

4.1

INTRODUCTION

This Chapter provides a summary of the EIA process that is being followed for the *Sasol Pipeline and FSO Project*. The process is structured in compliance with the regulatory requirements established in the *Environmental Impact Assessment Regulations approved by Decree No 45/2004 of 29 September*¹ as amended by *Decree No 42/2008 of 4 November* (refer to *Chapter 3* of this document) and *Decree 56/2010 – Environmental Regulation for Petroleum Operations*. The process also takes into account the requirements established in the IFC performance standards which Sasol is committed to.

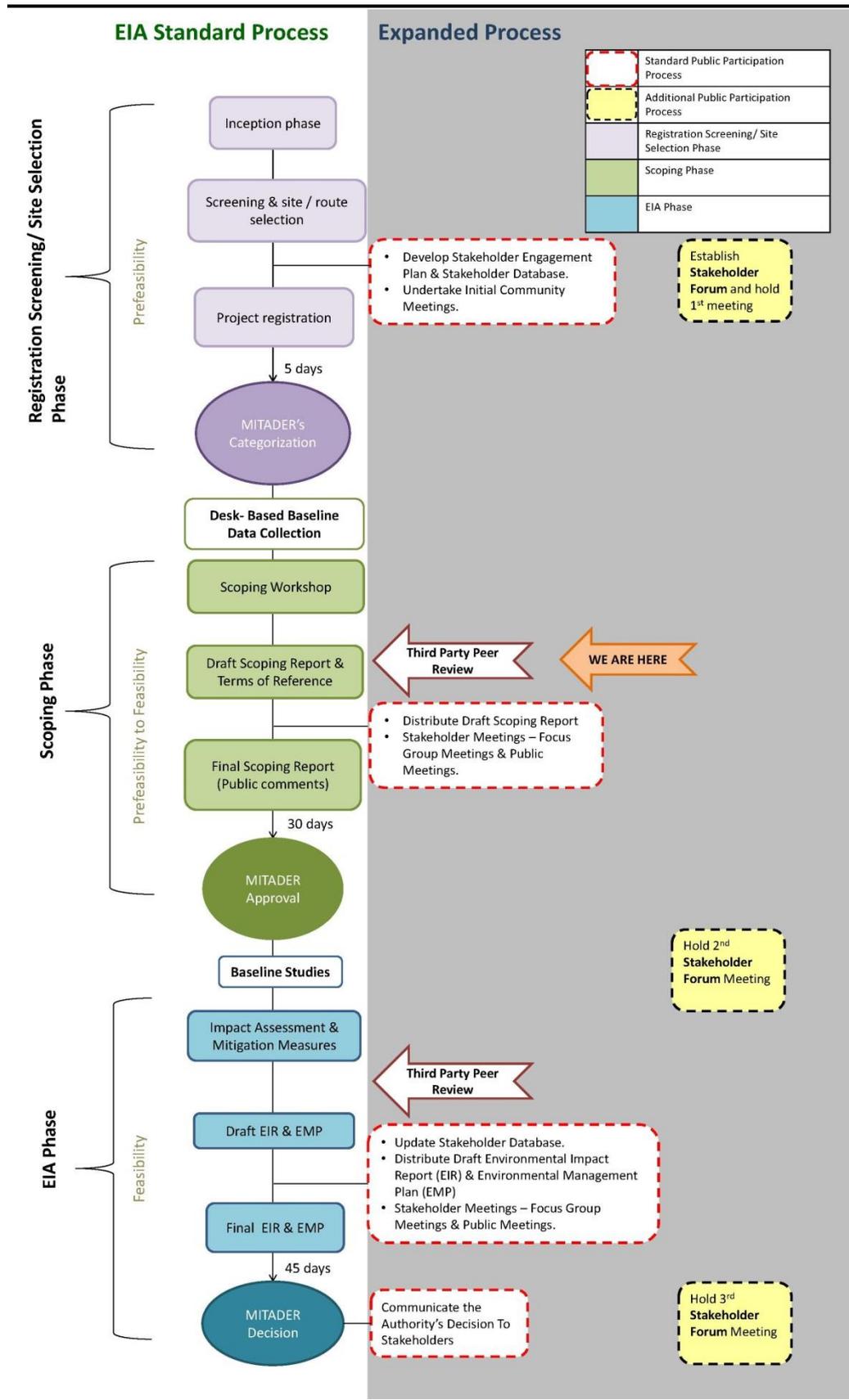
The overall aim of the EIA is to identify and assess potential environmental and social impacts associated with the phases of the proposed Project, in order to support a decision by MITADER. The EIA process is divided into three distinct stages, namely:

