# TECHNICAL MEMO

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## 1.0 IMPACT ASSESSMENT METHODOLOGY

This section sets out the approach and method for the assessment of impacts for the Project and defines the terminology applied and the steps used to evaluate impact significance.

### 1.1 Approach to Impact Assessment

The identification and assessment of environmental and social impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with a proposed project. Impacts are identified throughout the ESIA process by environmental and social assessment practitioners, from specialist studies and stakeholder engagement process, and refined as more detailed baseline information, modelling data or project design information is available. For potentially significant impacts or those of stakeholder concern, the impact identification and evaluation process involves the following main steps:

**STEP 1: DEFINE THE AREA OF INFLUENCE:**

The area of influence of the project is defined as a basis for defining the boundaries for baseline data gathering by taking into consideration the spatial extent of potential direct and indirect impacts of the project. Direct impacts of the project are typically located within a smaller area around the project activities (i.e. in the direct area of influence) while indirect impacts typically extend across a wider area and often relate to the social sphere of influence of the project. The direct area of influence will be reassessed in the ESIA phase on the basis of the Drill Discharges and Oil Spill Modelling results.

**STEP 2: IDENTIFICATION OF POTENTIAL IMPACTS**

Potential impacts of a project are identified through a process of examining the potential for interactions between project activities and environmental and social receptors (or features). This requires consideration of the range of project activities across different phases of the project (planning, exploration, construction, operation and decommissioning) and the potential for interactions on each of the environmental receptors, features or aspects occurring in the project area of influence. The results are then presented in an ‘environmental and social interaction matrix’ format. For each project activity, the degree of interaction is rated through colour coding the level and type of interaction in the matrix. This matrix approach to impact identification is designed to highlight where interactions may occur as a way of focussing the impact assessment.

## STEP 3: COMPILE IMPACTS – ASPECTS REGISTER

An impacts-aspects register is typically prepared during the Scoping Phase as a basis for further elaborating the potential impacts identified through the initial impact identification stage. For each of the project activities, different aspects associated with the activity and their potential impacts are tabulated. This systematic approach provides a basis for planning the scope of specialist studies to ensure the correct information is obtained to conduct a detailed assessment of the project impacts. It also enables identification of the linkages between different specialist scopes and overlapping impacts, and where there are interdependencies on data and reporting to enable an integrated impact assessment. For instance, social specialists are typically reliant on other specialists for inputs such as water quality, air quality or underwater noise effects and this needs to be factored into work scopes and scheduling. The presentation of an Impacts-Aspects Register further provides stakeholders with a degree of confidence that the specialists and environmental assessment practitioners have adequately identified potential impacts at an early stage.

## STEP 4: IMPACT EVALUATION

Evaluation of impact significance follows a stepwise process as set out below with reference to definitions in **Section 2.**

### A Assign sensitivity ratings to receptors

The sensitivity of a receptor is defined on a scale of Very Low, Low, Moderate, High or Very High guided by the definitions for biophysical, ecological and social receptors in **Section 3.** These are derived from the baseline information, which shall be used to support the sensitivity ratings in the description of impact.

### B Determine the impact magnitude ratings

Magnitude (or consequence) is determined based on a combination of the “intensity”, “duration” and “extent” of the impact following the designations set out in **Section 4** Magnitude is assigned to the pre-mitigation impact (i.e., before additional mitigation measures are applied but taking into account embedded controls specified as part of the project description) and residual impacts after additional mitigation is applied.

### C Determine impact significance rating

The significance of an impact is a function of the intensity and the sensitivity of the impact determined using the matrix table in **Section 5**. and is assigned to the predicted impact pre-mitigation and post-mitigation (residual) after considering all possible feasible mitigation measures in accordance with the mitigation hierarchy.

