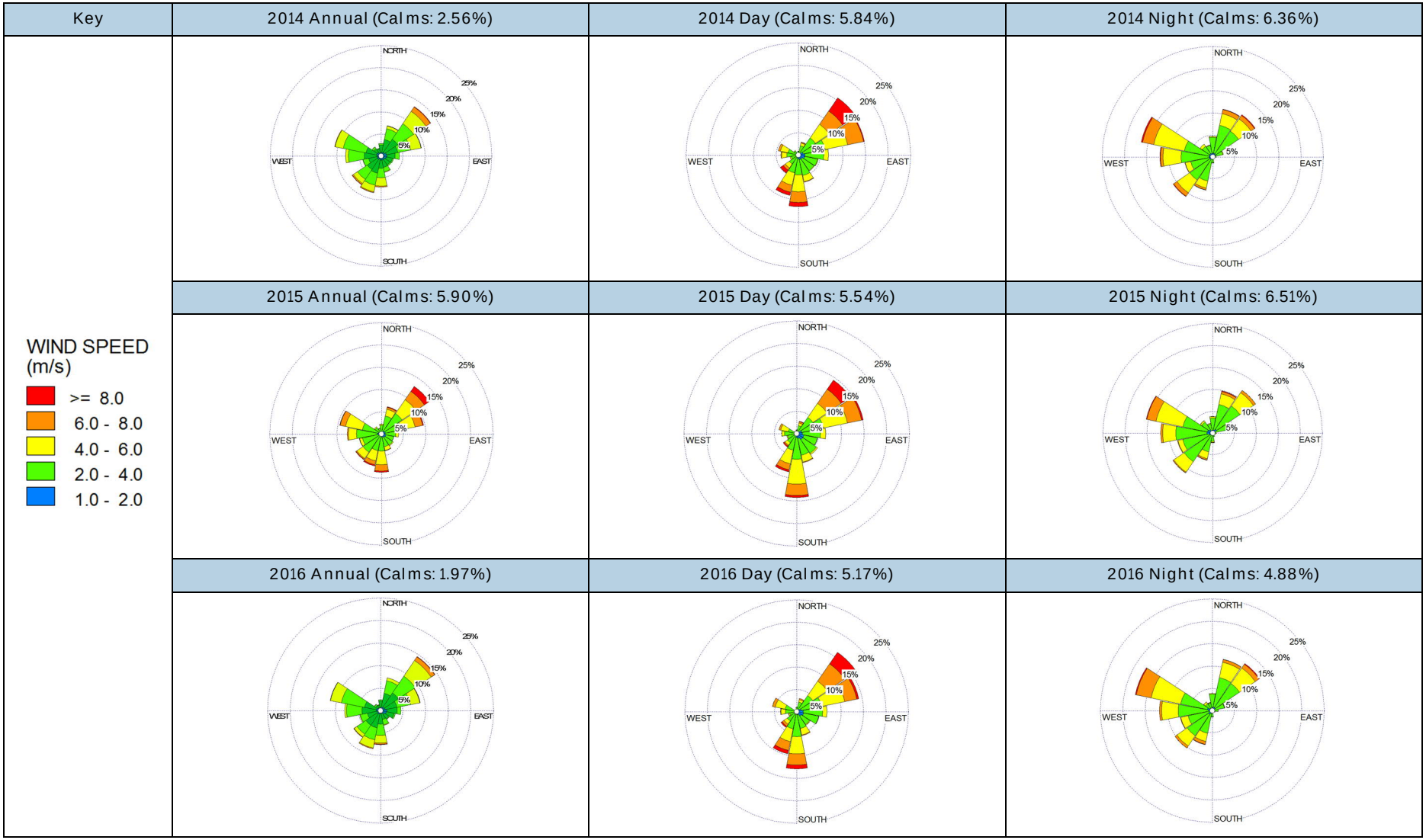

Figure 6.4: Diurnal (2014 to 2016) wind rose plots from the MM5 dataset

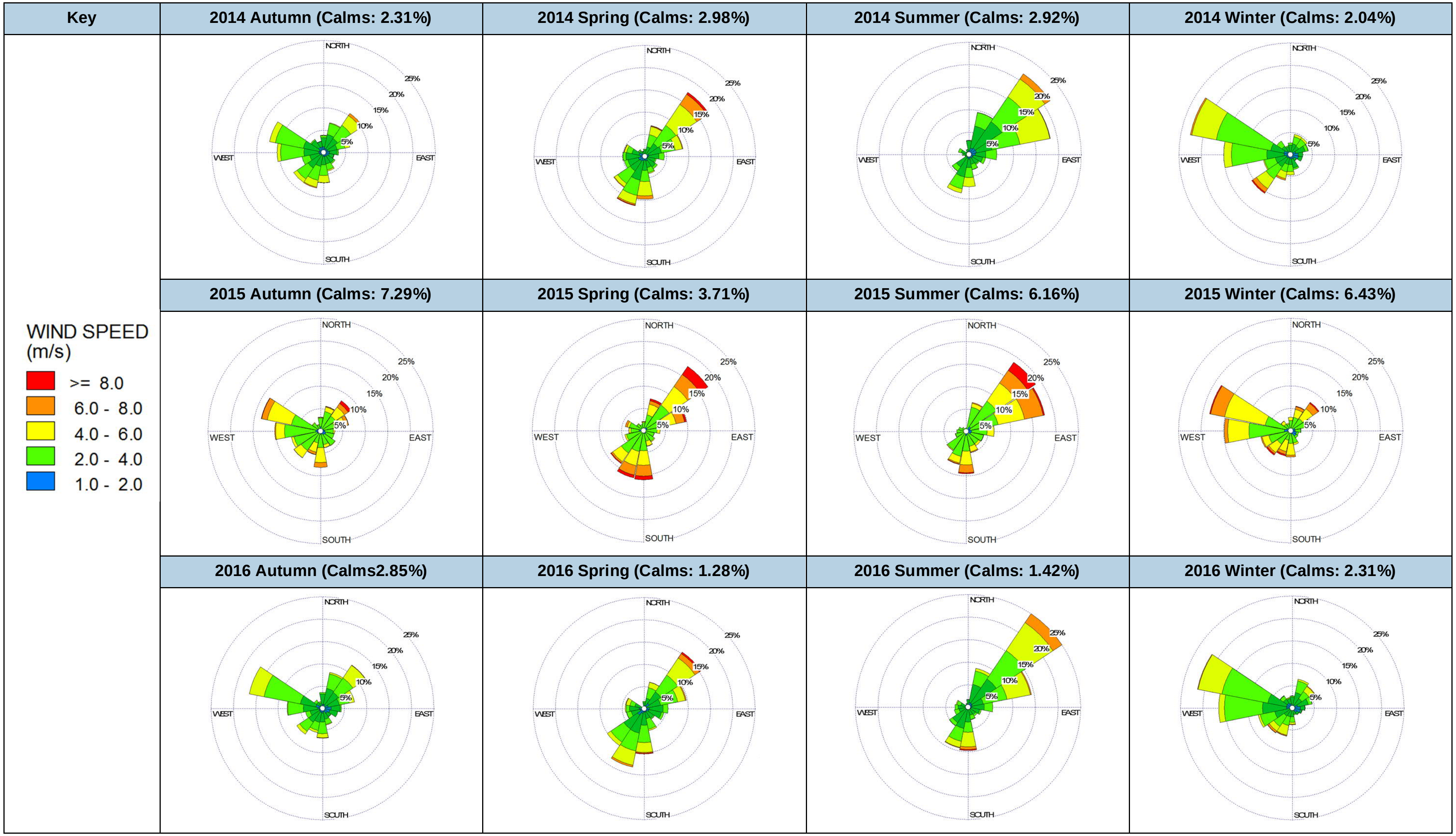

Figure 6.5: Seasonal (2014 to 2016) wind rose plots from the MM5 dataset

6.3 GEOLOGY

Drennan, Maud and Partners conducted a geotechnical investigation in October 2006. This report concluded that the area is underlain by weathered tillite of the Dwyka Group of the Karoo Supergroup at a depth of between 3m and 26m below existing ground level. This is overlain by alluvial/estuarine clays, silts and silty clays capped by fill material generally comprising gravelly, silty clays and occasional wood chips and pulp.

Tillite is a sedimentary rock that consists of consolidated masses of unweathered blocks (detached rock bodies) and glacial till in a rock flour (matrix or paste of unweathered rock). The matrix, which comprises a large percentage of the rock, usually is dark grey to greenish black in colour and consists of rock fragments in a very fine-grained paste. The unconsolidated alluvial/estuarine clayey and silty sediments vary in consistency from soft to very stiff.

The depth to the weathered tillite bedrock varies considerably across the site from being exposed in a cut-face behind the Canteen to in excess of 26m. Below the existing log storage facility the bedrock level slopes in a south easterly direction. Below the Continua Building and Canteen area, the bedrock level slopes steeply in a northerly direction.

The soils beneath the present site have been heavily disturbed by past activities. The area comprises fill which overlies disturbed Witbank Form soil.

6.4 TOPOGRAPHY

The Mill is located at approximately 10 m above mean sea level (mamsl). The area is level with a slight slope from north to south. LignoTech (SA), located adjacent to the Mill to the northeast, is level, whilst the area further to the east rises slightly before dropping off into the Mkomazi River. On the opposite bank of the Mkomazi River, the land rises sharply to a height of 106 mamsl.

The areas to the north and west of the plant are gently to steeply undulating, rising to heights of 152m (the ridge between the plant and Magabeni).

There are no topographical limitations associated with the proposed development of the site.

6.5 FLORA AND FAUNA

The Mill is situated within the KwaZulu Natal Coastal Belt Grassland vegetation type (**Figure 6.6**). In terms of the KwaZulu-Natal Biodiversity Sector Plan the Mkomazi River falls within an irreplaceable critical biodiversity area (CBA) (**Figure 6.7**).

The Mill is bounded to the north and east by the Mkomazi River and the fairly steep vegetated slopes leading up to the Magabeni and Danganya settlements. Some farming activities are taking place on the banks of the river below Magabeni. The area immediately east of the plant comprises sugar cane land leading down to the river – there is very little indigenous vegetation along the southern river bank. The riverine vegetation on the northern banks of the Mkomazi River provide breeding and foraging habitat for many species of animals and birds.

The land to the south and west of the Mill is all highly disturbed, with areas of sugar cane, forestry land and residential development. There is no indigenous vegetation in close proximity to the Mill. The operational areas within the Mill boundary are devoid of vegetation. The site does not provide suitable habitat for the majority of animals although numerous birds have been observed using the infrastructure for perches.

