



SIVEST (PTY) LTD: ENVIRONMENTAL DIVISION

ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

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1. INTRODUCTION

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts is undertaken through an assessment of the significance of the impacts.

2. IMPACT SIGNIFICANCE

2.1 Determination of significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

The table in **Annexure 1** must be used for reporting on the significance of impacts and must be added to the impact assessment section of the report.

2.2 Impact Rating System

The assessment of impacts takes into account the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact must also be assessed according to the project stages, namely:

- Planning
- Construction
- Operation
- Decommissioning

The proposal for mitigation or optimisation of an impact must be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance must be included.

3. RATING SYSTEM USED TO DETERMINE SIGNIFICANCE OF IMPACTS

In order to classify the potential impacts of a development, a rating system has been developed. The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of an impact. Impacts must then be consolidated into one rating. In assessing the significance of each issue, the following criteria (including an allocated point system/score) has been used:

3.1 Nature

Provide a brief description of the impact of an environmental parameter being assessed in the context of the project. This criterion must include a brief written statement of the environmental aspect being impacted upon by a particular action or activity.

3.2 Geographical Extent

Defined as the area over which the impact will be expressed spatially.

Score	Extent	Description
1	Site	The impact will only affect this site
2	Local/district	The impact will affect the local area or district
3	Province/region	The impact will affect the entire province or region
4	International and National	The impact will affect the entire country

3.3 Probability

Probability describes the likelihood of the impact actually occurring.

Score	Probability	Description
1	Unlikely	The chance of the impact occurring is extremely low (less than a 25% chance of occurrence)
2	Possible	The impact may occur (between a 25% to 50% chance of occurrence)
3	Probable	The impact will likely occur (between a 50% to a 75% chance of occurrence)
4	Definite	Impact will certainly occur (greater than a 75% chance of occurrence)

3.4 Reversibility

Provide a description on the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.

Score	Probability	Description
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required

Score	Probability	Description
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures
4	Irreversible	The impact is irreversible and no mitigation measures exist

3.5 Irreplaceability

Provide a description on the degree to which resources will be irreplaceably lost as a result of a proposed activity.

Score	Irreplaceability	Description
1	No loss of resource	The impact will not result in the loss of any resources
2	Marginal loss of resource	The impact will result in marginal loss of resources
3	Significant loss of resource	The impact will result in significant loss of resources
4	Complete loss of resource	The impact is result in a complete loss of all resources.

3.6 Duration

Provide a description on the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.

Score	Duration	Description
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).

3.7 Cumulative Effect

This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.

Score	Cumulative Effect	Description
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects
2	Low cumulative impact	The impact would result in insignificant cumulative effects
3	Medium cumulative impact	The impact would result in minor cumulative effects
4	High cumulative impact	The impact would result in significant cumulative effects

3.8 Intensity/Magnitude

The magnitude or intensity describes the severity of an impact

Score	Cumulative Effect	Description
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

4. DETERMINING SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria above (excluding the magnitude/intensity) will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which must be measured and assigned a significance rating.

Below is a table outlining the impact significance ratings and a description of the anticipated impacts:

Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

ANNEXURE 1

The table below must be represented in the Impact Assessment section of the report (one table per impact):

IMPACT TABLE FORMAT		
Environmental Parameter	<i>A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water</i>	
Issue/Impact/Environmental Effect/Nature	<i>A brief description of the nature of the impact that is likely to affect the environmental aspect as a result of the proposed activity e.g. alteration of aquatic biota The environmental impact that is likely to positively or negatively affect the environment as a result of the proposed activity e.g. oil spill in surface water</i>	
<i>Extent</i>	<i>A brief description of the area over which the impact will be expressed</i>	
<i>Probability</i>	<i>A brief description indicating the chances of the impact occurring</i>	
<i>Reversibility</i>	<i>A brief description of the ability of the environmental components recovery after a disturbance as a result of the proposed activity</i>	
<i>Irreplaceable loss of resources</i>	<i>A brief description of the degree in which irreplaceable resources are likely to be lost</i>	
<i>Duration</i>	<i>A brief description of the amount of time the proposed activity is likely to take to its completion</i>	
<i>Cumulative effect</i>	<i>A brief description of whether the impact will be exacerbated as a result of the proposed activity</i>	
<i>Intensity/magnitude</i>	<i>A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily</i>	
<i>Significance Rating</i>	<i>A brief description of the importance of an impact which in turn dictates the level of mitigation required</i>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	1
Probability	4	1
Reversibility	4	1
Irreplaceable loss	4	1
Duration	4	1
Cumulative effect	4	1
Intensity/magnitude	4	1
Significance rating	-96 (high negative)	-6 (low negative)
Mitigation measures	<i>Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. Describe how the mitigation measures have reduced/enhanced the impact with relevance to the impact criteria used in analyzing the significance. These measures will be detailed in the EMP.</i>	



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