

Environmental Impact Assessment (EIA) for the proposed construction,
operation and decommissioning of the Saldanha Regional Marine Outfall
Project of Frontier Saldanha Utilities (Pty) Ltd. at Danger Bay
in the Saldanha Bay region

FINAL EIA REPORT

CHAPTER 7: PLAN OF STUDY FOR EIA



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CHAPTER 7. PLAN OF STUDY FOR EIA

7.1 IDENTIFICATION OF ISSUES

The DEAT General Guide to the EIA Regulations (Guideline 3, 2006) states that when the competent authority has accepted the Scoping Report and Plan of Study for EIA, the EIA phase may commence. The purpose of the EIA phase is to:

- Address issues that have been raised through the Scoping Process;
- Assess alternatives to the proposed activity in a comparative manner;
- Assess all identified impacts and determine the significance of each impact; and
- Recommend actions to avoid/mitigate negative impacts and enhance benefits.

The Plan of Study for EIA (PSEIA) sets out the process followed in the EIA phase and is shaped by the findings of the Scoping process. The EIA phase consists of three parallel and overlapping processes:

- Assessment process involving the authorities where inputs are integrated and presented in documents that are submitted for approval by authorities (Sections 7.2 and 7.4);
- Public participation process whereby findings of the EIA phase are communicated and discussed with I&APs and responses are documented (Section 7.3); and
- Specialist studies that provide additional information required to address the issues raised in the Scoping phase (Sections 7.5 and 7.6).

7.2 OVERVIEW OF APPROACH TO PREPARING THE EIA REPORT AND EMP

The Draft EIR was released for a 40-day I&AP and authority review period, as outlined in Sections 7.3 and 7.4. All I&APs on the project database were notified in writing of the release of the Draft EIR for review. During this review period a Public Open Day was held on 13 November 2014 as well as Focus Group Meetings with key I&APs. The purpose of these meetings was to provide an overview of the outcome and recommendations from the specialist studies, as well as provide opportunity for comment. Comments raised through written correspondence (letters, emails and comments forms) are captured in a Comments and Responses Trail in Chapter 6 of the FEIAR. Comments raised were responded to by the CSIR EIA team and/or the applicant. All the comments received are included in Appendix G of the FEIAR.

The attendance registers and notes of the Focus Group Meetings held after the release of the Draft EIA Report for comment are included in Appendix H of this report. The following Focus Group Meetings were held after the release of the Draft EIA Report:

STAKEHOLDER	DATE
Jacobsbaai Sea Products and Jacobsbaai Residents and Rate Payers Association	30 October 2014
Saldanha Bay Municipality	13 November 2014
Jacobsbaai ward councillor	13 November 2014
Department of Environmental Affairs and Development Planning (DEA&DP), CapeNature, Mr Nick Helme of <i>Nick Helme Botanical Surveys</i>	12 March 2015

The results of the specialist studies and other relevant project information were synthesised and integrated into the Final EIA Report (FEIAR). The FEIAR includes a Draft Environmental Management Programme (EMPR), which was prepared in compliance with the relevant regulations. This EMPR is based broadly on the environmental management philosophy presented in the ISO 14001 standard, which embodies an approach of continuous improvement. Actions in the EMP were drawn primarily from the management actions identified in the specialist studies for the construction and operational phases of the project. If the pipeline and electrical corridor components are decommissioned or re-developed, this will need to be done in accordance with the relevant environmental standards and clean-up/ remediation requirements applicable at the time.

The FEIAR will be released for an additional 30-day public review period. Comments on the FEIAR will be submitted to Shawn Johnston of *Sustainable Futures*. The comments will then be submitted with the FEIAR to DEA&DP for decision-making.

7.3 PUBLIC PARTICIPATION PROCESS

The key steps in the public participation process for the EIR phase are described below. The participation process for the Scoping Process is described in Section 5.3 of Chapter 5 of this report.