Figure 6.6: Locality of the Mill within the KwaZulu-Natal Coastal Belt Grassland

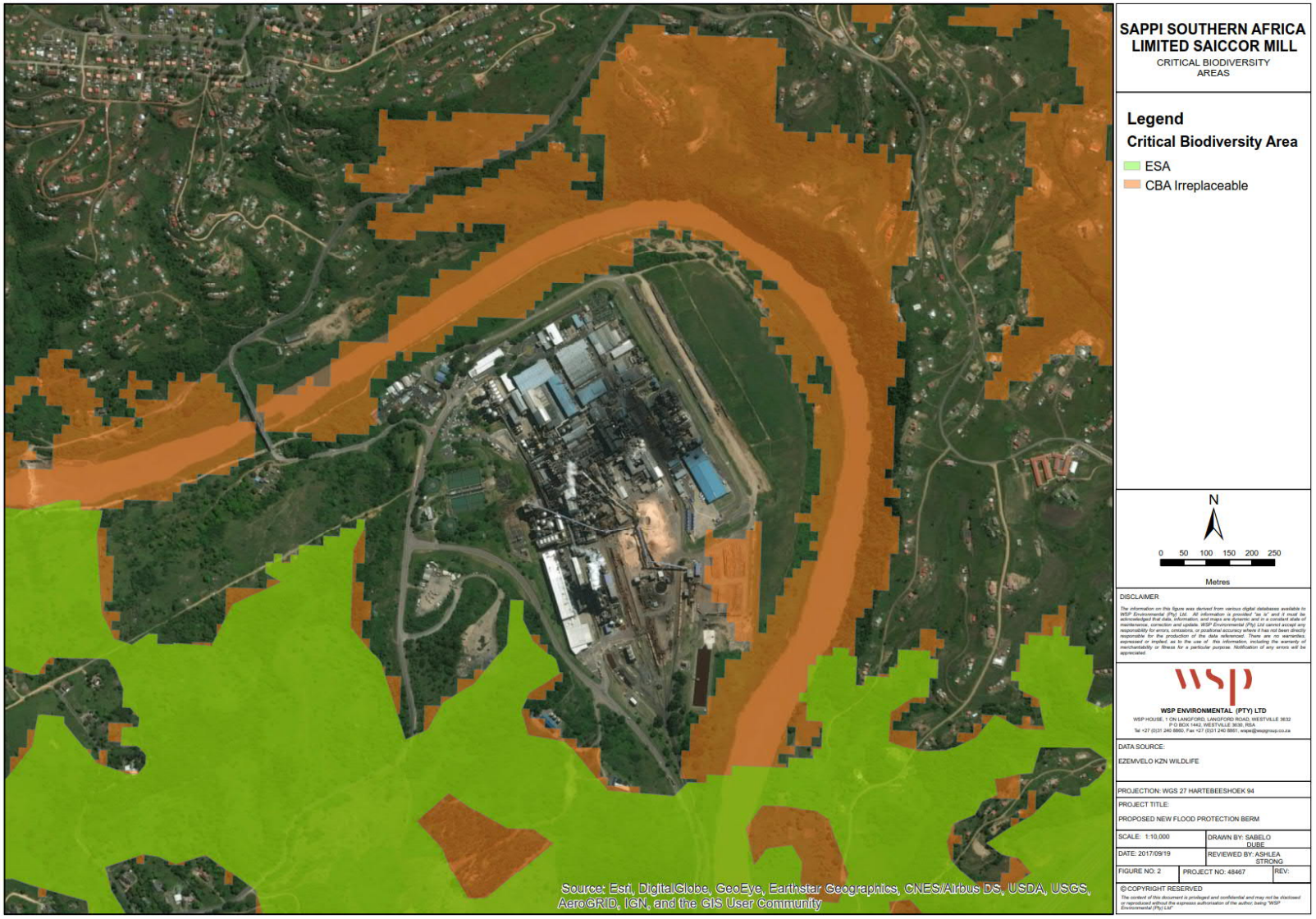

Figure 6.7: Locality of the Irreplaceable Critical Biodiversity Area

6.6 HYDROGEOLOGY

Alluvial sediments (i.e. sand and clay) occupy the top portion of the regolith to a depth of 12 – 36m below ground level. In some places of the alluvial layer, there are basal boulders (2 – 3m in diameter). Below the alluvial sediments, there is fractured Tillite bedrock from the Dwyka Formation (Drennan, Maud and Partners, 2000; GCS 2012).

According to the Aquifer Classification of South Africa (1:3 000 000 scale, dated 1999) the underlying geology is considered representative of a minor aquifer, a moderate-yielding system of variable water quality with a moderate vulnerability to contamination and medium susceptibility to anthropogenic activities. The aquifer recharge and discharge is provided in **Table 6.2**.

Table 6.2: Aquifer Recharge and Discharge (U10L and U10M)

Quaternary Catchment	Recharge (mm/a)	Baseflow (mm/a)	Aquifer Recharge (mm/a)	Groundwater Baseflow (mm/a)	Interflow (mm/a)
U10A	180.8	178.7	27.9	25.8	152.9
U10B	155.2	151.2	30.1	26.7	124.4
U10C	136.0	131.3	32.0	27.3	103.9
U10D	116.3	111.0	31.8	26.4	84.5
U10E	124.1	118.5	31.1	26.2	92.3
U10F	89.7	93.8	23.2	17.8	65.9
U10G	97.8	93.0	22.3	17.6	75.3
U10H	88.3	83.5	22.1	17.3	6.2
U10J	54.7	49.0	23.4	17.9	31.0
U10K	42.4	37.8	21.9	17.9	19.9
U10L	43.2	35.2	27.0	19.7	15.5
U10M	56.2	48.9	26.7	20.4	28.5

Source: WARMS Database, 2016

Groundwater use within the Mkomazi Catchment is minimal. **Table 6.3** shows a breakdown of the groundwater water use for the U10 tertiary, including borehole use, as well as water from a spring/eye. The total volume used (843 249m^3) is nominal compared to the MAR of the catchment (1 038 million m^3, i.e. 8% of the MAR).

Table 6.3: Groundwater Use in the U10 Tertiary

Quaternary	Sector	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Volume (m^3)
U10A	Schedule 1 *	-29.4500	29.5184	3 285
U10B	Water Supply Service	-29.6222	29.5568	730
U10D	Agriculture (irrigation) *	-29.5999	29.7653	4 284
U10E	Recreation	-29.7181	29.7497	183
	Water Supply Service	-29.5888	29.8624	22 692
U10F	Water Supply Service	-29.7663	29.8498	164 250
	Schedule 1	-29.8279	29.7729	469
	Water Supply Service*	-29.8136	29.7616	172 280

U10G	Agriculture (livestock watering)	-29.6791	29.9875	3 650
	Schedule 1	-29.6804	30.0697	500
	Agriculture (livestock watering)	-29.6861	29.9736	10 000
	Water Supply Service	-29.6498	30.0662	183
	Schedule 1	-29.6786	29.9527	1 000
U10H	Industry (non-urban) *	-29.9094	30.1497	1 800
U10J	Industry (non-urban)	-29.9056	30.2861	5 475
	Schedule 1	-29.9083	30.2888	500
	Agriculture (livestock watering)	-30.0530	30.1788	370
	Agriculture (livestock watering)	-30.0250	30.1916	3 504
	Agriculture (irrigation)	-30.0250	30.1916	10 000
	Water Supply Service	-30.0790	30.0034	73
	Water Supply Service	-29.8962	30.1620	730
	Schedule 1	-29.9702	30.0644	91
U10K	Schedule 1	-30.0787	30.1727	1 000
	Agriculture (irrigation)	-30.1583	30.1250	144 000
	Industry (urban)	-30.1403	30.0471	42 535
	Water Supply Service	-30.1768	30.0424	182 500
	Schedule 1	-30.1305	30.0871	500
	Agriculture (irrigation) *	-30.1425	29.9974	20 800
U10L	Schedule 1	-29.9530	30.2838	365
	Agriculture (irrigation)	-29.9880	30.3272	45 500
Total				**843 249**

Source: WARMS Database, DWA, 2016
** Spring/Eye (otherwise borehole)*

The National Groundwater Archive (NGA) was also used to assess the use of boreholes within a 5km radius of the Mill. **Table 6.4** provides the relevant information.

Table 6.4: NGA Boreholes within in a 5 km Radius of the Saiccor Mill

NGA Borehole Point	Quaternary	Farm	Latitude (decimal degrees)	Longitude (decimal degrees)	Borehole ID
1	U70E	Umnini Ged Umzonsi Umgubbulu	-30.1558	30.7969	3030BB00002
2	U70E	Umnini Ged Umzonsi Umgubbulu	-30.1686	30.7808	3030BB00005
3	U70E	Ifumi Mission Ptn. Nsulwane Banyana Clinic	-30.1389	30.7863	3030BB00014
4	U70E	Umnini Ged Umzonsi Umgubbulu	-30.1656	30.8136	3030BB00015
5	U10M	Umnini Ged Umzonsi Umgubbulu	-30.1811	30.7830	3030BB00016
6	U70E	Nsulwane Ptn.Thoyane Tribal Authority	-30.1389	30.7783	3030BB00020

7	U70E	Nsulwane Ptn.Thoyane Tribal Authority	-30.1419	30.7636	3030BB00021
8	U70E	Ifumi Mission Reserve	-30.1385	30.7619	3030BB00056
9	U80L	Umkomaas Ptn. Golf Club	-30.2100	30.7899	3030BB00062
10	U70E	Umnini Ged Dangane	-30.1614	30.7983	3030BB00063
11	U70E	Umnini Ged Dangane	-30.1731	30.7872	3030BB00064

6.7 SURFACE WATER

The main rivers in the Mvoti to Umzimkulu WMA (i.e. WMA 11) are the Mvoti, Mgeni, Mkomazi and the Umzimkulu Rivers, which all drain directly into the Indian Ocean. The Mill site is situated adjacent to the Mkomazi River, approximately 3km upstream of the river mouth and is located in a meander, on the floodplain of the Mkomazi River. The meander bounds the site to the west, north and east. The site is located above the 1:100 year floodline, however, the 1:200 year flood event could inundate the site by approximately 400mm. It is however noted that the Mill has a floodberm protection system, which will provide protection in the event of extreme flooding events.

A stormwater management plan has been implemented at the Mill. Currently the generated stormwater is diverted via drains to the first flush system, (designed to manage 600m^3 per hour) prior to being diverted to the effluent management system for discharge via the sea outfall pipeline. For major storm events water exceeding the 600m^3 per hour volumetric capacity of the first flush system is discharged directly to the Mkomazi River.

There are no major dams situated on the Mkomazi River. The contributing catchment upstream of the Mill (i.e. upstream of the Mill weir) is 4 376km^2, with approximately 11km^2 of catchment area downstream of the weir.

6.8 GROUNDWATER

Groundwater levels on the site range from 4.98 m to 6.83 m below ground level. Groundwater gradients are low, resulting in very little lateral migration. Groundwater beneath the site has been found to be saline, due to natural sea water intrusion into the aquifer. Due to the natural salinity of the shallow groundwater beneath the site, the water is not suitable for domestic or industrial use and hence may not be considered to be a resource.

Annual groundwater monitoring is carried out on the site.

6.9 NOISE

As an industrial facility, the Mill generates noise as a result of operational processes and activities. A review of the Mill Complaints Register confirmed that numerous complaints regarding noise have been logged over the past three years, all attributed to one resident located in, Craigieburn.

The SANS 10103:2008 document (The measurement and rating of environmental noise with respect to speech communication) provides methods and guidelines for the assessment of working and living environments in respect to acoustic comfort as well as respect to possible annoyance by noise. SANS 10103 provides typical rating levels for noise in different districts (Table 6.5**)**.