### D Applying the Mitigation Hierarchy

Identification of mitigation measures in accordance with the mitigation hierarchy is done throughout the ESIA process with emphasis placed on avoiding significant impacts where feasible. The mitigation hierarchy, as specified in IFC Performance Standard 1, which is widely regarded as a best practice approach to managing risks, is based on a hierarchy of decisions and measures, as presented in **Figure 1** and **Table 9**. Certain avoidance mitigation measures may be identified early in the Scoping Phase and become ‘embedded’ into the project design and specified in the project description (e.g., drilling sites may be confirmed to avoid sensitive sea floor areas or the timing of surveys may avoid certain seasons). These embedded controls are not ‘added’ to the list of mitigation measures or used to determine the post-

mitigation significance. Additional mitigation measures may be identified during the impact assessment process and those agreed with the proponent will be used to assess the post-mitigation significance ratings. These may include measures such as helicopters to avoid fly-over of islands at certain heights.

**E Assign additional ratings to describe the impact**

Qualifying ratings are assigned to criteria such as probability (or likelihood of the impact occurring), confidence (in the impact prediction), mitigation potential, extent of resource loss (as defined in **Section 5**). reversibility of impact and potential for cumulative impacts.

## 2.0 DEFINITIONS OF IMPACT TYPES AND CRITERIA USED

### 2.1 Impact Types

**Table 1** below defines the criteria used to categorise and describe impacts.

*Table 1: Impact Types and Criteria*

| TERM | DEFINITION |
|---|---|
| Nature of Impact | Effect (neutral) |
| Positive | An impact that is considered to represent an improvement to the baseline conditions or introduces a positive change to a receptor. |
| Negative | An impact that is considered to represent an adverse change from the baseline conditions or receptor or introduces a new adverse effect. |
| Neutral | An impact that has no or negligible effect on the receptor. |
| Type | Cause and effect relationship between the project activity and the nature of effect on receptor |
| Direct | Impacts that result from a direct interaction between a proposed project activity and the receiving |
| Indirect | Impacts that are not a direct result of a proposed project, often produced away from or as a result of a complex impact pathway. Sometimes referred to as secondary impacts. |
| Induced | A type of indirect impact resulting from factors or activities caused by the presence of the Project but which are not always planned or expected (e.g. human in-migration along new access or for jobs creating increased demand on resources). |
| Residual | The impacts that remain after implementation of the project and all associated mitigation and other environmental management measures. |

### 2.2 Definitions of Impact Assessment Criteria and Categories Applied

Definitions of the criteria used in assessing impact significance and the assigned categories, and the additional criteria used to describe the impacts, are summarised in **Table 2** below.

*Table 2: Definitions of Impact Assessment Criteria and Categories Applied*

| CRITERION | DEFINITION | CATEGORIES |
|---|---|---|
| Sensitivity | Sensitivity is a rating given to the importance and/ or vulnerability of a receptor (e.g. conservation value of a biodiversity feature or cultural heritage resource or social receptor | Very Low<br>Low<br>Medium<br>High<br>Very High |

| CRITERION | DEFINITION | CATEGORIES |
|---|---|---|
| Magnitude (or consequence) | A term describing the actual change predicted to occur to a resource or receptor caused by an action or activity or linked effect. It is derived from a combination of Intensity, Extent and Duration and considers scale, frequency and degree of reversibility | Very Low<br>Low<br>Medium<br>High<br>Very High |
| Intensity | A descriptor for the degree of change an impact is likely to have on the receptor which considers scale and frequency of occurrence. | Very Low<br>Low<br>Medium<br>High<br>Very High |
| Extent | The spatial scale over which the impact will occur. | Site<br>Local<br>National<br>Regional<br>International<br>Transboundary |
| Duration | Time scale over which the consequence of the effect on the receptor/s will last. [Note that this does not apply to the duration of the project activity]. The terms 'Intermittent' and 'Temporary' may be used to describe the duration of an impact. | Short-term<br>Medium-term<br>Long-term<br>Permanent |
| Probability | A descriptor for the likelihood of the impact occurring. Most assessed impacts are likely to occur but Probability is typically used to qualify and contextualise the significance of unplanned events or major accidents. | Unlikely<br>Possible<br>Likely<br>Highly<br>Likely<br>Definite |
| Confidence | A descriptor for the degree of confidence in the evaluation of impact significance. | Low<br>Medium<br>High<br>Certain |
| Mitigation potential | A descriptor for the degree to which the impact can be mitigated to an acceptable level. | None<br>Very Low<br>Low<br>Medium<br>High |
| Loss of Irreplaceable resources | A descriptor for the degree to which irreplaceable resources will be lost, fragmented or damaged. | Low<br>Medium<br>High |
| Reversibility | A descriptor for the degree to which an impact can be reversed. | Irreversible<br>Partially Reversible<br>Fully Reversible |
| Cumulative | A descriptor of the potential for an impact to have cumulative impacts to arise. | Unlikely<br>Possible<br>Likely |