Task 1: Review of Draft EIR and EMP

The first stage in the process entailed the release of the Draft EIR for a 40-day public and authority review period. Relevant organs of state and I&APs were informed of the review process in the following manner:

- An advertisement was placed in the “Weskus Media” on 23 October 2014 (see Appendix E1);

- A letter (Letter 4) was sent to all I&APs (including authorities), with notification of the 40-day public review period for the Draft EIR and invitation to attend the Public Open Day;
- A Public Open Day on the Draft EIR was held at the Blue Water Bay Lodge in Saldanha Bay on 13 November 2014. Key findings of the Draft EIA were communicated and I&APs had the opportunity to provide comments and engage with the EIA team and project proponent (see attendance register and notes of the Public Open Day in Appendix H); and
- Focus Group Meeting(s) with I&APs were held on 30 October 2014 , 13 November 2014 and 12 March 2015 (see Appendix I for the attendance registers and notes of the Focus Group Meetings).

The Draft EIR and Draft EMP were made available and distributed through the following mechanisms to ensure access to information on the project and to communicate the outcome of specialist studies:

- Copies of the report were placed at the Saldanha Bay and Louwville (Vredenburg) Public Libraries and at the Jacobsbaai Ratepayers and Residents Association office;
- I&APs on the database received notification of the Draft EIR via email or letters where possible;
- Relevant organs of state and key I&APs were provided with a hard copy and/or CD of the report; and
- The Report was placed on the project website: www.csir.co.za/eia/frontier_marine_outfall_pipeline.html

Task 2: Comments and Responses Trail

A key component of the EIA process is documenting and responding to the comments received from I&APs and the authorities. Comments on the Draft EIR and EMP were received through:

- Written, faxed and email comments (e.g. letters and completed comment forms);
- Comments made at the Public Open Day;
- Comments made at Focus Group Meetings;
- Telephonic communication with the public facilitator (Mr Shawn Johnston of Sustainable Futures); and
- One-on-one meetings with key authorities and/or I&APs.

The comments received were compiled into a Comments and Responses Trail contained in Chapter 6 of the FEIAR. The comments received were considered by the EIA team (Frontier, CSIR, Sustainable Futures and the specialists) and appropriate responses were provided by the relevant member/s of the EIA team.

Task 3: Compilation of Final EIAR for public review

The FEIAR was prepared, including the Comments and Responses Trail and EMP, and is hereby submitted to all registered I&APs for a 30- day review period. Letter 5 will be sent to all I&APs on the project database notifying them of the release of the FEIAR for comment. The FEIAR will be distributed as follows:

- Copies of the report will be placed at the Saldanha Bay and Louwville (Vredenburg) Public Libraries and at the Jacobsbaai Ratepayers and Residents Association office;
- All I&APs (including organs of state) on the database will be notified of the FEIAR via email and letters where possible;
- Relevant organs of state and key I&APs will be provided with a hard copy and or CD of the report; and the
- Report to be placed on the project website: www.csir.co.za/eia/frontier_marine_outfall_pipeline.html

Task 4: Compilation of Final EIAR for submission to authorities for decision-making

Following the closure of the review period of the FEIAR, the FEIAR including the Comments received from I&APs and the responses thereto will be submitted to the DEA&DP for decision making.

Task 5: Environmental Decision and Appeal Period

All I&APs on the project database will receive notification of the issuing of the Environmental Decision and the appeal period. Although the project was undertaken under the 2010 NEMA Regulations, the 2014 National Appeal regulations apply to this project. In terms of these Appeal Regulations (Section 4(1) of Chapter 2), the appellant has 20 days to submit an appeal from:

- (a) the date that the notification of the decision for an application for an environmental authorisation or a waste management licence was sent to the registered interested and affected parties by the applicant; or
- (b) the date that the notification of the decision was sent to the applicant by the competent authority, issuing authority or licensing authority, in the case of decisions other than those referred to in paragraph (a).

The following process will be followed for the distribution of the Environmental Decision and notification of the appeal period:

- Copies of the Environmental Decision will be placed at the Saldanha Bay and Louwville (Vredenburg) Public Libraries and at the Jacobsbaai Ratepayers and Residents Association office;
- All I&APs (including organs of state) will be notified of the Environmental Decision and Appeal period via email and or letters where possible;
- Letter 7 to be sent to all I&APs (including organs of state), with a copy of the Environmental Decision and information on the Appeal Period;
- Environmental Decision to be placed on the project website: www.csir.co.za/eia/frontier_marine_outfall_pipeline.html; and
- All I&APs on the project database will be notified of the outcome of the appeal period, this notification will be included in Letter 8 to I&APs.