Table 6.5: Typical Rating Level for Noise in Districts (adapted from SANS 10103:2008)

Type of District	Classification	Equivalent Continuous Rating level for Noise ($L_{Req, T}$) (dB(A))	
		Outdoors	
		Day-time ($L_{Req,d}$)	Night-time ($L_{Req,n}$)
a) Rural	A	45	35
b) Suburban (with little road traffic)	B	50	40
c) Urban	C	55	45
d) Urban (with one or more of the following: workshops, business premises and main roads)	D	60	50
e) Central Business Districts	E	65	55
f) Industrial District	F	70	60

During the Environmental Acoustic Impact Assessment (EAIA) (WSP, 2018) (**Appendix D**) an assessment of the existing noise climate in the area surrounding the mill was undertaken in April 2018. Ambient day and night-time noise measurements were conducted at the entrance of the Mill and six other surrounding sensitive receptor locations (**Table 6.6**) (**Figure 6.8**).

Table 6.6: Noise Monitoring Locations (WSP EAIA, 2018)

ID	Description	Distance from Sappi Site Boundary (m)	SANS District	SANS Classification
N_01	Sappi Main Gate	0	Industrial	F
N_02	Dlambula Residence	325	Suburban	B
N_03	Umkomaas	2 320	Suburban	B
N-04	Craigieburn – Juniper Road	1 060	Suburban	B
N-05	Magabeni Residence	310	Suburban	B
N-06	Dlambulu School	400	Suburban	B
N-07	Magabeni – Sibhakada Road	575	Suburban	B

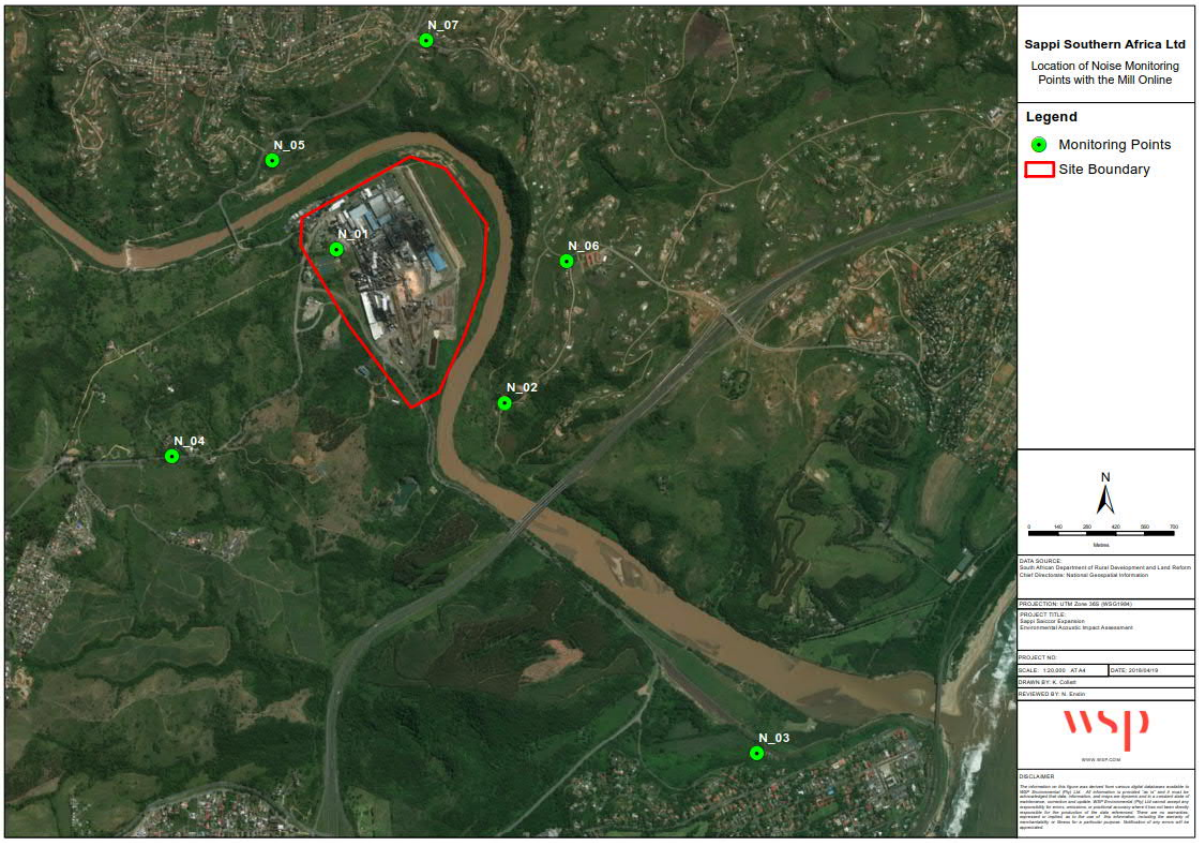

Figure 6.8: Location of Noise Monitoring Points (WSP EAIA, 2018)

The day-time monitoring results during normal baseline conditions when the Mill is online are presented in **Table 6.7**. A summary of the finding are:

- Noise levels at the Saiccor main gate were elevated and exceeded the industrial guideline level.
- Noise levels at the majority residential locations exceed the suburban guideline level with high general vehicle activity being the predominant source of the noise at these locations.
- The Mill was only audible at one of the residential locations, namely Magabeni Residence, located 310m north of the mill boundary.

Table 6.7: Day-Time Noise Monitoring Results (Baseline) (WSP EAIA, 2018)

ID	Location	Time	L_{Aeq} (dB(A))	L_{Amax} (dB(A))	L_{Amin} (dB(A))	SANS Guideline (dB(A))	Compliant
N_01	Sappi Main Gate	13:00	71.8	80.8	61.9	70	No
N_02	Dlambula Residence	10:37	49.5	52.6	45.1	50	Yes
N_03	Umkomaas	12:35	46.7	71.7	38.9	50	Yes
N_04	Craigieburn – Juniper Road	11:51	55.8	80.0	34.5	50	No
N_05	Magabeni Residence	11:25	58.0	67.8	54.2	50	No
N_06	Dlambula School	10:13	50.9	64.7	38.8	50	No
N_07	Magabeni – Sibhakada Road	11:02	50.3	74.5	38.8	50	No

The night-time monitoring results during normal baseline conditions when the Mill is online are presented in **Table 6.8**. A summary of the finding are:

- Noise levels at the Saiccor main gate were elevated and exceeded the industrial guideline level.
- Noise levels at the majority residential locations exceed the suburban guideline level with high general vehicle activity being the predominant source of the noise at these locations.
- The Mill was only audible at two of the residential locations, namely Dlambula and Magabeni Residence.

Table 6.8: Night-Time Noise Monitoring Results (Baseline) (WSP EAIA, 2018)

ID	Location	Time	L_{Aeq} (dB(A))	L_{Amax} (dB(A))	L_{Amin} (dB(A))	SANS Guideline (dB(A))	Compliant
N_01	Sappi Main Gate	00:32	64.1	72.6	62.1	60	No
N_02	Dlambula Residence	22:10	58.4	67.0	53.0	40	No
N_03	Umkomaas	00:06	42.7	66.5	39.4	40	No
N_04	Craigieburn – Juniper Road	23:39	47.5	69.7	41.0	40	No
N_05	Magabeni Residence	23:13	56.6	66.5	51.4	40	No
N_06	Dlambula School	22:30	55.3	65.5	50.7	40	No
N_07	Magabeni – Sibhakada Road	22:53	53.2	65.2	47.2	40	No

6.10 TRAFFIC

There are two key methods of transport used for the mill production, namely logging trucks and freight rail.

Incoming materials are transported via both truck and rail. Incoming raw materials consist of predominantly hardwood logs. Chemicals required for the operation of Mill are also transported to the mill by trucks. Outgoing product (dissolving wood pulp) is transported only by trucks. An average of 55 trucks transport outgoing product from the Mill to the Durban Harbour on a daily basis. Approximately 600 vehicles travel to the Mill on a daily basis.

The Mill has an external rail connection. Locomotives operated by Transnet Freight Rail transport wagons loaded with timber from the plantations to a rail wagon storage yard located approximately 2km away from the site. A Sappi owned diesel locomotive collects the loaded wagons from the rail storage yard and transports them back to the Mill.

The main Mill access for truck deliveries is located on the P88 provincial road. The access point for staff employed at the Mill is located further north on the P197-3 provincial road (**Figure 6.9**) (WSP Traffic Impact Assessment (TIA), 2018) (**Appendix E).**

Figure 6.9: Sappi Saiccor Mill Access Points (WSP TIA, 2018)

6.11 WATER ABSTRACTION

Sappi Saiccor currently abstracts raw water from the Mkomazi River at their pump house located at the Saiccor Weir upstream of the Mill. In terms of the Saiccor WUL (Licence No. B191/2/1910/11) dated June 2004, the Mill is licenced to abstract 53 million m^3/annum from the Mkomazi River.

6.12 EFFLUENT MANAGEMENT

Effluent from the Mill is discharged via a sea outfall pipeline, which discharges 6.5km out to sea. The disposal of the effluent via the sea outfall pipeline is an existing authorised activity regulated by the Coastal Water Discharge Permit (CWDP) (Ref: 2011/002/KZN/SAPPISA) issued on 21 December 2016.

Saiccor Mill is permitted to discharge 48 650 000m^3 per annum of industrial effluent. The average discharge over the past year (May 2017 to May 2018) was 5 081m^3 per hour. **Table 6.9** below presents the current effluent quantity (May 2018) and quality measured against the CWDP quality requirements.

Table 6.9: Effluent Discharge Quality Compliance with CWDP

Parameter	CWDP Limits	May 2018 Effluent Results	Compliant
pH	2,8 to 8,5	3,4	**Yes**
Electrical conductivity	5 000mS/m	487mS/m	**Yes**
Temperature	63 °C	52 °C	**Yes**
Chemical Oxygen Demand	20 000 mg/l	12818 mg/l	**Yes**

Total Suspended Solids	600 mg/l	348 mg/l	**Yes**
Colour	3 000 hazen units	2017 hazen units	**Yes**
Lignin	6 000 mg/l	2681 mg/l	**Yes**
Total Dissolved Solids	20 000 mg/l	10 584 mg/l	**Yes**

The sea outfall is approximately 5km north of the Aliwal shoal. External studies have been conducted in the past to assess the impact of the Mill sea outfall on the shoal.

These studies have concluded that there is no impact on the marine flora and fauna as follows:

- A modelling-based evaluation of causes and likely effects of the variability in light penetration at Aliwal Shoal, Kwazulu-Natal, South Africa. - CSIR March 2002 (CSIR Report ENV-S-C 2002-040) Two volumes;
- Status report on the Sappi Saiccor Aliwal Shoal Project - Specialist Study 7 - Proposed Marine Pipeline Extension for Sappi Saiccor 1997; and
- Studies on the environmental impact of Sappi Saiccor effluent on the Kwazulu-Natal coast - CSIR March 2002 (CSIR report: ENV-D-C 2002-004). Also in 1981 (revised 1984), 1986, 1992, 1995, 1996, 1997, 1999, 2000, 2001, 2003, 2004, 2005.

In terms of the past studies the first referenced (see references above) work shows that Sappi Saiccor effluent has less impact on light quality on the reef than the river with flood, the river with no flood, and cloud cover. In terms of diver visibility, the effluent is second to river with flood and followed by river without flood and cloud cover.

Ongoing annual marine surveys are conducted on the marine outfall and surrounding areas. To date no negative impact has been highlighted.

6.13 MAJOR HAZARD RISK

The Sappi Saiccor Mill is registered as a MHI in accordance with the MHI Regulations (2001) promulgated under the OHSA. The Mill is designated a MHI due to both the storage and production of substances that have the potential to cause a major incident that may pose a risk that could affect the health and safety of employees and the general public.