1. **EIA Pre-assessment Application (Screening)**: The proposed project is screened against applicable environmental laws and regulations to determine category of assessment that must be undertaken.
2. **Environmental Pre-Feasibility and Scoping (Scoping)**: Where projects are categorized as **Category A**, scoping is undertaken to identify *potential* impacts, carry out preliminary engagement with interested and affected parties (who may assist in determining the potential impacts) and define the Terms of Reference (ToR) for the EIR.
3. **Environmental Impact Assessment**: The EIA stage comprises a number of steps that collectively assess the manner in which the proposed project will interact with elements of the physical, biological, and socio-economic environments resulting in impacts on resources/receptors. Furthermore, the EIA phase evaluates what mitigation measures are warranted so as to avoid or reduce the magnitude of the impacts associated with the proposed project. Based on a balanced view of the advantages and disadvantages of the Project, the EIA makes a recommendation as to whether the Project should be authorised.

Figure 4.1 illustrates an overview of the EIA process that will be followed for this Project. The process is largely based on regulated steps which can be divided into the three major phases described above, namely Screening, Scoping and the Environmental Impact Assessment Phase, which includes specialist studies and the Environmental Impact Report (EIR). However, it must be noted that this is not a linear process, but one in which several stages may be carried out in parallel and where the assumptions and conclusions are revisited and modified as the EIA progresses. The following sections provide detail on how each stage of the EIA process will be applied to the Project.

¹ Note: New Regulations governing the Environmental Impact Assessment process in Mozambique have been published in *Decree No 54/2015*, which took effect on 30 March 2016. However, the Sasol Pipeline and FSO Project was registered under *Decree No 45/2004* and will be conducted in accordance with the requirements of this legislation. The applicability of the new requirements on an on-going Project will be tested with MITADER as part of the submission of this EPDA.

Figure 4.1 Steps of the Proposed EIA Process for this Category A Project



4.2

EIA PRE-EVALUATION APPLICATION (SCREENING)

All major developments must be screened in order to determine which environmental impact assessment process should be undertaken. Article 3 of the *EIA Regulations* and the associated Annexures I, II and III define this process.

The screening process involves the submission of Project Registration documentation together with an Environmental Application Form to MITADER, specifically at the Provincial Directorate of Environmental Affairs (DPCA) and National Agency of Environmental Quality (AQUAA). Based on this, MITADER determines the category of the project and the environmental impact assessment process to be adopted.

The application was submitted to the national and provincial environmental authorities on 4 December 2015. The environmental impact assessment process was formally classified as a *Category A Project* by MITADER (refer to *Section 3.2.3*) on the 26 January 2016 (reference number 90/180/DGA/DPTADER/16).

4.3

SCOPING

The purpose of the scoping phase is to identify key sensitivities and those activities with the potential to contribute to, or cause, potentially significant impacts to environmental and socio-economic receptors and resources and to evaluate siting, layout and technology alternatives for the project proposed.

The key objectives of scoping are to:

- Identify the key environmental and social issues;
- Obtain stakeholder views through consultation; and
- Develop the Terms of Reference for the EIA through consultation so as to ensure that the process and output are focused on the key issues.

Subsequent phases of the EIA process focuses on these key issues through the collection of information on existing environmental and social conditions; engagement with stakeholders; understanding the impacts to the physical, biophysical and social environment; and developing the measures to avoid/control and monitor these impacts.

This Scoping Report will be submitted to the Ministry of Land, Environment and Rural Development (*Ministério da Terra, Ambiente e Desenvolvimento Rural* – MITADER) for approval, prior to initiation of the EIA Phase.

The Public Participation Process (PPP) for this Project will be undertaken in accordance with the Mozambican legislation, specifically with the requirements provided in *Article 19, Section III, Chapter II, of Decree 56/2010* of 22 November and in compliance with the Guidelines for the Public Participation Process (Ministerial Diploma No.130/2006 of 19 July).

In addition to aligning with national standards, Sasol has committed to undertaking the engagement process in line with relevant international good practice, specifically the International Finance Corporation's Performance Standards (IFC PS). IFC requirements place an emphasis on broad engagement and disclosure of findings to stakeholders (*Box 4.1*) and require a stakeholder engagement plan to be developed.