7.4 AUTHORITY CONSULTATION DURING THE EIA PHASE

Authority consultation is integrated into the public consultation process, with additional one-on-one meetings held with the lead authorities where necessary. It is proposed that DEA&DP as well as other lead authorities will be consulted at various stages during the EIA process. The authority consultation process for the Scoping Process is outlined in Chapter 5 of this report. Table 7.1 below indicates the proposed consultation schedule for the EIA phase.

Table 7.1 Authority communication schedule

STAGE IN EIA PHASE	FORM OF CONSULTATION
Following the release of the Draft EIA Report	<ul style="list-style-type: none">• Focus Group Meeting with DEA&DP and CapeNature on 12 March 2015.• Focus Group Meeting with Saldanha Bay Municipality on 13 November 2014;• Focus Group Meeting with Tabakbaai Ward Councillor and member of Ward Committee on 13 November 2014

7.5 APPROACH TO SPECIALIST STUDIES AND IMPACT ASSESSMENT

This section outlines the assessment methodology and legal context for specialist studies, in accordance with *Section 3: Assessment of Impacts*, in DEAT Guideline 5, June 2006.

7.5.1 Generic Terms of Reference for the assessment of impacts

The identification of potential impacts should include impacts that may occur during the construction and operational phases of the activity. The assessment of impacts is to include direct, indirect as well as cumulative impacts.

In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed activity is well understood so that the impacts associated with the activity can be assessed. The process of identification and assessment of impacts will include:

- Determine the current environmental conditions in sufficient detail to provide a baseline against which impacts can be identified and measured;
- Determine future changes to the environment that may occur if the activity does not proceed;
- An understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

As per DEAT *Guideline 5: Assessment of Alternatives and Impacts* the following methodology is to be applied to the predication and assessment of impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
- **Spatial extent** – The size of the area that will be affected by the impact:
 - Site specific
 - Local (less than 2 km from site)
 - Regional (within 30 km of site)
 - National
 - International (important for migrant birds)
- **Intensity** – The anticipated severity of the impact:
 - High (severe alteration of natural systems, patterns or processes)
 - Medium (notable alteration of natural systems, patterns or processes)
 - Low (negligible alteration of natural systems, patterns or processes).

- **Duration** – The timeframe during which the impact will be experienced:
 - Temporary (less than 1 year)
 - Short term (1 to 6 years)
 - Medium term (6 to 15 years)
 - Long term (the impact will cease after the operational life of the activity)
 - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).
- **Reversibility** – The “reversibility” of the environmental impacts of the proposed development after project cessation or decommissioning (‘High’ representing a ‘positive’ value and ‘Low’ representing a ‘negative’ value):
 - High (the alteration of natural systems can be reversed to an extent that represents similar or better environmental conditions, pre-development - through rehabilitation)
 - Medium (alteration of natural systems can be reversed to some extent)
 - Low (it is unlikely that the alteration of natural systems can be reversed)
- **Irreplaceability** – The “replaceability” of the natural characteristics in the area that may be impacted upon the proposed development:
 - High (high irreplaceability means that the opportunity to replace or restore systems that are affected by the proposed development will be in very short supply and the site will not recover to its original state);
 - Medium (alteration of natural systems, patterns or processes may be able to be replaced); and
 - Low (the site does most likely not represent a particularly sensitive system and can be replicated or replaced).

Using the criteria above, the impacts will further be assessed in terms of the following:

- **Probability** –The probability of the impact occurring:
 - Improbable (little or no chance of occurring)
 - Probable (less than 50% chance of occurring)
 - Highly probable (50 – 90% chance of occurring)
 - Definite (greater than 90% chance of occurring).
- **Significance** – Will the impact cause a notable alteration of the environment?

○ **Low to very low** (the impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);

○ **Medium** (the impact will result in a moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated); and

○ **High** (the impacts will result in a major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making).