In terms of the MHI Regulations, the Mill is required to undertake a risk assessment review every 5 years and prior to modifications to the Mill operations. The risk assessment conducted in terms of these regulations involves the collection, organisation, analysis, interpretation, communication and implementation of information in order to identify the probable frequency, magnitude and nature of any major incident which could occur at a major hazard installation, and the measures required to remove, reduce or control the potential causes of such an incident.

The last MHI risk assessment of the Mill was conducted by Ishecon in August 2014, with a revision of this report undertaken in March 2017 to correct an aspect of the assessment pertaining to the chlorine dioxide tank releases. Ishecon is currently in the process of reviewing the risk profile of the Mill.

6.14 SOCIO-ECONOMIC ENVIRONMENT

The Mill currently employs approximately 1 160 people on a permanent basis. This excludes the temporary jobs that arise from *ad hoc* activities that occur at the Mill.

6.14.1 REGIONAL CONTEXT

The KZN Coastal Metropolitan Area is the economic hub of the KwaZulu-Natal Province and is the third largest contributor to the national Economy (Blue Drop KZN Report (1), 2014). Durban is one of the fastest growing urban areas in the world and KwaZulu-Natal's contribution to the Gross Domestic Product is 16%.

The forestry, timber, pulp and paper industry have the following South African economic impacts:

- This sector's contribution to Gross Domestic Product in 2003 totalled R12.2 billion;
- Exports - in 2003 totalled nearly R11 billion;

- Employment - total direct employment in 2003 was 170 000, of whom 106 000 were in plantation forestry typically in deep rural areas where few alternate job opportunities exist. Around 500 000 people in these areas are dependent on such employment; and
- Sappi Saiccor currently employs approximately 1160 people on a permanent basis (based on May 2018 data).

Water services delivery in KwaZulu-Natal (KZN) is performed by 14 Municipalities which act as the Water Service Authorities, via 209 drinking water supply systems. There are numerous Water Service Providers contracted to manage the municipal networks via a number of bulk water supply schemes (Blue Drop Report, 2014). The main Water Service Providers in KZN are the Umgeni and Uthukela Water Boards, serving 31 and 34 systems out of the 209, respectively.

The Mill falls within the eThekwini Metropolitan Municipality, which encompasses Durban and the surrounding areas. The Water Service Provider for eThekwini Metropolitan Municipality is the Umgeni Water Board but the eThekwini Metropolitan Municipality is the Water Service Authority of the area.

Between 2012 and 2014 the DWA Blue Drop Reports show a decrease of 2% in the overall score for eThekwini Metropolitan Municipality. The Municipality was previously ranked first; currently ranked second out of the 14 Water Service Authorities, with a score of 95.90% beaten only by Msunduzi Local Municipality at 97.97% (DWA *Natal Blue Drop Report*, 2014).

The most important economic sectors providing employment in the area are "manufacturing" and "community/social/personal" and "wholesale/retail". The most significant increases are evident in the "agricultural/forestry/fishing" sector.

6.14.2 LOCAL CONTEXT

The largest city in eThekwini Metropolitan Municipality is the city of Durban (eThekwini), and the third largest city in South Africa, owing to South Africa's busiest port and a high tourism income. The main economic sectors include: finance (22%); manufacturing (22%); community services (18%); trade (16%); transport (16%); construction (3%) and electricity (2%) (Local Government Handbook, 2016).

The Mill is located within Ward 99 of the eThekwini Municipal Area. Statistics SA 2011 and 2016 have been used as the primary data source to ensure consistency in the information presented. The ward is comprised of a predominantly African population (68%), with a total population of 27 424 people. There are 7 836 households and 8.8% of these are informal dwellings.

The population in the ward area has increased over time with majority of the population (34%) falling under the 20-39 year age group and 31% under the age of 18. Education levels are fairly average with 42.8% having completed their matric, which is about 10% higher than the provincial rate (Statistics SA, 2011).

Unemployment in the ward is 41.6% which is significantly higher than the national rate of 29.8% (Statistics SA, 2011). In 2011, the average annual household income was recorded to be R29 400 and 14% of households had no household income. The number of employed individuals in the ward area is 40% with 76% employed in the formal sector.

6.14.3 SURFACE WATER USERS

The water resources of the Mvoti to Umzimkulu WMA are of significant strategic importance, both for supply of demands, and from an environmental aspect. Each main river independently flows into the Indian Ocean, and therefore each estuary is of environmental significance in order to ensure the ecological integrity of the estuary remains strong. There are substantial areas of commercial afforestation and irrigation within the Mkomazi catchment, supplied by both dams and rivers. The dominant crops under irrigation are Rye Grass and pastures, although a variety of crops are grown over the area.

Based on the DWS WARMS Database (2016), five water use sectors were identified within the quaternary catchments associated with the Mkomazi River, these included:

- Industry (non-urban and urban);
- Domestic and Industrial (urban);
- Commercial afforestation;
- Agriculture (irrigation and livestock watering); and,

– Water Supply Service.

It must be noted that since the Mill is the last water user within the Mkomazi River catchment, that water use associated with the Mill will not result in any effects on downstream water use barring potential ecological functioning and recreational use (e.g. fishing).

Table 6.10 provides the water users per sector within the U10 tertiary. The total water use in the tertiary is 166 million m^3/annum.

Table 6.10: Water Use per Sector in Tertiary U10

Sector	Water Use Volume (m^3/a)	% of Total
Industry: Non-urban	60 024 317	36%
Clean Water Dam	34 309 120	21%
Commercial Afforestation	32 466 142	20%
Irrigation: Agriculture	30 073 016	18%
Water Supply Services (Domestic & Industrial)	9 161 793	6%
Industry: Urban	150 535	<0%
Schedule 1	68 532	<0%
Agriculture: Livestock Watering	55 070	<0%
Urban: Domestic and Industrial	5 280	<0%
Recreation	183	<0%
Total	**166 313 988**	**100%**

7 ENVIRONMENTAL ASPECTS

The environmental aspects associated with the proposed Saiccor Mill expansion project are described in this section. An environmental aspect is defined as an element or characteristic of the project that interacts or can interact with the environment and which has the potential to cause environmental impacts. The environmental aspects were determined through undertaking of a series of workshops with the Sappi Saiccor Technical over the period September 2017 to May 2018.

7.1 AIRBORNE EMISSIONS

7.1.1 CONSTRUCTION PHASE

Vehicle movements and use of equipment in the work areas and the construction layout areas has the potential to generation dust emissions. These emissions are likely to be confined to the immediate area, except under very windy conditions.

7.1.2 OPERATIONAL PHASE

Air quality environmental aspects discussed below are referenced from the Air Quality Impact Assessment (AQIA) (WSP, 2018) (**Appendix C**). The AQIA assessed the ambient impact of the key air pollutant emissions from Sappi Saiccor, namely PM, SO_2, and NO_x.

AIR QUALITY EMISSIONS CHANGES

The proposed expansion project will result in a change in the emissions profile of the Mill. The AQIA presents the changes in respect of point sources, vehicle emissions and line and area sources. Vehicle emissions and line and areas source emissions were calculated to ensure a complete and accurate emissions inventory was prepared for dispersion modelling. Emission calculations are included in **Appendix C**, as points sources are the most significant, a summary of these sources and associated changes are presented below.

POINT SOURCES

The project will result in changes to the following existing point sources:

- Coal Fired Boiler Scrubber (CFBS) stack.
- MgO1 stack
- MgO2 stack
- Emissions from the Blow Tank Stack (BTS) and Wash Pit Stack (WPS) are assumed to remain unchanged under the proposed scenarios. This is an environmentally conservative assumption, as there are planned improvements for these stacks (**Appendix C**).

The project includes a new proposed source:

- MgO3 stack

The current and predicted SO_2, NO_x and PM emissions for the Mill baseline and proposed (Vulindlela and Stone) scenarios are presented in the AQIA (**Appendix C**).

Table 7.1 presents the maximum continuous emission rates under the current and proposed operations.

Volatile Organic Compound (VOC) profiles are highly variable and, as such, snapshot values on a static profile diagram are misleading and thus excluded from the profile diagrams and further modelling. A previous assessment undertaken by WSP in 2013 showed that ambient VOC impacts resulting from measured stack concentrations are negligible.

Table 7.1: Current and Proposed Key Point Source Emission Rates (maximum continuous rates) (WSP AQIA, 2018)

Source	Baseline			Project Vulindlela			Project Stone		
	PM_{10} (g/s)	SO_2 (g/s)	NO_x (g/s)	PM_{10} (g/s)	SO_2 (g/s)	NO_x (g/s)	PM_{10} (g/s)	SO_2 (g/s)	NO_x (g/s)
CFBS Stack	3.29	2.08	6.30	0.67	0.42	1.27	0.29	0.24	0.74
MgO1 Stack	2.38	10.42	12.55	2.31	10.12	12.19	2.31	10.12	12.19
MgO2 Stack	7.14	11.57	13.64	5.91	2.59	11.30	7.67	3.36	14.66
BTS Stack	NA	0.00179	NA	NA	0.00179	NA	NA	0.00179	NA
WPS Stack	NA	0.0253	NA	NA	0.0253	NA	NA	0.0253	NA
MgO3 Stack	NA	NA	NA	8.33	2.60	31.25	10.84	3.39	40.64

SUMMARY OF AIR QUALITY IMPACTS

- A predicted increase in period average PM_{10} receptor concentrations is noted at Magabeni, Dlambula, Ilfracombe, Umkomaas, Saiccor Village, Naidooville and Craigieburn while a predicted decrease in period average PM_{10} receptor concentrations is noted at Drift between the baseline and proposed Phase 2 scenarios.
- A predicted increase in P99 24-hour average receptor PM_{10} concentrations is expected at all receptors.
- A decrease in SO_2 concentrations is predicted at all receptors across all averaging periods between the baseline (**Figure 7.1**) and Phase 2 (**Figure 7.2**) scenarios.
- An increase in NO_2 concentrations is predicted for all averaging periods for all receptors between the baseline and proposed Phase 2 scenario.
- No exceedances of the PM_{10} or SO_2 NAAQS are predicted for any pollutants under any of the averaging periods for normal operating conditions under the baseline or proposed scenarios.
- Exceedences of the NO_2 NAAQS are predicted in the vicinity of the train line. This is based on conservative emission calculations and assuming that the diesel train is running continuously during the year. Concentrations at the nearest sensitive receptors are significantly below the NAAQS under all averaging period and scenarios.

The peak receptor concentrations of each of the key pollutants for current operations (baseline) and the proposed expansion phases are summarised in **Table 7.2**.

