

1. Methodology used in determining the significance of environmental impacts

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process were determined in order to decide the extent to which the initial site layout needs revision)

A “significant impact” is defined as it is defined in the EIA Regulations (2014): “an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence”. The objective of this EIA methodology is to serve as framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream. In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. For example, the removal of groundcover for the sloping or scraping of an embankment, can lead to higher amounts of water runoff which increases the rate of erosion. Further down in the river the amount of sediment increases because of the increased erosion. A number of fish species cannot endure the high amount of sediment and moves off. The habitat is thus changed or in the process of changing. Thus one needs to understand that the root of the problem (removal of groundcover) is assessed in terms of the degree of change in the health of the environment and/or components in relation to their conservation value. Thus if the impact of removal of groundcover of a definable system is high and the conservation value is also high then the impact of removal of groundcover is highly significant.

Environmental Impact Assessment (EIA) Regulations, 2014 requirements

The Environmental Impact Assessment (EIA) 2014 Regulations promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.

ENVASS has developed an impact assessment methodology (as defined below) whereby the Significance of a potential impact is determined through the assessment of the relevant temporal and spatial scales determined of the Extent, Magnitude and Duration criteria associated with a particular impact. This method does not explicitly define each of the criteria but rather combines them and results in an indication of the overall significance.

ENVASS Impact Assessment Methodology

Nature of the impact

The NATURE of an impact can be defined as: “a *brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact*”.

The status of the impact:

STATUS	Status	Description
		Positive

	Negative	A cost to the holistic environment
	Neutral	No cost or benefit to the holistic environment

Magnitude of the impact

The **MAGNITUDE** of an impact can be defined as: *“a brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects”*.

Determining the magnitude of an impact			
MAGNITUDE	Magnitude	Score	Description
Magnitude / intensity of impact (at the specified scale)	Zero	1	Natural and/or social functions and/or processes remain unaltered
	Very low	2	Natural and/or social functions and/or processes are negligibly altered
	Low	3	Natural and/or social functions and/or processes are slightly altered
	Medium	4	Natural and/or social functions and/or processes are notably altered
	High	5	Natural and/or social functions and/or processes severely altered

Extent of the impact

The **EXTENT** of an impact can be defined as: *“a brief description of the spatial influence of the impact or the area that will be affected by the impact”*.

Determining the extent of an impact			
EXTENT	Extent	Score	Description
Extent or spatial influence of impact	Footprint	1	Only as far as the activity, such as footprint occurring within the total site area
	Site	2	Only the site and/or 500m radius from the site will be affected
	Local	3	Local area / district (neighbouring properties, transport routes and adjacent towns) is affected
	Region	4	Entire region / province is affected
	National	5	Country is affected

Duration of the impact

The DURATION of an impact can be defined as: “a short description of the period of time the impact will have an effect on aspects”.

Determining the duration of an impact			
DURATION Duration of the impact	Extent	Score	Description
	Short term	1	Less than 2 years
	Short to medium term	2	2 – 5 years
	Medium term	3	6 – 25 years
	Long term	4	26 – 45 years
	Permanent	5	46 years or more

Probability of the impact occurring

The PROBABILITY of an impact can be defined as: “the estimated chance of the impact happening”.

Determining the probability of an impact			
PROBABILITY	Probability	Score	Description
	Unlikely	1	Unlikely to occur (0 – 15% probability of impact occurring)
	Possible	2	May occur (15 – 40% chance of occurring)
	Probable	3	Likely to occur (40– 60% chance of occurring)
	Highly Probable	4	Between 60% and 85% sure that the impact will occur
	Definite	5	Will certainly occur (85 - 100% chance of occurring)

Degree to which impact can be reversed

The REVERSIBILITY of an impact can be defined as: “the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects”.

Determining the probability of an impact			
REVERSIBILITY	Reversibility	Score	Description
	Completely reversible	1	Will reverse with minimal rehabilitation & negligible residual affects
	Partly reversible	2	Impacts can be reversed through the implementation of mitigation measures
	Irreversible	3	Impacts are permanent and can't be reversed by the implementation of mitigation measures or rehabilitation is not viable

Degree to which impact may cause irreplaceable loss of resources

The irreplaceability of an impact can be defined as “the amount of resources that can/can't be replaced”.

Irreplaceability = Magnitude + Extent + Duration + Reversibility

IRREPLACEABILITY Irreplaceable loss of resources	No loss	No loss of any resources
	Low	Marginal loss or resources
	Medium	Significant loss of resources
	High	Complete loss of resources

Degree to which the impact can be mitigated

The degree to which an impact can be MITIGATED can be defined as: “the effect of mitigation measures on the impact and its degree of effectiveness”.

Determining the mitigation rating of an impact			
MITIGATION RATING	MITIGATED	High	Impact mitigated 100%
	Degree impact can be mitigated	Medium	Impact mitigated >50%
		Low	Impact mitigated <50%

Confidence rating

CONFIDENCE in the assessment of an impact can be defined as the:” *level of certainty of the impact occurring*”.

Determining the confidence rating of an impact			
CONFIDENCE RATING	CONFIDENCE	Certain	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is <i>unlimited and sound</i>
		Sure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is <i>reasonable and relatively sound</i>
		Unsure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is <i>limited</i>

Cumulative impacts

The effect of CUMULATIVE impacts can be described as:” the effect the combination of past, present and “reasonably foreseeable” future actions have on aspects”.

Determining the confidence rating of an impact			
CUMULATIVE RATING	CUMULATIVE EFFECTS	Low	<i>Minor</i> cumulative effects
		Medium	<i>Moderate</i> cumulative effects
		High	<i>Significant</i> cumulative effects

Significance of Impacts

The SIGNIFICANCE can be defined as:” *the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required*”.