As part of a previous EIA process undertaken by Sasol for exploration activities in the offshore Blocks 16 and 19, a Stakeholder Forum was constituted in the Project Area to allow for a group of stakeholder representatives to closely monitor the EIA process through closer engagement with the consultants and Sasol. The previous Forum appointed the Southern African Institute for Environmental Assessment (SAIEA) (represented by Peter Tarr) to provide them with the technical support to review the draft EIR and to provide comfort that Sasol's consultants had been objective in conducting the EIA process. The Forum and the peer review process facilitated a greater degree of transparency and trust in the EIA process for Block 16 and 19 and it is anticipated that this will also be achieved for this Project. Sasol has therefore committed to establishing a Stakeholder Forum for the EIA process (discussed in more detail in *Chapter 5*) for this Project as well as to submit the EIA process to an independent peer review (discussed in more detail in *Section 4.4*).

Box 4.1***Definition of Stakeholders***

Stakeholders include those individuals, groups or organisations who themselves could be directly affected by the Project (Project - affected people) and those individuals or organisations who, although not directly affected by the Project, represent those affected or have a regulatory duty, an interest, influence or secondary involvement in the Project (secondary stakeholders).

For this Project, ERM has appointed the SAIEA, represented by Peter Tarr, to support the Forum in the technical review of this Scoping Report, the EIR and specialist studies and to ensure that the scope and EIA process followed for the Project are objective and quality focussed. The SAIEA is a non-profit Environmental Trust, whose mission is to support sustainable development in Southern Africa through promoting the effective and efficient use of Environmental Assessment as a planning tool.

ERM has also appointed Madalena Dray, an environmental consultant with many years of relevant experience in Mozambique, to peer review the stakeholder engagement and the Stakeholder Forum processes. Madalena Dray will provide assurance to stakeholders that issues they raise are addressed in the public participation process reports and that their views, opinions and concerns are considered in the development of the EIR and relevant mitigation measures.

The peer reviewers' comments will be shared with stakeholders to provide reassurance of the quality of the reports and the environmental assessment process followed.

Consultation with stakeholders will be undertaken at a number of stages during the evolution of the Project. An overview of the PPP for this Project is summarised in *Chapter 5* of this document.

4.5 **SPECIALIST STUDIES (BASELINE DATA COLLECTION)**

Issues identified during the Scoping Phase of the EIA process will be assessed, so as to understand what receptors and resources will be *significantly* affected by the Project. Specialist studies will also describe baseline conditions that will influence the assessment of both social and environmental impacts. The description of the baseline will be aimed at providing sufficient detail to meet the following objectives:

- Identify the key conditions and sensitivities in areas potentially affected by the Project ;
- Provide a basis for extrapolation of the current situation and the development of future scenarios without the Project;
- Provide data to aid the prediction and evaluation of possible impacts of the Project;
- Understand stakeholder concerns, perceptions and expectations regarding the Project;
- Facilitate the development of appropriate mitigation measures later in the EIA process; and
- Provide a benchmark against which future changes and the effectiveness of mitigation measures can be assessed.

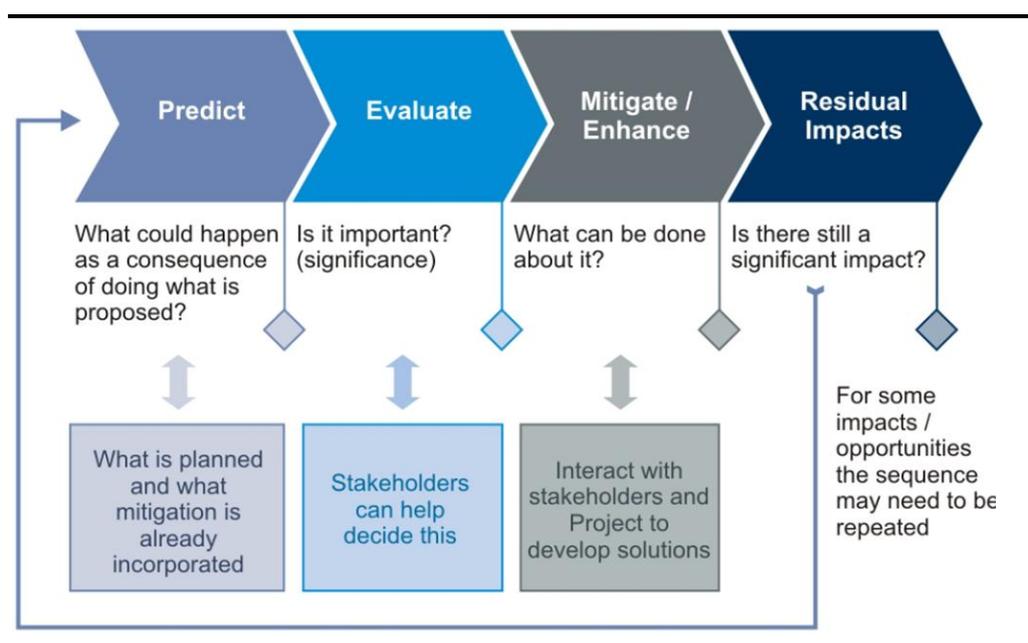
The Terms of Reference for each of the specialist studies required for this Project are described in *Chapter 9*.