Table 7.2: Peak receptor ambient pollutant concentrations across emission scenarios

Pollutant	Avg. Period	NAAQS ($\mu g/m^3$)	Scenario			Max Δ baseline to Phase 2 ($\mu g/m^3$)	Δ baseline to Phase 2 (%)	Resultant Effect
			Baseline ($\mu g/m^3$)	Phase 1 ($\mu g/m^3$)	Phase 2 ($\mu g/m^3$)			
PM_{10}	Period	40	1.49*	1.39**	1.62**	0.48**	42%**	Increase
	P99 24-hour	75	6.95*	7.85*	8.54*	1.59*	23%*	Increase
SO_2	Period	50	2.13*	1.52*	1.50*	-0.64*	-30%*	Decrease
	P99 24-hour	125	12.06*	10.12*	10.12*	-1.94*	-16%*	Decrease
	P99 1-hour	350	38.96*	34.34*	34.15*	-4.81*	-12%*	Decrease
NO_2	Period	40	5.20*	6.03***	7.26***	2.64**	74%**	Increase
	P99 1-hour	200	68.08***	96.90*	110.38*	47.31*	75%*	Increase

***Drift, **Craigieburn, ***Dlambula**

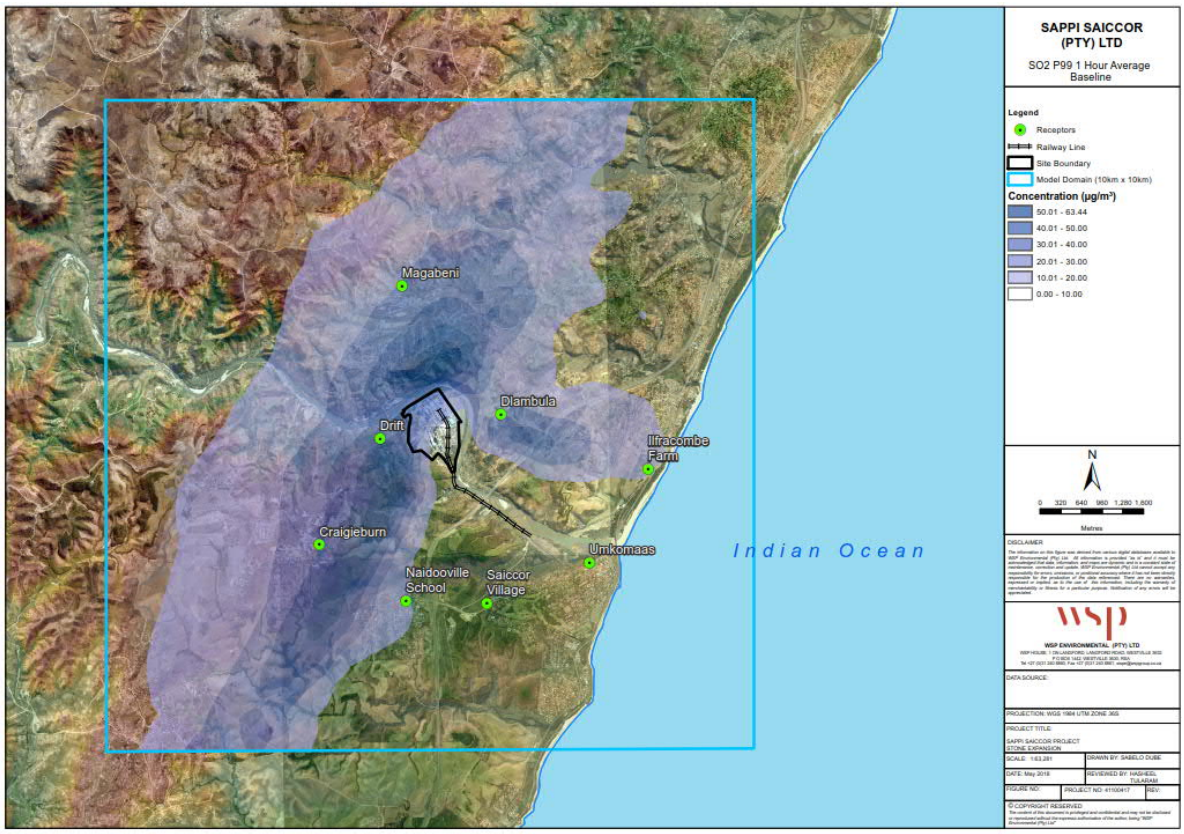

Figure 7.1: Current scenario P99 1-hour average SO_2 concentrations (WSP AQIA, 2018)

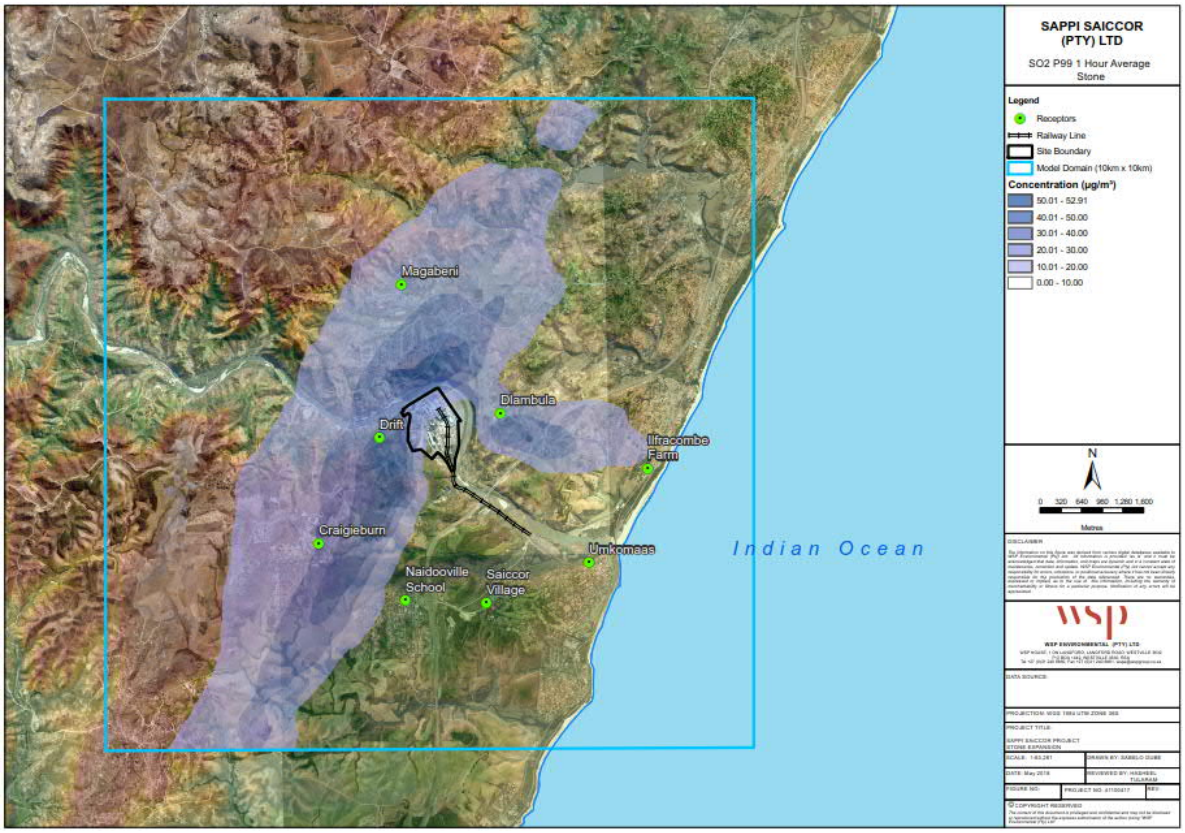

Figure 7.2: Proposed (Phase 2) scenario P99 1-hour average SO_2 concentrations (WSP AQIA, 2018)

7.2 NOISE EMISSIONS

7.2.1 CONSTRUCTION PHASE

Construction activities will not be continuous in nature, with only some equipment active at any given time. During the construction phase, the following noise sources have been identified as likely to be applicable:

- Earth moving equipment (excavators, compactors, bull-dozers, front end loaders, graders, scrapers, etc.);
- Material handling equipment (concrete mixers, cranes, etc.);
- Power units (generators, compressors, etc.);
- Power equipment (pile drivers, pneumatic breakers, grinders, welders, etc.) and;
- Other equipment (compressed air blowers, power saws, electric drills, etc.).

It is unlikely that the noise will be audible from areas surrounding the Mill with potential to cause nuisance.

7.2.2 OPERATIONAL PHASE

Environmental acoustic aspects discussed below are referenced from the Environmental Acoustic Impact Assessment (EAIA) (WSP EAIA, April 2018) (**Appendix D**).

The acoustic impacts of the proposed expansion were assessed through the use of attenuation-over-distance acoustic calculations. In order to represent a worst-case scenario it was assumed that all proposed noise sources during both expansion phases will operate simultaneously within an area along the closest mill boundary to each sensitive receptor.

Noise levels in the immediate vicinity of the expansion area are predicted to be high. From 20 m from the source, noise levels will reduce considerably, with noise levels at 16 m from the source dropping to below the industrial guideline rating level of 70 dB(A). Noise levels will drop below the suburban guideline rating level of 50 dB(A) at about 144 m from the source (WSP EAIA, 2018).

After the completion of both phases of the mill expansion, day-time noise levels are predicted to increase by between 0.1 and 0.9 dB(A) at four of the residential receptor locations (**Table 7.3**). Such increases fall into the category of "little" community response as defined by SANS 10103:2008 and are well below the 7 dB(A) threshold for annoyance as per the Noise Control Regulations. Noise levels at the entrance to the mill are predicted to remain constant. Due to the existing elevated baseline noise levels at the Mill entrance, additional sources of noise associated with the mill expansion are deemed to go unnoticed at this location (WSP EAIA, 2018).

Table 7.3: Predicted day-time noise levels at specified reception locations (WSP EAIA, 2018)

Receptor	Location	Predicted Noise Level (dB(A))	Current Noise Level (dB(A))	Cumulative Noise Level (dB(A))	Change (dB(A))	Estimated Community Response
N_01	Sappi Main Gate	44.1	71.8	71.8	0.0	N/A
N_02	Dlambula Residence	43.4	49.5	50.4	+0.9	Little
N_03	Umkomaas	26.3	46.7	46.7	+0.0	Little
N_04	Craigieburn – Juniper Road	33.1	55.8	55.8	+0.0	Little
N_05	Magabeni Residence	43.8	58.0	58.2	+0.2	Little
N_06	Dlambula School	41.6	50.9	51.4	+0.5	Little
N_07	Magabeni – Sibhakada Road	38.4	50.3	50.6	+0.3	Little

Night-time noise levels are predicted to increase marginally at all off-site receptor locations. Noise levels are predicted to increase by between 0.1 and 0.2 dB(A) resulting in "little" community response at all six receptor locations (**Table 7.4**). Such increases are well below the 7 dB(A) threshold for annoyance as per the Noise Control Regulations. Noise levels at the entrance to the Mill are predicted to remain constant. Due to the existing elevated baseline noise levels at the Mill entrance, additional sources of noise associated with the mill expansion are deemed to go unnoticed at this location (WSP EAIA, 2018).

Table 7.4: Predicted night-time noise levels at specified receptor locations

Receptor	Location	Predicted Noise Level (dB(A))	Current Noise Level (dB(A))	Cumulative Noise Level (dB(A))	Change (dB(A))	Estimated Community Response
N_01	Sappi Main Gate	44.1	64.1	64.1	0.0	N/A
N_02	Dlambula Residence	43.4	58.4	58.5	+0.1	Little
N_03	Umkomaas	26.3	42.7	42.8	+0.1	Little
N_04	Craigieburn – Juniper Road	33.1	47.5	47.7	+0.2	Little
N_05	Magabeni Residence	43.8	56.6	56.8	+0.2	Little
N_06	Dlambula School	41.6	55.3	55.5	+0.2	Little
N_07	Magabeni – Sibhakada Road	38.4	53.2	53.3	+0.1	Little

7.3 ROAD TRAFFIC

7.3.1 CONSTRUCTION PHASE

During the construction phase there is likely to be an increase in vehicular traffic associated with the delivery of equipment, supplies and chemicals, and removal of waste for off-site disposal. These traffic movements will be intermittent and are unlikely to significantly increase road traffic in the vicinity of the Mill.