## 3.0 DETERMINATION OF SENSITIVITY

Sensitivity is a term that covers the 'importance' (e.g., value of an ecological receptor or heritage resource) or 'vulnerability' (e.g., ability of a social receptor to cope with change) of a receptor to a project-induced change. It considers 'Irreplaceability' - measure of the value of, and level of dependence on, impacted

resources to society and/ or local communities, as well as of consistency with policy (e.g., conservation) targets or thresholds.

Broad definitions of sensitivity ratings for social, ecological and physical/abiotic receptors are defined in **Table 3** below. These are not exhaustive and may be modified on a case-by-case basis, as appropriate. Additional ratings can be developed for other receptors such as cultural heritage.

*Table 3: Sensitivity Categorisation and Description*

| SENSITIVITY RATING | DEFINITION |
|---|---|
| Social Receptors | Individuals, communities or groups of stakeholders |
| Very Low | Receptors who are not vulnerable or susceptible to project-related changes and have substantive resources and support to understand and anticipate Project impacts. Such receptors have the ability to avoid negative Project impacts, or to cope with, resist or recover from the consequences of a such an impact with negligible changes to their lives, or will derive little benefit or opportunities from the project. |
| Low | Receptors who have few vulnerabilities and are marginally susceptible to project-related changes but still have substantive resources and support to understand and anticipate a Project impact. Such receptors are able to easily adapt to changes brought about by the project with marginal impacts on their living conditions, livelihoods, health and safety, and community well-being, or will derive marginal benefits or opportunities from the project. |
| Medium | Receptors have some vulnerabilities and are more susceptible to project-related changes given they only have moderate access to resources, support, or capacity to understand and anticipate a Project impact. Such receptors are not fully resilient to Project impacts but are generally able to adapt to such changes albeit with some diminished quality of life.<br>For positive impacts, these receptors are likely to derive a moderate level of benefit or opportunities from the project. |
| High | Receptors are vulnerable and susceptible to project-related changes, and have minimal access to resources, support, or capacity to understand and anticipate a Project impact. Such receptors are not resilient to Project impacts and will not be able to adapt to such changes without substantive adverse consequences on their quality of life.<br>For positive impacts, these receptors are likely to derive a substantial level of benefits or opportunities from the project. |
| Very High | Receptors are highly vulnerable and have very low resilience to project-related changes. By fact of their unique social setting or context, such receptors have a diminished or lack of capacity to understand, anticipate, cope with, resist or recover from the consequences of a potential impact without substantive external support. For positive impacts, receptors are likely to derive substantial benefits or opportunities from the project which could lead to significant and sustained improvement in their quality of life. |
| Ecological Receptor | Species, habitats or ecosystems including processes necessary to maintain ecosystem functions |
| Very Low | Species or habitats with negligible importance for biodiversity including habitats that are largely transformed or highly modified. |
| Low | Species or habitats listed as Least Concern (LC) on the International Union for Conservation of Nature (IUCN) Red List or on regional or national Red Lists and/or habitats or species which are common and widespread, of low conservation interest, or habitats which are degraded and qualify as 'modified habitat' under international definitions (e.g. IFC or World Bank standards). |
| Medium | Species, habitats or ecosystems listed as globally Vulnerable (VU) or Near Threatened (NT) on IUCN Red List; or listed as VU or NT on national or regional Red Lists, or which meet the IUCN criteria based on expert-driven biodiversity planning processes. It includes habitats that meet definitions of 'natural habitat'; or ecosystems with important functional value in maintaining the biotic integrity of these habitats or VU or NT species. |