4.6 **ASSESSMENT OF IMPACTS AND MITIGATION**

The impact assessment stage comprises a number of steps that collectively assess the manner in which the proposed Project will interact with elements of the physical, biological, cultural or human environment to produce impacts to resources/receptors.

The process of predicting and evaluating impacts and development of mitigation measures is iterative, and informs and runs in parallel with the design of the Project. The process also links in with consultation and stakeholder input regarding the significance of impacts and the suitability of proposed mitigation measures. This process is illustrated in *Figure 4.2*. Following the detailed assessments, the impacts to each social and environmental resource / receptor will be presented in three stages: (i) the potential impact is described; (ii) the mitigation committed to by Sasol is outlined; and (iii) the residual impact (that remaining after mitigation) is described and assigned a significance level.

Figure 4.2 *Predictions, Evaluation and Mitigation of Impacts*



The steps involved in the prediction, evaluation and mitigation of impacts are described in greater detail below.

4.6.1 *Impact Prediction*

The impact assessment process describes what will happen by predicting the magnitude of impacts and quantifying these to the extent practicable. The term ‘magnitude’ is used as shorthand to encompass all the dimensions of the predicted impact including:

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

Magnitude therefore describes the actual change that is predicted to occur in the resource or receptor (eg the area and duration over which air may become polluted and the level of increase in concentration, and the degree and probability of impact on the health of a local community).

The impact characteristic terminology to be used during the impact assessment is summarised in *Table 4.1*.

Table 4.1 *Impact Characteristic Terminology*

Characteristic	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect).	<ul style="list-style-type: none"> • Direct • Indirect • Induced
Extent	The “reach” of the impact (eg confined to a small area around the Project Footprint, projected for several kilometres, etc.).	<ul style="list-style-type: none"> • Local • Regional • International
Duration	The time period over which a resource / receptor is affected.	<ul style="list-style-type: none"> • Temporary • Short-term • Long-term • Permanent
Scale	The size of the impact (eg the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	[no fixed designations; intended to be a numerical value]
Frequency	A measure of the constancy or periodicity of the impact.	[no fixed designations; intended to be a numerical value]

When categorising an impact, it is important to note that this process will take into account any control measures that are already part of the project design. Additional mitigation measures aimed at further reducing the significance of impacts will also be proposed where necessary or appropriate.

In the case of *type*, the designations are defined universally (ie the same definitions apply to all resources/receptors and associated impacts). For these universally-defined designations, the definitions are provided in *Table 4.2*.

Table 4.2 *Designation Definitions*

Designation	Definition
Type	
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (eg between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (eg viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (eg influx of camp followers resulting from the importation of a large Project workforce).
Extent	
Local	Defined on a resource/receptor-specific basis.
Regional	
International	
Duration	
Temporary	Defined on a resource/receptor-specific basis.
Short-term	
Long-term	
Permanent	

An additional characteristic that pertains only to unplanned events (e.g., traffic accident, accidental release of toxic gas, community riot, etc.) is likelihood. The likelihood of an unplanned event occurring is designated using a qualitative (or semi-quantitative, where appropriate data are available) scale, as described in *Table 4.3*.

Table 4.3 *Definitions for Likelihood Designations*

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (ie it is essentially inevitable).

In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity/vulnerability/importance of the impacted resource/receptor. There are a range of factors to be taken into account when defining the sensitivity/vulnerability/importance of the resource/receptor, which may be physical, biological, cultural or human.

Where the resource is physical (for example, a water body) its quality, sensitivity to change and importance (on a local, national and international scale) are considered. Where the resource/receptor is biological or cultural (for example, the marine environment or a coral reef), its importance (for example, its local, regional, national or international importance) and its sensitivity to the specific type of impact are considered. Where the receptor is human, the vulnerability of the individual, community or wider societal group is considered.