7.3.2 OPERATIONAL PHASE

Traffic related environmental aspects are referenced from the Traffic Impact Assessment (TIA) (WSP, March 2018: Report No. 23887-03 (**Appendix E).**

The project will result in an increase in total truck trips made up of the transport of raw materials to the site and the transport of products from the site.

Table 7.5 presents the current and proposed daily trip generation (movement of trucks in and out) for the Mill. The implementation of proposed expansion project represent an incremental increase of 15% (Project Vulindlela) and a further increase of 16,5 % (Project Stone) in traffic movements.

Table 7.5: Current and Proposed Daily Trip Generation (WSP, 2018)

Phase	Trucks In (Per Day)	Trucks Out (per day)	Total (In and Out)
Baseline	218	55	**273**
Project Vulindlela (Phase 1)	251	63	**314**

Project Stone (Phase 2)	292	74	**366**

The morning and afternoon peak hours are relevant when considering intersection capacity. The weekday morning and afternoon peak hour trip generations for baseline, Project Vulindlela and Project Stone are shown in **Table 7.6** and **Table 7.7**.

Table 7.6: Weekday AM Peak Hour Trip Generation (WSP, 2018)

Phase	Trips		Total Trips	Additional Trips	
	Trucks In	Trucks Out		In	Out
Baseline	14	14	28	-	-
Project Vulindlela	16	16	32	**2**	**2**
Project Stone	18	18	36	**4**	**4**

Table 7.7: Weekday PM Peak Hour Trip Generation (WSP, 2018)

Phase	Trips		Total Trips	Additional Trips	
	Trucks In	Trucks Out		In	Out
Baseline	17	17	34	-	-
Project Vulindlela	19	19	38	**2**	**2**
Project Stone	23	23	46	**6**	**6**

An analysis of the current and proposed intersection capacity was undertaken and results confirmed that no intersection upgrades are necessary at the following key intersections:

- P88 and the entrance to the Mill (access to weighbridge 2, 3, and 4);
- P88 and P197-3; and
- P197-3 and the entrance to the Mill (staff entrance and access to weighbridge 1).

The Traffic Impact Assessment Report concluded that the planned increase in the production at the Saiccor Mill is supported from a traffic engineering perspective. There is the potential for increased traffic to pose a risk to pedestrians and other road user.

7.4 SOLID WASTE GENERATION

7.4.1 CONSTRUCTION PHASE

During the construction phase it is anticipated that general and hazardous waste streams will be generated (**Table 7.8**). Wastes generated will be collected and managed by the Mill's approved waste management contractor.

Table 7.8: Typical Construction Waste

Waste Category	Waste Type	Typical Components
General Waste	Domestic Waste	Paper and cardboard packaging, empty plastic and metal containers (non-hazardous original contents) etc.
	Mixed Industrial Waste	Wood, plastic, packaging etc.
	Metal Waste	Ferrous and non-ferrous scrap generated from machinery serving and general maintenance undertaken at workshops.

	Building Rubble / Excavated Material	Non-contaminated concrete, bricks, stone and cement residue as well as earth and rock that may result from demolishing and excavation activities.
Hazardous Waste	Oily Waste	Used lubricant and hydraulic oils and hydrocarbon based solvents produced during the maintenance of mechanical equipment.
	Oil Contaminated Waste	Solid material (rags) that has come into contact with and contains traces of oil or grease.
	Fluorescent Light Bulbs	Contains toxic materials such as mercury and cadmium.
	Contaminated Excavated Material	Excavated material (from trenches, earthworks) that is required to be spoiled may be considered potentially hazardous as a result of contamination (for example, as a result of petrochemical or chemical spills).

7.4.2 OPERATIONAL PHASE

The Mill currently generates a variety of waste streams as a result of its operations. Wastes generated at the Mill are collected and managed by Sappi approved waste management contractors. The proposed expansion of the Mill will result in a change in the volumes of general and hazardous waste streams generated. There is anticipated to be a marginal increase in wastes generated in the woodyard and magnesium cooking process.

The project will results in a net decrease in waste generated from approximately 195 tons/day to 150 tons/day, which represents a 23% decrease in waste to landfill. The predominant changes are significant reductions in coal ash and gypsum volumes, in addition to a decrease in wastes generated from the calcium cooking process.

7.5 HAZARDOUS MATERIALS

7.5.1 CONSTRUCTION PHASE

Small quantities of hazardous chemicals (typically not exceeding 1000l) will be stored and handled during the construction phase. This includes fuel for equipment (diesel and petrol), lubrication oils and greases as well as solvent based detergents and degreasers.

7.5.2 OPERATIONAL PHASE

An increase in the above ground storage capacity of hazardous chemical substances[1] is required in support of the proposed expansion project (**Table 7.9**). These are existing chemicals used in the Mill's production process.

Table 7.9: Hazardous Chemical Substances (Current and Proposed)

Chemicals Stored	Current Volume	Proposed Increase	Proposed Volume
Hydrogen Peroxide 50% (H_2O_2)	$100m^3$	$80m^3$	$180m^3$
Caustic	$1000m^3$ (2 x $500m^3$)	No increase	$1000m^3$

[1] As per South African National Standards (2008) SANS 10234-A: List of classification and labelling of chemicals in accordance with the Globally Harmonized System (GHS)

Sodium Hypochlorite (NaClO)	260m^3 (140m^3 + 120m^3)	300m^3	560m^3
Sulphuric Acid (H_2SO_4)	210m^3 (150m^3 + 60m^3)	80m^3	290m^3
Chlorine Dioxide (ClO_2)	1200m^3 (6 x 200m^3)	2 x 200m^3	1600 m^3
Magnesium oxide (MgO) / magnesium hydroxide ($Mg(OH)_2$)	1700m^3	700m^3	2400m^3
Sodium Chlorate ($NaClO_3$)	3 x 445m^3 (storage) 1 x 44m^3 (dissolving tank)	445m^3 (storage) 44m^3 (dissolving tank)	1780m^3 (storage) 88m^3 (dissolving tanks)

Ishecon have undertaken a preliminary assessment of the effect of the proposed expansion on the major hazard risk (**Appendix F**). On review of the scope of Project Vulindlela and Project Stone, Ishecon have identified that only the additional chemical storage and associated increase in hazardous materials inventory will have an effect on the major hazard risk associated with the Mill.

The preliminary assessment undertaken by Ishecon determined that only the additional sulphuric acid and magnesium oxides pose local risks to employees. The risk to employees is considered to be tolerable. In terms of risk acceptability, the risk to the public is considered insignificant. It was concluded that the proposed expansion will not cause the major hazard risks to become unacceptable (Ishecon, 2018).

A detailed MHI risk assessment will be undertaken and provided to the authorities in accordance with the MHI regulatory requirements prior to commencement of the project.

7.6 STORMWATER RUNOFF

7.6.1 CONSTRUCTION PHASE

During construction, activities have the potential to generate stormwater contaminated with sediment and hydrocarbons emanating from machinery and construction related activities. Stormwater runoff will be collected and managed within the existing onsite stormwater collection system which discharges to the effluent treatment system.

7.6.2 OPERATIONAL PHASE

The proposed expansion will take place within the existing Mill footprint on existing hardstanding areas. An increase in stormwater runoff generated at the site is therefore not anticipated. All stormwater generated is directed to the onsite effluent treatment system.

7.7 WATER CONSUMPTION

7.7.1 CONSTRUCTION PHASE

No increase in water consumption anticipated.

7.7.2 OPERATIONAL PHASE

The implementation of Project Vulindlela and Stone will result in a 7% decrease in the Mill's water consumption. The decrease in water consumption is largely due to improved operational efficiency and the

implementation of water saving measures incorporated into the design. The overall 7% reduction in water use will be achieved through the implementation of the following water use efficiency initiatives including:

- Reduced water use in pulp production; and
- Increased reuse of evaporative condensate water.

7.8 GENERATION AND MANAGEMENT OF EFFLUENT

7.8.1 CONSTRUCTION PHASE

No increase in effluent anticipated.

7.8.2 OPERATIONAL PHASE

The Mill intends to reduce the calcium cooking process and increase the magnesium based cooking process. Magnesium oxide cooking is a closed loop process which does not generate a significant amount of effluent as most of the effluent is recovered. The reduction in calcium cooking will result in a decrease in the volume of effluent generated by the Mill.

Effluent produced by the Mill is discharged offshore via the sea outfall pipe. Once the upgrade has been completed, the effluent volume requiring discharge will decrease by 5%.

The proposed expansion will result in a significant decrease in effluent COD as the majority of the COD concentration in the effluent is produced through the calcium cooking and pulp production process. The proposed reduction in COD represents an improvement in the quality of the effluent released into the marine environment. The pH and temperature of the effluent will remain unchanged. All other parameters, with the exception of Total Suspended Solids (TSS) will reduce. The proposed effluent quality will remain well within the Mill's CWDP limits. (**Table 7.10**).

Table 7.10: Predicted Effluent Discharge Quality

Parameter	CWDP Limits	May 2018 Effluent Results	Project Vulindlela (estimate)	Project Stone (estimate)	Compliant
pH	2,8 to 8,5	3,4	3,4	3,4	**Yes**
Electrical conductivity	5 000 mS/m	487 mS/m	Reduced	Reduced	**Yes**
Temperature	63 ºC	52 ºC	52 ºC	52 ºC	**Yes**
Chemical Oxygen Demand	20 000 mg/l	12 818 mg/l	10 000 mg/l	8700 mg/l	**Yes**
Total Suspended Solids	600 mg/l	348 mg/l	380 mg/l	460mg/l	**Yes**
Colour	3 000 hazen units	2017 hazen units	Reduced	Reduced	**Yes**
Lignin	6 000 mg/l	2681 mg/l	2 500 mg/l	2 000 mg/l	**Yes**
Total Dissolved Solids	20 000 mg/l	10 584 mg/l	8 200 mg/l	7 200 mg/l	**Yes**

7.9 SOCIO-ECONOMICS

7.9.1 CONSTRUCTION PHASE

The construction phase will result in the creation of employment opportunities for existing contractors. This will indirectly contribute to sustaining existing businesses and potentially resulting in new employment being generated. The estimated employment requirements for the construction phase are 2 080 skilled individuals; and 1 120 unskilled individuals.

The proposed project will provide the potential for the generation of indirect employment within the supply and customer chains linked to construction phase activities.

7.9.2 OPERATIONAL PHASE

At a broad level the proposed expansion project will result in an increased contribution to the South African GDP and increase government tax revenue as a result of the sale of additional product.

The construction phase will result in the creation of new employment opportunities. The estimated employment requirements for the operational phase are 114 skilled individuals; and 11 unskilled individuals. Furthermore, the expansion project will ensure the continued security of employment and potential increase in indirect employment associated with the Mill's operational supply chain.

8 IMPACT ASSESSMENT

8.1 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the construction and operational phase of the proposed expansion of the Saiccor Mill is provided in **Table 8.1** and **Table 8.2** with the full assessment tables included in **Appendix G**.