| SENSITIVITY RATING | DEFINITION |
|---|---|
| High | Species, habitats or ecosystems listed as globally Endangered (EN) or Critically Endangered (CR) by IUCN or listed as EN/CR on national or regional Red Lists; or which meet IUCN criteria for range-restricted species[1] or which meet the definition of migratory and congregatory species[2], but which do not qualify as Critical Habitat based on IUCN Key Biodiversity Area thresholds[3]. It includes habitats or ecosystems which are important for meeting national conservation targets based on expert-driven national or regional systematic conservation planning processes, but which do not meet global IUCN thresholds. It can also include protected areas such as national parks, marine protected areas or ecological support areas designated for biodiversity protection containing species that are nationally or globally listed as EN or CR, or other designated areas important for the persistence of EN/CR species or habitats. |
| Very High | Species, habitats or ecosystems listed as globally Endangered (EN) or Critically Endangered (CR) by IUCN, or listed as EN/CR on expert-verified national or regional Red Lists; or which meet IUCN criteria for range-restricted or migratory /congregatory species and which meet IUCN thresholds for Key Biodiversity Areas.<br>It includes habitats or ecosystems which are of high importance for maintaining the persistence of species or habitats that meet critical habitat thresholds. Habitats of high sensitivity may typically include legally protected areas that meet IUCN categories 1, 1a and 1b[4], or KBAs or Important Bird Areas (IBAs) with biodiversity features that meet the IUCN KBA criteria and thresholds. |
| Physical Abiotic Receptors | Water quality, sediment quality, air quality, noise levels |
| Very Low | Receptors are highly resilient to project-induced change and changes remain undetectable and within any applicable thresholds. |
| Low | Receptors are resilient to project-induced change and changes, while detectable, are within the range of natural variation and remain within any applicable thresholds. |
| Medium | Receptors are moderately resilient to project-induced changes, but these changes are easily detectable, exceed the |
| High | Receptors are vulnerable to project-induced change and changes are readily detectable, well outside the range of natural variation or occurrence, and regularly exceed any applicable thresholds. |
| Very High | Receptors are highly vulnerable to project-induced change and changes are easily detectable, fall well outside the range of natural variation or occurrence, and will continually exceed any applicable thresholds. |

[1] Restricted range species are those with limited Extent Of Occurrence (EOO) (GN74):

- For terrestrial vertebrates and plants, a restricted-range species is defined as those species that have an EOO less than 50 000 square kilometres ($km^2$).
- For marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100 000 $km^2$.
- For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart)

[2] Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem) (GN76). Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.

[3] IUCN, A Global Standard for the Identification of Key Biodiversity Areas, 2016.

[4] IUCN, "Protected Areas Category", https://www.iucn.org/theme/protected-areas/about/protected-area-categories

## 4.0 DETERMINATION OF MAGNITUDE (CONSEQUENCE)

### 4.1 Definitions of Criteria Used to Derive Magnitude (Consequence)

The term 'magnitude' (or consequence) describes and encompasses all the dimensions of the predicted impact including:

- the nature of the change (what is affected and how);
- Its size, scale or intensity;
- Degree of reversibility; and
- Its geographical extent and distribution.

Taking the above into account, Magnitude (or Consequence) is derived from a combination of 'Intensity', 'Duration' and 'Extent'.

The criteria for deriving Intensity, Extent and Duration are summarised in **Table 4** below.

*Table 4: Categorisation and Description for Intensity, Extent and Duration*

| CRITERIA | RATING | DESCRIPTION |
|---|---|---|
| Criteria for ranking of the INTENSITY of environmental impacts considering reversibility and scale | Very Low | Negligible change, disturbance or nuisance which is barely noticeable or may have minimal effect on receptors or affect a tiny proportion of the receptors. |
| | Low | Minor (Slight) change, disturbance or nuisance which is easily tolerated and/or reversible in the short term without intervention, or which may affect a small proportion of receptors. |
| | Medium | Moderate change, disturbance or discomfort caused to receptors, or which is reversible over the medium term, and/or which may affect a moderate proportion of receptors. |
| | High | Prominent change, or large degree of modification, disturbance or degradation caused to receptors, or which may affect a large proportion of receptors, possibly entire species or community and which is not easily |
| Criteria for ranking the EXTENT / SPATIAL SCALE of impacts | Site | Impact is limited to the immediate footprint of the activity and immediate surrounds within a confined area. |
| | Local | Impact is confined to within the project concession / licence area and its nearby surroundings. |
| | Regional | Impact is confined to the region, e.g., coast, basin, catchment, municipal region, district, etc. |
| | National | Impact may extend beyond district or regional boundaries with national implications. |
| | International | Impact extends beyond the national scale or may be transboundary. |
| Criteria for ranking the DURATION of impacts | Short Term | The duration of the impact will be < 1 year or may be intermittent. |
| | Medium Term | The duration of the impact will be 1-5 years. |
| | Long Term | The duration of the impact will be 5-25 years, but where the impact will eventually cease either because of natural processes or by human intervention. |
| | Permanent | The impact will endure for the reasonably foreseeable future (>25years) and where |