- **Status** - Whether the impact on the overall environment will be:
 - positive - environment overall will benefit from the impact
 - negative - environment overall will be adversely affected by the impact
 - neutral - environment overall not be affected.
- **Confidence** – The degree of confidence in predictions based on available information and specialist knowledge:
 - Low
 - Medium
 - High
- **Management Actions and Monitoring of the Impacts (EMP)**
 - Where negative impacts are identified, mitigation measures will be identified to avoid or reduce negative impacts. Where no mitigation measures are possible this will be stated;
 - Where positive impacts are identified, measures will be identified to potentially enhance positive impacts; and
 - Quantifiable standards for measuring and monitoring mitigation measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

Table 7.2 below is to be used by specialists for the rating of impacts.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts will be evaluated for the construction and operation phases of the development. The assessment of impacts for the decommissioning phase will be brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- The impact evaluation will, where possible, take into consideration the cumulative effects associated with this and other facilities/projects which are either developed or in the process of being developed in the local area;
- The 'no-go alternative' ('no-development alternative') must be considered;
- The Western and Eastern Jacobsbaai Road Corridors must be assessed;
- The Marine Ecological study must also assess the co-disposal option with the West Coast District Municipality Desalination Plant.
- The impact assessment will attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

Table 7.2 Table to be used by specialists to assess potential impacts of the SRMO Project during the construction or operational phases.

Nature of impact	Status (Negative or positive)	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceability	Significance (no mitigation)	Mitigation/Management Actions	Significance (with mitigation)	Confidence level
CONSTRUCTION PHASE											
Scenario 1: Vegetation loss during construction											
1.1 Temporary loss of vegetation cover in the construction footprint and lay down area	Negative	Local , i.e. less than 2 km of turbine	Short , i.e. within 5 days of a release	High , since there will be severe alteration of the natural system	Highly probable , since construction cannot progress if vegetation is not cleared.	High , post decommissioning the vegetation can easily be restored	Low , the vegetation consists of low ecological biodiversity with no threatened species, consists of species easily rehabilitated	Medium , since impact could be mitigated	Demarcate the construction footprint with tape and ensure workers stay within this area, wherever practical. Educate workers on the need to stay on paths and established tracks wherever practical. If possible, establish lay down areas in degraded areas. Construction protocols will require top soil to be removed and separately stored from sub-soil.	Low , since the areas will be rehabilitated after construction	High , since the prediction is made on available information
OPERATIONAL PHASE											
Scenario ...: ...											

7.6 POTENTIAL ISSUES AND TERMS OF REFERENCE FOR THE SPECIALIST STUDIES

The following specialist studies were undertaken during the EIA phase.

Table 7.3 Specialist Studies undertaken as part of the EIA for the proposed SRMO Project

EIA SPECIALIST TEAM		
Dr Andrea Pulfrich Pisces Environmental Services (Pty) Ltd	Marine Ecology	Ph.D. Fisheries Biology. She is a member of the South African Council for Natural Scientific Professions. She has 26 years of experience in marine ecology and has been party to a number of specialist studies including desalination plants (e.g. NamWater and Areva, Namibia) that have that have been undertaken on the west coast of southern Africa.
Nick Helme Nick Helme Botanical Surveys	Terrestrial Ecology (Fauna and Flora)	B.Sc. Botany and a Registered with the South African Council for Natural Scientific Professions. Nick has undertaken over 30 different botanical assessments within the West Coast District Municipality and the Saldanha Bay region in the last 8 years.
Luanita van der Walt CSIR	Wetlands	M.Sc. Environmental Sciences. Her M.Sc focussed on the biogeochemical landscape functionality, plant species diversity, and plant functional diversity of fragmented grasslands. Luanita extracted the relevant findings from the Freshwater Ecological study that was prepared by Dr Liz Day of <i>The Freshwater Group</i> for the proposed WCDM desalination plant EIA (Day, 2014), for the purposes of the SRMO Project EIA.
Henry Holland MapThis (Pty) Ltd	Visual	M.Sc. Geology. Henry is a visual specialist who has done visual studies for several industrial developments, utilising GIS and computer simulation skills in his work. Mr Holland has undertaken the visual impact assessment for the proposed WCDM desalination plant EIA.
John Pether University of Cape Town	Palaeontology	M.Sc. Earth Science. John is registered with the South African Council for Natural Scientific Professions. He has extensive experience with working on the west coast of South Africa.
Dr Jayson Orton ASHA Consulting	Archaeology	D.Phil. Archaeology (Oxon). ASAPA professional accreditation. Jayson has been actively involved in a wide range projects spanning the west coast region.
Dr Hugo van Zyl Independent Economic Researchers	Economics	Ph.D. Economics. Hugo has been involved in over 50 appraisals of infrastructure projects, industrial developments, land use changes, conservation projects and eco-tourism initiatives throughout Southern Africa.
SUPPORTING TECHNICAL STUDIES		
Francois Smit WorleyParsons RSA Independent Review by WSP Group Africa (Pty) Ltd	Marine Modelling/ Hydrodynamics	MEng (Civil), University of Stellenbosch, 1991. Francois Smit is a Coastal Engineer with twenty years' experience in coastal engineering, including three with WorleyParsons. Experience includes coastal zone management, coastal monitoring, coastal processes modelling and waterfront and coastal structures design. Specific expertise includes coastal measurement and monitoring, including ADCP, coastal imaging (video) and laser (LIDAR) technologies; wave climate and design condition assessments; harbour/marina/waterfront planning and design; shoreline stability assessment; coastal asset condition surveys; temporary and/or innovative coastal protection methods, including artificial surf reefs and