Table 8.1: Impact Summary – Construction Phase

Aspect	Potential Impact	Status	Significance	
			Without Mitigation	With Mitigation
Air Quality	Localised deterioration of ambient air quality due to dust emissions	Negative	**Medium**	**Low**
Noise	Generation of noise beyond the Mill boundary, however no significant changes in noise levels are anticipated beyond the Mills boundary	Negative	**Low**	**Low**
Solid Waste Generation	Contamination of surface water, groundwater and soils due to improper waste management practices	Negative	**Medium**	**Low**
	Health and safety incidents in the event of an accidental spill or incorrect handling	Negative	**Medium**	**Low**
	Generation of additional general and hazardous waste that has the potential to impact (indirectly) at third party waste management and disposal facilities	Negative	**Low**	**Low**
Hazardous Materials	Localised contamination caused by accidental spillage of hazardous substances	Negative	**Medium**	**Low**
Road Traffic	Increase in vehicular traffic may contribute to safety risks to pedestrians and other road users	Negative	**Medium**	**Low**
Socio-Economic	Creation of employment opportunities and sustaining existing contractor businesses' which will result in improved living standards of local individuals and households	**Positive**	**Medium**	**Medium**
	Contribution to the sustainability of supply and customer chain businesses resulting in securing of financial income and living standards	**Positive**	**Medium**	**Medium**
Heritage	Damage to or loss of cultural heritage resources	Negative	**Low**	**Low**

Table 8.2: Impact Summary – Operational Phase

Aspect	Potential Impact	Status	Significance	
			Without Mitigation	With Mitigation
Air Quality	Increase in PM_{10} and NO_2 emissions at all residential receptors, however concentrations remain compliant with national standards	Negative	**Low**	**Low**

	Significant decrease in SO_2 concentrations at all sensitive residential receptor locations/	**Positive**	**High**	**High**
Noise	Increase in day- and night-time noise at sensitive receptors, however increases are slight and are likely to go unnoticed.	Negative	**Low**	**Low**
Road Traffic	Incremental increase in traffic movements within the capacity of key intersections, however the increase may contribute to the safety risks to pedestrians and other road users	Negative	**Low**	**Low**
Solid Waste Management	Decrease in waste to landfill which will impact positively (indirectly) at third party waste management and disposal facilities	**Positive**	**Medium**	**Medium**
Hazardous Materials	Insignificant change in major hazard risk and associated health risk to employees and the public as a result of increased storage of hazardous materials	Negative	**Low**	**Low**
	Accidental spillage of hazardous substances, or potential loss of containment of large quantities of process chemicals from storage tanks which has the potential to contaminate surface water, groundwater and soils	Negative	**Medium**	**Low**
	Occupational exposure to staff and contractors in the event of accidental spillage or incorrect handling and inadequate Personal Protective Equipment (PPE)	Negative	**High**	**Low**
Water Consumption	Decrease in Mills water consumption and reduced reliance on water supply from the Mkomazi River	**Positive**	**Low**	**Low**
Effluent Generation	Decrease in the volume of effluent generated, the decrease represents a 5% reduction in effluent volume requiring discharge to the marine environment.	**Positive**	**Low**	**Low**
	Significant decrease (43%) in effluent Chemical Oxygen Demand which will result in an improvement in the quality of the effluent released into the marine environment	**Positive**	**Medium**	**Medium**
Socio-Economics	Contribution to the South African GDP and government revenue streams associated with the sale of additional product	**Positive**	**Medium**	**Medium**
	Creation of new employment opportunities at the Mill and potential indirect employment associated with the Mill's supply chain which will result in improved living standards of local individuals and households	**Positive**	**Medium**	**Medium**

9 CONCLUSION

9.1 SUMMARY OF IMPACT ASSESSMENT

The EIA process has found that both construction and operational phases of the proposed project will involve activities which will lead to direct and indirect impacts (negative and positive) on the biophysical and socio-economic environment. These impacts were found to vary in terms of their consequence and probability. Where appropriate, mitigation measures to ameliorate negative impacts, and enhance positive impacts have been proposed. Both the initial and residual (post-mitigation) significance of impacts are summarised in **Section 8** and presented in full in **Appendix G**. A summary of the key environmental and social impacts is provided below:

Construction Phase

- All anticipated negative impacts; including dust and noise generation; road traffic; waste generation, and potential for localised contamination as a result of accidental spillage of hazardous substances; were considered to be of low significance on condition that the identified mitigation measures are implemented;
- The socio-economic impacts associated with the project are considered to be of medium positive significance. There are opportunities to enhance the impact on local individuals and businesses through prioritisation of local contractors and labour during the construction phase, as far as possible.

Operational Phase

- All anticipated negative impacts were considered to be of low significance with the implementation of identified mitigation measures.
- There is a predicted increase in PM_{10} and NO_2 emissions and an associated increase in ambient PM_{10} and NO_2 concentrations at the modelled receptor points. These concentrations will however remain with the National Ambient Air Quality Standards.
- There is significant decrease in SO_2 emissions and the ambient concentrations at the modelled receptor locations. This is considered to be of positive significance.
- The operational phase of the project will result in a slight decrease in effluent volume generated and a significant decrease in effluent COD. This is anticipated to result in an improvement in the quality of the effluent released into the marine environment. These impacts are considered to be of low and medium positive significance.
- The socio-economic impacts associated with the operational phase of the project are considered to be of medium positive significance. New employment opportunities will be created and the local impact can be enhanced through prioritised through local recruitment as far as possible. The expansion of the mill will ensure security and increase in indirect employment as a result of the Mill's supply chain.

It is necessary for Sappi to expand to remain globally competitive. The proposed increase in production at the Sappi Saiccor Mill represents an opportunity for Sappi to continue to contribute to the South African economy and will provide much needed employment opportunities. The proposed expansion has a strong focus on environmental improvements. Improved SO_2 emissions; reduced water use and effluent generation are all evident within the assessment undertaken.

9.2 IMPACT STATEMENT

The overall objective of the BA process is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

Potential impacts associated with the proposed expansion of the Saiccor Mill have been assessed and the significance of these evaluated with consideration of proposed mitigation measures. Potential overall negative impacts were considered to be of low significance, some positive impacts of low and medium significance were also revealed. The low significance of potential impacts was substantiated on the premise that EMPr measures would be implemented.

Mitigation measures have been developed where applicable for the above aspects and are presented within the EMPr (**Appendix H**). It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

APPENDIX

A EAP AND SPECIALIST CV'S AND DECLARATIONS

APPENDIX

B STAKEHOLDER ENGAGEMENT REPORT

APPENDIX

C AIR QUALITY IMPACT ASSESSMENT

APPENDIX

D ENVIRONMENTAL ACOUSTIC IMPACT ASSESSMENT

APPENDIX

E TRAFFIC IMPACT ASSESSMENT

APPENDIX

F MHI PRELIMINARY ASSESSMENT

APPENDIX

G IMPACT ASSESSMENT

APPENDIX

Sappi Saiccor Expansion - Project Vulindlela and Project Stone									
Significance Rating Table									
Construction Phase									
Air Quality									
Potential Impact		Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Localised deterioration of ambient air quality due to dust emissions	Nature of impact:	Excavations, piling and movement of vehicles and machinery may results in an increased release of dust and associated localised deterioration of ambient air quality. This has the potential to be a nuisance factor to sensitive receptors.							
	Without Mitigation	2	2	4	4	32	Medium	-	High
	degree to which impact can be reversed:	High							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	Implement measures specified in the EMPr, including: — Limit vehicle speeds on un-surface areas. — Avoid dust-generating activities (grading/movement of soil) during windy periods. . — Cover / Maintain appropriate freeboard on trucks hauling loose material that could generate dust when transported. — Dust suppression measures (spraying / physical barriers) to be implemented on cleared/active area and stockpiles (especially during windy conditions).							
	With Mitigation	1	2	4	4	28	Low	-	High

APPENDIX

Noise									
Generation of noise emissions beyond the Mill boundary, however no significant changes to noise levels are anticipated	Nature of impact:	Operation of construction machinery may result in additional source sources within the Mill boundary. Additional noise is unlikely to be experienced beyond the site boundary.							
	Without Mitigation	1	2	2	3	15	Low	-	High
	degree to which impact can be reversed:	High							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	Notwithstanding the absence of environmental impacts, it is recommended that good practice measures, as specified in the EMPr, are implemented including: — Maintain vehicles and machinery in good working order. — Investigate all instances of excessive noise and assess possibilities for mitigation. — Undertake noisy construction activities during daylight hours if practical. — Notify surrounding residents well ahead of time should any excessive 'out of hours' noise be anticipated. — Avoid noisy activities during weekend non-working hours. — Employees / contractors are to be provided with appropriated hearing protection when working in noise environments.							
	With Mitigation	1	1	2	2	8	Low	+	High
Solid Waste Generation									
Contamination of surface water, groundwater and soils due to improper waste management practices	Nature of impact:	Contamination of surface water, groundwater and soils due to accidential spillage / poor management of general and/or hazardous waste outside of contained areas.							
	Without Mitigation	1	2	6	4	36	Medium	-	High

	degree to which impact can be reversed:	Medium							
	degree of impact on irreplaceable resources:	Medium							
	Mitigation Measures	— Return excess construction materials which are suitable for re-use. — Waste should be stored in separate and secure skips / containers depending on management options - opportunities for re-use, recycle or disposal should be determined in consultation with the waste service provider. — Hazardous waste (including used oils and material containing oils, solvents, empty chemical containers, etc.) should be stored within impermeable bunded and ventilated storage areas, capable of containing 110% of the largest storage volume. All storage containers are to be labelled, sealed and stored in accordance with Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) requirements. — General waste should be stored within waste skips within a designated area with consideration of stormwater management. — Working areas are to be cleared of litter on a daily basis. No litter / waste is to be burnt onsite. — Waste is only allowed to be removed from site by a licenced waste service provider.							
	With Mitigation	1	2	4	2	14	Low	-	High
Health and safety incidents in the event of an accidental spill or incorrect handling	Nature of impact:	Health and safety incidents involving staff and contractors in the event of accidental spillage or incorrect handling and inadequate Personal Protective Equipment (PPE)							
	Without Mitigation	1	2	6	4	36	Medium	-	High
	degree to which impact can be reversed:	High							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	— MSDS and SDS for all hazardous waste streams must be available on site during the construction phase. — Personnel involved in the handling of hazardous wastes must be provided with the necessary PPE as stipulated in the MSDS and SDS.							