## 5.0 DETERMINING MAGNITUDE (OR CONSEQUENCE) RATINGS

Once the intensity, extent and duration are defined, the magnitude of negative and positive impacts is derived based on **Table 5** below. It should be noted that there may be times when these definitions may need to be adjusted to suit the specific impact where justification should be provided. For instance, the permanent loss of the only known occurrence of a species in a localised area of impact can only achieve a "High" magnitude (or consequence) rating but could, in this instance, warrant a Very High rating. The justification for amending the rating should be indicated in the impact table.

*Table 5: Magnitude Determination*

| MAGNITUDE (OR CONSEQUENCE) RATING | DESCRIPTION |
|---|---|
| Very High | Impacts could be EITHER:<br>of high intensity at a regional level and endure in the long term;<br>OR of high intensity at a national level in the medium or long term;<br>OR of medium intensity at a national level in the long term. |
| High | Impacts could be EITHER:<br>of high intensity at a regional level and endure in the medium term;<br>OR of high intensity at a national level in the short term;<br>OR of medium intensity at a national level in the medium term;<br>OR of low intensity at a national level in the long term;<br>OR of high intensity at a local level in the long term;<br>OR of medium intensity at a regional level in the long term. |
| Medium | Impacts could be EITHER:<br>of high intensity at a local level and endure in the medium term;<br>OR of medium intensity at a regional level in the medium term;<br>OR of high intensity at a regional level in the short term;<br>OR of medium intensity at a national level in the short term;<br>OR of medium intensity at a local level in the long term;<br>OR of low intensity at a national level in the medium term;<br>OR of low intensity at a regional level in the long term. |
| Low | Impacts could be EITHER:<br>of low intensity at a regional level and endure in the medium term;<br>OR of low intensity at a national level in the short term;<br>OR of high intensity at a local level and endure in the short term;<br>OR of medium intensity at a regional level in the short term<br>OR of low intensity at a local level in the long term;<br>OR of medium intensity at a local level and endure in the medium term. |
| Very Low | Impacts could be EITHER:<br>of low intensity at a local level and endure in the medium term;<br>OR of low intensity at a regional level and endure in the short term;<br>OR of low to medium intensity at a local level and endure in the short term.<br>OR Zero or very low intensity with any combination of extent and duration. |

** Note: For any impact that is considered to be "Permanent" or "International" apply the "Long-Term" and "National" ratings, respectively. For impacts at the "Site" or "Local" level apply the "Local" level rating.*

## 6.0 DETERMINATION OF IMPACT SIGNIFICANCE

### 6.1 Matrix to Derive Impact Significance

The significance of an impact is based on expert judgement of the sensitivity (importance or vulnerability) of a receptor and the magnitude (or consequence) of the effect that will be caused by a project-induced change.

In summary, the impact assessment method is based on the following approach:

**Significance = Magnitude (or Consequence) x Sensitivity**
**Where Magnitude (or Consequence) = Intensity +Extent + Duration**

Once ratings are applied to each of these parameters the matrix presented in **Table 6** is used to derive Significance.

*Table 6: Matrix for Determining Significance*

| MAGNITUDE OR CONCEQUENCE | SENSITIVITY | | | | | |
|---|---|---|---|---|---|---|
| | | VERY LOW | LOW | MEDIUM | HIGH | VERY HIGH |
| | VERY LOW | NEGLIGIBLE | NEGLIGIBLE | VERY LOW | LOW | LOW |
| | LOW | VERY LOW | VERY LOW | LOW | LOW | MEDIUM |
| | MEDIUM | LOW | LOW | MEDIUM | MEDIUM | HIGH |
| | HIGH | MEDIUM | MEDIUM | HIGH | HIGH | VERY HIGH |
| | VERY HIGH | HIGH | HIGH | HIGH | VERY HIGH | VERY HIGH |

The definitions and approach to determining “sensitivity” and “magnitude” (or consequence) criteria are described below.