		<p>geo-containers; computational and physical modelling of coastal processes, including surf zone turbulence and suspended sediment transport, wave and wind-induced hydrodynamics, coastal response and marine water quality.</p> <p>The Hydrodynamic Modelling study was independently reviewed by WSP.</p>
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The Terms of Reference (ToRs) for the specialist studies consisted of the generic assessment requirements and the specific issues identified for each study. These issues have been identified through the baseline studies, I&AP and authority consultation, as well as input from the proposed specialists based on their experience.

It should be noted that all the specialists were requested to assess the Jacobsbaai Western and the Jacobsbaai Eastern pipeline routing corridors. The specialists were also requested to assess cumulative impacts and the No-Development Alternative. The impacts identified for each impact, the assessment thereof and the proposed mitigation measures are included in Chapter 8 of this FEIAR. The actual specialist studies are included as appendices in Volume II of this report.

7.6.1 Marine Ecology

Pisces Environmental Services (Pty) Ltd will undertake the Marine Ecological study for the proposed Frontier SRMOP. The Marine Specialist Report comprised a desktop study which was undertaken in terms of the following TOR:

- A description of the baseline marine biology in the project area, emphasising, but not limited to, sensitive and threatened habitats, and threatened or rare marine fauna and flora. All pertinent characteristics of the marine environment will be described including amongst others the following components:
 - Marine Baseline Conditions
 - Waves, Tides and Currents
 - Surf-zone Currents and Processes
 - Upwelling
 - Nutrients
 - Turbidity
 - Organic Inputs
 - Low Oxygen Events
 - Rocky shore Communities
 - Sandy beach Communities
 - Pelagic Communities
 - Marine Mammals and seabirds
 - Extractive and non-extractive uses of the area and Future-use scenarios.
- A review and expert interpretation of all relevant, available local and international publications and information sources on the disturbances and risks associated with

hypersaline effluents, waste water discharges and the potential toxicity and behaviour of Rare Earth Elements (REEs) in the marine environment;

- Identification and description of all factors resulting from the SRMO that may influence the marine and coastal environments in the region, based on existing information;
- An assessment of the impacts of the proposed marine outfall on the marine biology of the project area. All identified marine and coastal impacts will be summarised, categorised and ranked in appropriate EIA tables, to be incorporated in the overall EIA. The significance of the impacts will be rated according to the impact assessment methodology specified by the lead consultant for the EIA process;
- An assessment of the various alternatives and scenarios, including the following:
 - a. Scenario 1: Discharge into Danger Bay through pipeline Option 1 (sandy beach west end of Danger Bay); discharge of the SRMO effluent only;
 - b. Scenario 1: Discharge into Danger Bay through pipeline Option 2 (sandy beach in centre of Danger Bay); discharge of the SRMO effluent only; and
 - c. Scenario 2: Co-discharge with a hypersaline brine from the proposed WCDM desalination plant.
- Recommendations for mitigation and monitoring of impacts; and
- Compilation of an EMP for the marine aspects of the operational phase of the effluent disposal system.