APPENDIX

	With Mitigation	1	2	2	2	10	Low	-	High
Generation of additional general and hazardous waste that has the potential to impact (indirectly) at third party waste management and disposal facilities	Nature of impact:	During construction there is likely to be an increase in the contribution to potential indirect environmental and social impacts at third party waste management and disposal facilities.							
	Without Mitigation	3	2	4	3	27	Low	-	High
	degree to which impact can be reversed:	Medium							
	degree of impact on irreplaceable resources:	Medium							
	Mitigation Measures	The contractors is required to implement a system at the construction site for the segregation of recyclable materials in order to divert waste from landfill. As a minimum the following waste streams are to be recycled: — Metal (ferrous and non-ferrous) — Paper and cardboard — Used oil — Recyclable plastic (uncontaminated)							
	With Mitigation	3	2	4	2	18	Low	-	High
Hazardous Materials									
Localised soil contamination caused by accidental spillage of hazardous substances	Nature of impact:	During construction there is the potential for the release of small quantities of chemicals being stored and handled. Localised soil contamination may be caused by accidental spillage of hazardous substances outside of secondary containment.							
	Without Mitigation	1	2	6	4	36	Medium	-	High
	degree to which impact can be reversed:	Medium							

	degree of impact on irreplaceable resources:	Medium							
	Mitigation Measures	— Storage of hazardous materials should be undertaken within impermeable, bunded, ventilated and covered storage areas capable of containing 110% of total volume. — All storage containers are to be labelled, sealed and stored in accordance with MSDS requirements. — Use drip trays under vehicles and machinery that are prone to oil leaks. — Contaminated soil must be removed as soon as possible and managed appropriately as hazardous waste. Spill and response equipment must be accessible on site. — Personnel involved in the handling of hazardous wastes must be provided with the necessary PPE as stipulated in the MSDS.							
	With Mitigation	1	2	4	2	14	Low	-	High
Road Traffic									
Increase in vehicular traffic may contribute to safety risks to pedestrians and other road users	Nature of impact:	Increased vehicular traffic is likely to be associated only with the delivery of equipment, supplies and chemicals, and removal of waste for disposal off-site. In the absence of adequate controls, there may be safety risks to pedestrians and other road users as a result of this increase.							
	Without Mitigation	2	2	6	4	40	Medium	-	High
	degree to which impact can be reversed:	High							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	— Where possible deliveries and removals are to take place outside of peak traffic times. — Develop and implement procedures to ensure vehicles making use of the external road network are roadworthy and that drivers hold a valid drivers licence (for class of vehicle being driven)							
	With Mitigation	2	2	4	3	24	Low	-	High

APPENDIX

Socio-Economic									
Creation of employment opportunities and sustaining existing contractors businesses which will result in improved living standards of local individuals and households	Nature of impact:	The construction phase will require 2080 skilled and 1120 unskilled individuals. The construction will be undertaken by existing contracting firms who have an existing staff base. The project will result in sustained business for contracting companies, and has the potential to generate new employment opportunities should they need to hire additional staff to complete the work required. Potential employment opportunities should be kept local as far as possible.							
	Without Mitigation	3	2	6	3	33	Medium	+	High
	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							
	Mitigation Measures	Whilst a positive impact, there are measures that can enhance the impact on local businesses: — Tender processes must included the prioritisation of local contractors and labour throughout the construction phase, where feasible. — All contractors will be required to use local labour as far as possible.							
	With Mitigation	3	2	6	4	44	Medium	+	High
Contribution to the sustainability of supply and customer chain businesses resulting in securing of financial income and living standards	Nature of impact:	During construction there is the potential for the generation of indirect employment within the supply and customer chains							
	Without Mitigation	3	2	6	3	33	Medium	+	High
	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							
	With Mitigation	3	2	6	4	44	Medium	+	High

Heritage									
Damage to or loss of cultural heritage resources	Nature of impact:	Construction will be confined to hardstanding areas within the Mill boundary. As such no impact on cultural heritage resources is anticipated.							
	Without Mitigation	1	2	4	2	14	Low	-	
	degree to which impact can be reversed:	High							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	Whilst no impacts are anticipated, in the unlikely event that a resource is encountered during excavation activities, a chance find protocol is included in the EMPr.							
	With Mitigation	1	2	4	2	14	Low		

Sappi Saiccor Expansion - Project Vulindlela and Project Stone								
Significance Rating Table								
Operational Phase								
Air Quality								
Potential Impact		Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
Increase in PM10 and NO2 emissios at all residential receptors, however concentrations remain compliant with national standards	Nature of impact:	A predicted increase in average PM10 receptor concentrations at the sensitive receptors, however predicted increases remain compliant with the National Ambient Air Quality Standards.						
	Without Mitigation	2	4	4	3	30	Low	-	High
	degree to which impact can be reversed:								
	degree of impact on irreplaceable resources:								
	Mitigation Measures								

	With Mitigation	2	4	4	3	30	Low	-	High
Significant decrease in SO2 concentrations at all sensitive residential receptor locations	Nature of impact:	The proposed expansion will result in a significant decrease in SO2 concentrations at all sensitive receptors.							
	Without Mitigation	2	4	8	5	70	High	+	High
	degree to which impact can be reversed:								
	degree of impact on irreplaceable resources:								
	With Mitigation	2	4	8	5	70	High	+	High
Noise									
Increase in day- and night-time noise at sensitive receptors, however increases are slight and are likely to go unnoticed	Nature of impact:	Noise levels are predicted to increase marginally at sensitive receptors surrounding the Mill. The predicated day- and night-time noise increases are well below the threshold of annoyance as per the Noise Control Regulations, and are considered negligible.							
	Without Mitigation	2	4	2	3	24	Low	-	
	degree to which impact can be reversed:	Medium							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	Although noise impact is expected to be negligible, it is recommended that: — The project be engineered in the detailed design stage to reduce noise emissions as far as practicable. — Investigate all instances of excessive noise and assess possibilities for mitigation. — The requirement for additional monitoring to be determined based on complaints lodged.							
	With Mitigation	2	4	2	3	24	Low	-	

Road Traffic									
Incremental increase in traffic movements within the capacity of key intersections, however the increase may contribute to the safety risks to pedestrians and other road users	Nature of impact:	The project will result in an increase in the transport of raw material to the site and the transport of product from the site. An incremental increase of 15% associated with Project Vulindlela and further increase of 16,5% for Project Stone is anticipated. An analysis of intersection capacity was undertaken and no upgrades are necessary at key intersections							
	Without Mitigation	2	4	4	3	30	Low	-	
	degree to which impact can be reversed:	Medium							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	— Where possible deliveries and removals are to take place outside of peak traffic times. — Develop and implement procedures to ensure vehicles making use of the external road network are roadworthy and that drivers hold a valid drivers licence (for class of vehicle being driven)							
	With Mitigation	2	4	4	3	30	Low	-	
Solid Waste Management									
Decrease in waste to landfill which will impact positively (indirectly) at third party waste management and disposal facilities	Nature of impact:	The proposed expansion will result in a 39% decrease in the volume of waste generated during the operation of the Mill.							
	Without Mitigation	3	4	4	3	33	Medium	+	
	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							

APPENDIX

	Mitigation Measures	— Waste should be stored in separate and secure skips / containers depending on management options - opportunities for re-use, recycle or disposal should be determined in consultation with the waste service provider. — Hazardous waste (including used oils and material containing oils, solvents, empty chemical containers, etc) should be stored within impremeable bunded and ventilated storage areas, capable of containing 110% of the largest storage volume. All storage containers are to be labelled, sealed and stored in accordance with Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) requirements. — General waste should be stored within waste skips within a designated area with consideration of stormwater management. — Waste is only allowed to be removed from site by a licenced waste service provider.							
	With Mitigation	3	4	4	3	33	Medium	+	
Hazardous Materials									
Insignificant change in major hazard risk to employees and the public as of increased storage of hazardous materials	Nature of impact:	The impact of the expansion on the major hazard risk associated with the Mill (as a result of increased storage of hazardous substances) is deemed insignificant. The proposed project will not cause the risks to become unacceptable.							
	Without Mitigation	2	4	2	2	16	Low	-	High
	degree to which impact can be reversed:								
	degree of impact on irreplaceable resources:								
	Mitigation Measures								
	With Mitigation	2	4	2	2	16	Low	-	High

Accidental spillage of hazardous substances, or potential loss of containment of large quantities of process chemicals from storage tanks which has the potential to contaminate surface water, groundwater and soils	Nature of impact:	Accidental spillage of hazardous substances, or potential loss of containment of large quantities of process chemicals from storage tanks which has the potential to contaminate surface water, groundwater and soils							
	Without Mitigation	2	4	6	3	36	Medium	-	High
	degree to which impact can be reversed:	High							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	— Engineer the project in the detailed design stage to ensure adequate secondary containment (i.e. bunding) of all process chemical storage tanks. — Implement procedures to ensure the integrity of secondary containment is monitored and maintained. — Personnel involved in the handling of hazardous substances must be provided with the necessary PPE as stipulated in the MSDS							
	With Mitigation	2	4	4	2	20	Low	-	High
Occupational exposure to staff and contractors in the event of accidental spillage or incorrect handling and inadequate Personal Protective Equipment (PPE)	Nature of impact:	Occupational exposure to staff and contractors in the event of accidental spillage or incorrect handling and inadequate Personal Protective Equipment (PPE)							
	Without Mitigation	2	4	8	5	70	High	-	High
	degree to which impact can be reversed:	High							
	degree of impact on irreplaceable resources:	Low							
	Mitigation Measures	— Engineer the project in the detailed design stage to ensure adequate secondary containment (i.e. bunding) of all process chemical storage tanks. — Implement procedures to ensure the integrity of secondary containment is monitored and maintained. — Personnel involved in the handling of hazardous substances must be provided with the necessary PPE as stipulated in the MSDS							
	With Mitigation	2	4	4	2	20	Low	-	High

APPENDIX

Water Consumption									
Decrease in Mills water consumption and reduced reliance on water supply from the Mkomazi River	Nature of impact:	The project will result in a 7% reduction in water use at the Mill							
	Without Mitigation	1	4	2	4	28	Low	+	
	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							
	Mitigation Measures								
	With Mitigation	1	4	2	4	28	Low	+	
Effluent Generation									
Decrease in the volume of effluent generated, the decrease represents a 5% reduction in effluent volume requiring discharge to the marine environment.	Nature of impact:	The project will result in a 5% reduction in the volume of effluent that requires discharge via the sea outfall pipe.							
	Without Mitigation	1	4	2	4	28	Low	+	
	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							
	Mitigation Measures								
	With Mitigation	1	4	2	4	28	Low	+	
Significant decrease in effluent Chemical Oxygen Demand which	Nature of impact:	The project will result in a significant decrease in COD within the Mill effluent							
	Without Mitigation	2	4	6	4	48	Medium	+	

will result in an improvement in the quality of the effluent released into the marine environment	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							
	Mitigation Measures								
	With Mitigation	2	4	6	4	48	Medium	+	
Socio-Economics									
Contribution to the South African GDP and government revenue streams associated with the sale of additional product	Nature of impact:	Increased contribution to the country's GDP and increased tax revenue to the South African government as a result of the sale of additional product.							
	Without Mitigation	3	4	4	3	33	Medium	+	
	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							
	Mitigation Measures								
	With Mitigation	3	4	4	3	33	Medium	+	
Creation of new employment opportunities at the Mill and potential indirect employment associated with the Mill's supply chain which will result in improved living standards of local individuals and households	Nature of impact:	The operational phase will result in new employment opportunities for 114 skilled and 11 unskilled individuals. These opportunities should be sourced locally as far as practicably possible. The expansion project will ensure continued security of employment and potential increase of indirect employment associated with the supply chain							
	Without Mitigation	3	4	4	3	33	Medium	+	
	degree to which impact can be reversed:	N/A							
	degree of impact on irreplaceable resources:	N/A							

APPENDIX

	Mitigation Measures	Whilst a positive impact, there are measures that can enhance the local impact: — Recruitment and tender processes must include the prioritisation of local individuals and contractors, where feasible. — Contractors utilised during the operational phase are to resource locally as far as possible.							
	With Mitigation	3	4	4	3	33	Medium	+	

APPENDIX

APPENDIX

H ENVIRONMENTAL MANAGEMENT PROGRAMME