Other factors may also be considered when characterising sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value.

4.6.2 *Evaluating Significance*

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor has been characterised, the significance can be assigned for each input. Impact significance will be determined using the matrix shown in *Table 4.4*. In the case of impacts resulting from unplanned/ accidental events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor as described in *Table 4.3* is considered, together with the other impact characteristics, when assigning a magnitude designation.

Table 4.4 *Impact Significance*

Evaluation of Significance		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major
	Positive Impacts			
	Positive	Minor	Moderate	Major

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor- or impact-specific considerations are factored into the assignment of magnitude and sensitivity designations that enter into the matrix. *Box 4.2* provides a context for what the various impact significance ratings signify.

An impact of *negligible* significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of *minor* significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of *moderate* significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of *major* significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of impact assessment is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (ie ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

4.6.3

Mitigation of Impacts

Once the significance of a given impact has been characterised using the above matrix, the next step is to evaluate what mitigation measures are warranted. In keeping with the Mitigation Hierarchy, the priority in mitigation is to first apply mitigation measures to the source of impact (ie to avoid or reduce the magnitude of the impact from the associated project activity), and then to address the resultant effect to the resource/receptor via abatement or compensation measures or offsets (ie to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

It is important to note that it is not an absolute necessity that all impacts be mitigated to the lowest level of significance; rather in certain cases it may be acceptable to mitigate impacts to an ALARP (As Low As Reasonably Practicable) level.

Once mitigation measures are declared, the next step is to assign residual impact significance. This is essentially a repeat of the impact assessment steps, assuming the implementation of the additional declared mitigation measures.

4.6.4 *Dealing with Uncertainty*

Even with a final design and an unchanging environment, impacts are difficult to predict with certainty. Where such uncertainties are material to EIA findings, they will be clearly stated and conservatively approached ('the precautionary approach') in order to identify the broadest range of likely residual impacts and necessary mitigation measures.

Potential impacts may be assessed using tools ranging from quantitative techniques such as hydrodynamic modelling to qualitative techniques based on expert judgment and historical information. The accuracy of these assessment tools depends on the quality of the input data and available information and the experience of the study team. Where assumptions have been made, the nature of any uncertainties associated with the assumption is discussed. For qualitative predictions/assessments, some uncertainty is removed through consultation.

4.6.5 *Cumulative Impacts*

Cumulative impacts are those that arise as a result of an impact from the Project interacting with the impact of another activity to create an additional, larger, impact. The approach for assessing cumulative impacts is influenced by the availability of information about the impact of the other activity, and whether or not it already exists or is only proposed. Any cumulative impacts to which the Project may contribute will be assessed where practical.

4.6.6 *Management and Monitoring*

Management and monitoring measures need to be defined in order to identify whether:

- Impacts or their associated Project components remain in conformance with applicable standards, and
- Mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing impacts to the extent predicted.

This step may include additional elements, such as identification of the individuals responsible for implementing mitigation measures and assurance mechanisms for use in verifying proper implementation of mitigation measures.

4.6.7 *Environmental Impact Report*

The results of the specialist studies and the assessment of the impacts of the proposed activities will be integrated into an Environmental Impact Report (EIR). The report will be prepared in accordance with Article 12 of the EIA Regulations.

The EIR will assess the potential impacts associated with the proposed Project, and will provide recommendations on the mitigation of negative impacts and enhancement of positive impacts.

4.6.8 *Environmental Management Plans.*

As part of the PSA Development and LPG Project Sasol has developed the following EMPs:

- Construction Environmental Management Plan (C-EMP) - CPF Complex.
- Construction Environmental Management Plan (C-EMP) - Infrastructure Construction of the Infrastructure associated with the PSA Development and LPG Project, including Well-sites, Flowlines, Trunklines and Access Roads (excluding Well Drilling) in Inhambane Province, Mozambique.
- Operations Environmental Management Plan (O-EMP) - Operation of the Central Processing Facility, PSA Liquids and LPG Plant, Production Wells, Flowlines and Access Roads Inhambane Province, Mozambique.

These EMPs will be reviewed and updated to include the mitigation measures stipulated in the EIR. Where required, new EMPs will be developed to include the mitigation measures for offshore activities. These mitigation measures will be written as clear practical measures applicable to local conditions in the EMP.