## 7.0 DEFINITIONS OF SIGNIFICANCE RATINGS

Broad definitions of impact significance ratings are provided in the table below. Impacts of ‘High’ and ‘Very High’ significance require careful evaluation during decision-making and need to be weighed up against potential long- term socioeconomic benefits of the project to inform project authorisation. Where there are residual biodiversity impacts of ‘High’ and ‘Very High’ significance this will require careful examination of offset feasibility and confirmation that an offset is possible prior to decision-making.

*Table 7: Definition of Significance Ratings*

| SIGNIFICANCE RATING | INTERPRETATION |
|---|---|
| VERY HIGH | Impacts where an accepted limit or standard is far exceeded, changes are well outside the range of normal<br>variation, or where long-term to permanent impacts of large magnitude (or consequence) occur to highly sensitive resources or receptors.<br>For adverse residual impacts of very high significance, there is no possible further feasible mitigation that could reduce the impact to an acceptable level or offset the impact, and natural recovery or restoration is unlikely. The impact may represent a possible fatal flaw and decision-making will need to evaluate the trade- offs with potential social or economic benefits.<br>Positive social impacts of very high significance would be those where substantial economic or social benefits are obtained from the project for significant duration (many years). |
| HIGH | Impacts where an accepted limit or standard is exceeded; impacts are outside the range of normal variation<br>or adverse changes to a receptor are long-term. Natural recovery is unlikely or may only occur in the long- term and assisted and ongoing rehabilitation is likely to is required to reduce the impact to an acceptable level.<br>High significance residual impacts warrant close scrutiny in decision-making and strict conditions and monitoring to ensure compliance with mitigation or other compensation requirements.<br>Positive social impacts of high significance would be those where considerable economic or social benefits are obtained from the project for an extended duration in the order of several years. |

| SIGNIFICANCE RATING | INTERPRETATION |
|---|---|
| MEDIUM | Moderate adverse changes to a receptor where changes may exceed the range of natural variation or where<br>accepted limits or standards are exceeded at times. Potential for natural recovery in the medium-term is good, although a low level of residual impact may remain. Medium impacts will require mitigation to be undertaken and demonstration that the impact has been reduced to as low as reasonably practicable (even if the residual impact is not reduced to Low significance).<br>Positive social impacts of medium significance would be those where a moderate level of benefit is obtained by several people or a community, or the local, regional or national economy for a sustained period, generally more than a year. |
| LOW | Minor effects will be experienced, but the impact magnitude (or consequence) is sufficiently small (with and without mitigation) and well within the range of normal variation or accepted standards, or where effects are short-lived. Natural recovery is expected in the short-term, although a low level of localised residual impact may remain. In general, impacts of low significance can be controlled by normal good practice but may require monitoring to ensure operational controls or mitigation is effective. Positive social impacts of low significance would be those where a few people or a small proportion of a community in a localised area may benefit for a few months. |
| VERY LOW | Very minor effects on resources or receptors are possible but the predicted effect represents a minimal change to the distribution, presence, function or health of the affected receptor, and no mitigation is required. |
| NEGLIGIBLE | Predicted impacts on resources or receptors of very low or low sensitivity are imperceptible or indistinguishable from natural background variations, and no mitigation is required. |

## 8.0 ADDITIONAL ASSESSMENT CRITERIA

Additional criteria that are taken into consideration in the impact assessment process and specified separately to further describe the impact and support the interpretation of significance, include the following:

- Probability (Likelihood) of the impact occurring (which is considered mainly for unplanned events);
- Degree of Confidence in the impact prediction;
- Degree to which the impact can be mitigated;
- Degree of Resource Loss (i.e., the extent to which the affected resource/s will be lost, considering irreplaceability); and
- Reversibility – the degree to which the impact can be reversed.
- Cumulative Potential – potential for cumulative impacts with other planned projects or activities.

