

Impact assessment methodology

The assessment of the potential impacts included direct, indirect as well as cumulative impacts associated with the project. The following assessment methodology was followed to identify and assess the impacts:

CONSEQUENCE CRITERIA

The criteria that contribute to the consequence of the impact are **INTENSITY** (the degree to which pre- development conditions are changed), which also includes the **TYPE OF IMPACT** (being either a positive or negative impact); the **DURATION** (length of time that the impact will continue); and the **EXTENT** (spatial scale) of the impact. The sensitivity of the receiving environment and/or sensitive receptors is incorporated into the consideration of consequence by appropriately adjusting the thresholds or scales of the intensity, duration and extent criteria, based on expert knowledge. For each impact, the specialist applies professional judgement to ascribe a numerical rating for each criterion according to the examples provided in Table 0-1,

Table 0-2 and Table 0-3 below.

Table 0-1: Definition of intensity ratings

Rating	Criteria	
	Negative impacts (-)	Positive impacts (+)
Very high (-/+ 4)	Very high degree of damage to natural or social systems or resources. These processes or resources may restore to their pre-project condition over very long periods of time (more than a typical human life time).	Great improvement to ecosystem or social processes and services or resources.
High (-/+ 3)	High degree damage to natural or social system components, species or resources.	Intense positive benefits for natural or social systems or resources.
Moderate (-/+ 2)	Moderate damage to natural or social system components, species or resources.	Average, on-going positive benefits for natural or social systems or resources.
Low (-/+ 1)	Minor damage to natural or social system components, species or resources. Likely to recover over time. Ecosystems and valuable social processes not affected.	Low positive impacts on natural or social systems or resources.
Negligible (0)	Negligible damage to individual components of natural or social systems or resources, such that it is hardly noticeable.	Limited low-level benefits to natural or social systems or resources.

Table 0-2: Definition of duration ratings

Rating	Criteria
2	Long-term: The impact will continue for 6-15 years.
1	Medium-term: The impact will continue for 2-5 years.
0	Short-term: The impact will continue for between 1 month and 2

Table 0-3: Definition of extent ratings

Rating	Criteria
2	Regional: The impact will affect the entire region
1	Local: The impact will extend across the site and to nearby
0	Site specific: The impact will be limited to the site or immediate

The consequence is then established using the formula:

$$\text{Consequence} = \text{type} \times (\text{intensity} + \text{duration} + \text{extent})$$

Depending on the numerical result, the impact's consequence would be defined as either extremely, highly, moderately or slightly detrimental; or neutral; or slightly, moderately, highly or extremely beneficial. These categories are provided in Table 0-4 below:

Table 0-4: Application of consequence ratings

Rating	Significance rating
-8	Extremely detrimental
-7 to -6	Highly detrimental
-5 to -4	Moderately detrimental
-3 to -2	Slightly detrimental
-1 to 1	Negligible
2 to 3	Slightly beneficial
4 to 5	Moderately beneficial
6 to 7	Highly beneficial
8	Extremely beneficial

SIGNIFICANCE CRITERIA

To determine the significance of an impact, the **PROBABILITY** (or likelihood) of that impact occurring is also considered. In assigning probability, the specialist considers the likelihood of occurrence but also takes cognisance of uncertainty and detectability of the impact. The most suitable numerical rating for probability is selected from **Table 0-5** below

Table 0-5: Definition of probability ratings

Rating	Criteria
4	Certain/ Definite: There are sound scientific reasons to expect that the impact will definitely
3	Very likely: It is most likely that the impact will occur.
2	Fairly likely: This impact has occurred numerous times here or elsewhere in a similar environment and with a similar type of development and could very conceivably occur.
1	Unlikely: This impact has not happened yet but could happen.
0	Very unlikely: The impact is expected never to happen or has a very low chance of occurring.

The significance is then established using the following equation:

$$\text{Significance} = \text{consequence} + \text{probability}$$

Depending on the numerical result of this calculation, the impact would fall into a significance category of negligible, minor, moderate or major, and the type would be either positive or negative. Examples of these categories are provided in Table 0-6:

Table 0-6: Application of significance ratings

Rating	Significance rating
-4	Very high - negative
-3	High - negative
-2	Moderate - negative
-1	Low - negative
0	Very low
1	Low - positive
2	Moderate - positive
3	High - positive
4	Very high - positive

CONFIDENCE CRITERIA

Once the significance of an impact occurring without mitigation has been established, the same impacts will be assigned ratings after the proposed mitigation has been implemented. Although these measures may not eliminate subjectivity, they provide an explicit context within which to review the assessment of impacts. The specialists appointed to contribute to this impact assessment have empirical knowledge of their respective fields and are thus able to comment on the **CONFIDENCE** they have in their findings based on the availability of data and the certainty of their findings. A standard “degree of certainty” scale is detailed in Table 0-7. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making.

Table 0-7: Definition of confidence ratings

Rating	Criteria
Low	Judgement is based on intuition and there some major assumptions used in assessing the impact may prove to be untrue.
Medium	Determination is based on common sense and general knowledge. The assumptions made, whilst having a degree of uncertainty, are fairly robust.
High	Substantive supportive data or evidence exists to verify the assessment.

MITIGATION OF POTENTIAL & RESIDUAL IMPACTS

The significance of the impacts identified during the scoping phase will be assessed during the impact assessment phase. The specialists will recommend measures to mitigate the impacts. The implementation of the **MITIGATION MEASURES** is ensured through the ESMP. The ESMP will be

used to enforce the mitigation measures and ensure that the impacts of all phases of the proposed project are properly managed and addressed.