Definitions for these supporting criteria are indicated in **Table 8** below.

*Table 8: Categorisation and Description of Additional Assessment Criteria*

| CRITERIA | RATING | DESCRIPTION |
|---|---|---|
| Criteria for determining the PROBABILITY of impacts | UNLIKELY | Where the possibility of the impact to materialise is very low either because of design or historic experience, i.e. ≤ 5% chance of occurring. |
| | POSSIBLE | Where the impact could occur but is not reasonably expected to occur i.e. 5-35% chance of occurring. |
| | LIKELY | here there is a reasonable probability that the impact would occur, i.e. >35 to ≤75% chance of occurring. |
| | HIGH LIKELY | Where there is high probability that the impact would occur i.e. >75 to <99% chance of occurring. |

| CRITERIA | RATING | DESCRIPTION |
|---|---|---|
| | DEFINITE | Where the impact would occur regardless of any prevention measures, i.e. 100% chance of occurring. |
| Criteria for determining the DEGREE OF CONFIDENCE of the assessment | LOW | Low confidence in impact prediction (≤ 35%) |
| | MEDIUM | Moderate confidence in impact prediction (between 35% and ≤ 70%) |
| | HIGH | High confidence in impact prediction (> 70%). |
| | CERTAIN | Absolute certainty in the impact prediction (100%) |
| Criteria for the DEGREE TO WHICH IMPACT CAN BE MITIGATED | NONE | No mitigation is possible or mitigation even if applied would not change the residual impact. |
| | VERY LOW | Some mitigation is possible but will have marginal effect in reducing the residual impact or its significance rating. |
| | LOW | Some mitigation is possible and may reduce the residual impact, possibly reducing the impact significance. |
| | MEDIUM | Mitigation is feasible and will reduce the residual impact and may reduce the impact significance rating. |
| | HIGH | Mitigation can be easily applied or is considered standard operating practice for the activity and will reduce the residual impact and impact significance rating. |
| Criteria for DEGREE OF IRREPLACEABLE RESOURCE LOSS | LOW | Where the activity results in a marginal effect on an irreplaceable resource. |
| | MEDIUM | Where an impact results in a moderate loss, fragmentation or damage to an irreplaceable receptor or resource. |
| | HIGH | Where the activity results in an extensive or high proportion of loss, fragmentation or damage to an irreplaceable receptor or resource. |
| Criteria for REVERSIBILITY - the degree to which an impact can be reversed | IRREVERSABLE | Where the impact cannot be reversed and is permanent. |
| | PARTIALLY REVERSIBLE | Where the impact can be partially reversed and is temporary |
| | FULLY REVERSIBLE | Where the impact can be completely reversed. |
| Criteria for POTENTIAL FOR CUMULATIVE IMPACTS – the extent to which cumulative impacts may arise from interaction or combination from other planned activities or projects | UNLIKELY | Low likelihood of cumulative impacts arising. |
| | POSSIBLE | Cumulative impacts with other activities or projects may arise. |
| | LIKELY | Cumulative impacts with other activities or projects either through interaction or in combination can be expected. |

## 9.0 Application of mitigation Hierarchy

A key component of an ESIA process is to explore practical ways of avoiding or reducing potentially significant impacts of a proposed project. These are commonly referred to as mitigation measures and are incorporated into the proposed project as part of the ESMP. Mitigation is aimed at preventing, minimising or managing significant negative impacts to as low as reasonably practicable (ALARP) and optimising and maximising any potential benefits of the proposed project. The mitigation measures are established through the consideration of legal requirements, best practice industry standards and specialist input from the ESIA team.

The mitigation hierarchy which is widely regarded as a best practice approach to managing risks, is based on a hierarchy of decisions and measures, as presented in **Figure 1** and described in **Table 9**. This is

aimed at ensuring that wherever possible potential impacts are mitigated at source rather than mitigated through restoration after the impact has occurred. Any remaining significant residual impacts are then highlighted, and additional actions are proposed.

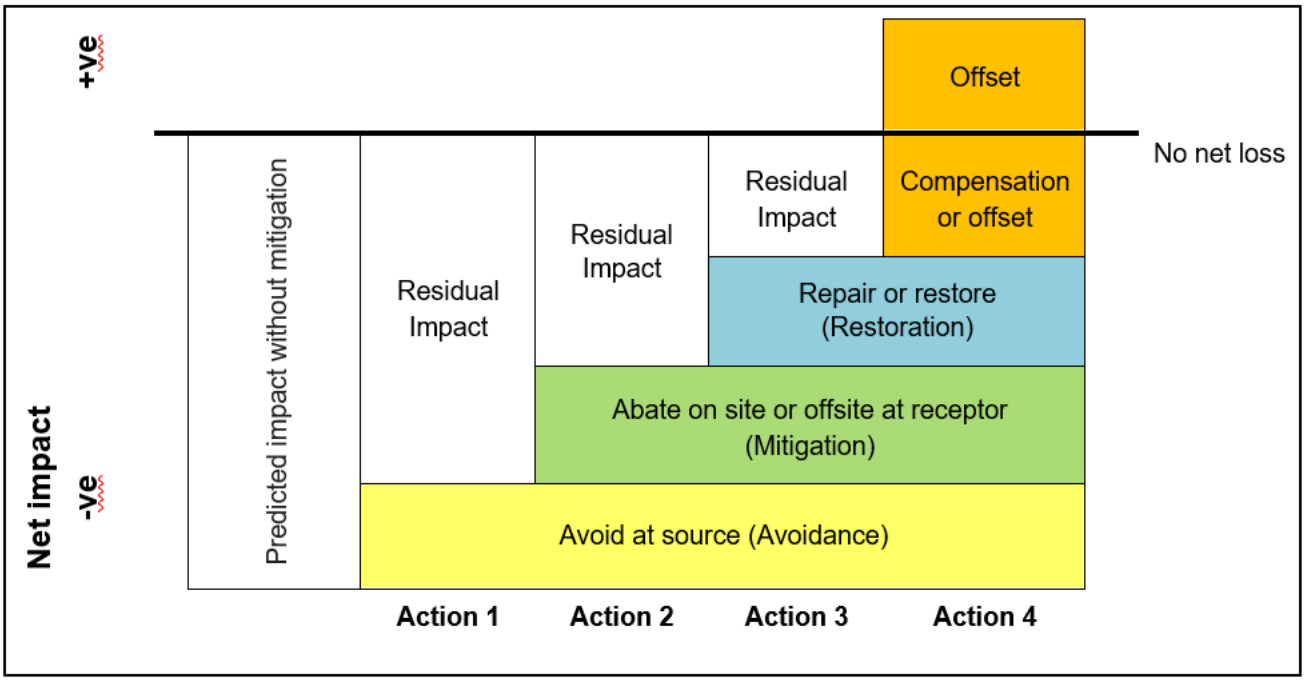


*Figure 1: Mitigation Hierarchy*

(Adapted from: www.thebiodiversityconsultancy.com)

*Table 9: Sequential application of the mitigation hierarchy*

| | |
|---|---|
| AVOID AT SOURCE | Avoiding or reducing at source is essentially 'designing' the project so that a feature causing an impact is designed out (e.g., a waste stream is eliminated). |
| ABITE ON SITE | This involves adding something to the basic design or procedures to abate the impact (often called 'end-of- pipe') or altered (e.g. reduced waste volume) and is referred to as minimisation Pollution controls fall within this category. |
| ABATE OFFSITE/AT RECEPTOR | If an impact cannot be abated on-site, then measures can be implemented off-site – an example disposing of waste generated on-board at a proper waste facility onshore. Measures may also be taken to protect the receptor. |
| REPAIR OR RESTORE | Some impacts involve unavoidable damage to a resource, e.g., shoreline pollution arising from an oil spill. Repair essentially involves restoration and reinstatement type measures, such as clean-up of the shoreline. |
| COMPENSATE OR OFFSET | Where other mitigation approaches are not possible or fully effective, then compensation, in some measure, for loss, damage and general intrusion might be appropriate. An example could be compensation for loss of earnings if fisheries were to be permanently impacted by a Project activity. |

Yours sincerely,

**WSP Group Africa (Pty) Ltd**

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