The EMP produced will define management objectives and set management standards for each marine issue identified as requiring management. These will be based on :

- Applicable environmental laws;
- Relevant water quality guidelines; and
- ISO14001 standard for Environmental Management Systems

The EMP will cover the marine aspects of the proposed Frontier Saldanha Regional Marine Outfall Project, and will include:

- environmental management recommendations and mitigation actions for the construction and operational phases;
- legal and international environmental best practise and administrative requirements; and
- recommendations for monitoring programmes to be implemented once the pipeline is operational.

7.6.2 Terrestrial Ecology (including Fauna and Flora)

The study area is within the planning domain of the Saldanha Fine Scale Conservation Plan (Pence 2008), which has identified and mapped Critical Biodiversity Areas (CBAs) throughout the region. Faunal sensitivity is expected to mirror the botanical sensitivity.

The Terms of Reference (ToR) for this study is the following:

- Describe the vegetation and fauna along the study area, and note the presence or likelihood of locally and regionally endemic plant species and plant and faunal Species of Conservation Concern (SCC; previously known as Red Data Book species);
- Assess the local (Saldanha) and regional (West Coast) conservation value of the study area, referring to specialist knowledge and to the National Spatial Biodiversity Assessment (NSBA, Rouget *et al.* 2004) and to CapeNature's Fine Scale Conservation Plan for the Saldanha Municipality (Pence 2008);
- Identify and assess the likely botanical and faunal impacts as a result of the proposed infrastructure development;
- Provide recommendations for the mitigation of the issues identified, where possible; and
- Assess the two pipeline routing corridors, i.e. the Jacobsbaai Eastern and Western Corridors and indicate the preferred alternative, from a terrestrial ecological perspective.

7.6.3 Wetlands

The proposed SRMO pipeline routing options lie within DWA quaternary catchment G10M, in the Berg River Water Management Area. Two wetlands have been identified that may potentially be impacted by the project. One of the wetlands assessed in this study (Wetland 1) lies within minor catchments, which either dissipates or drains directly into the sea to the west. The other assessed area (Wetland 2) is situated in the catchment of the Bok River, which flows south into Saldanha Bay.

The TOR are as follow:

- Identify wetlands that will potentially be affected by the proposed construction and operation of the pipeline;
- Assess the condition, PES and Ecological Importance of these wetlands;
- Determine and assess the potential negative as well as any positive impacts that could result from the proposed crossings of the wetlands, and include mitigation measures where appropriate;
- Report briefly on potential impacts and recommended mitigation measures in terms of
 - Pre-construction (planning and layout)
 - Construction
 - Operational phases.

7.6.4 Visual

The potential impacts of the proposed development on the landscape will depend on the landscape quality and the landscape character sensitivity.

A number of factors are used to assess the magnitude and significance of the potential visual impact of a development:

- Potential visibility of the development;
- Sensitivity of visual receptors to changes in the quality of their views;
- Distance of the development from sensitive viewers (visual exposure);
- Compatibility of the development with the 'sense of place' of the area (visual intrusion);

Potential visual impacts will be discussed in terms of these factors for construction and operational phases.

The following TOR have been specified for the specialist:

- Conduct a rapid desktop review of available information that can support and inform the specialist study;
- Characterise the visual character of the area and visual absorption capacity;
- Define and present relevant viewsheds highlighting the varying sensitivities of the viewsheds;
- Assess the potential impact, both positive and negative, as well as potential cumulative impacts, associated with the proposed project for the construction, operation and decommissioning phases;
- Identify management actions to avoid or reduce negative impacts; and to enhance positive benefits of the project;
- Develop a monitoring programme to be included in the EMP.

The specialist was required to assess the impacts for the Jacobsbaai Western and Eastern Corridors.

7.6.5 Archaeology

Archaeological resources are extremely common and generally well researched on the Vredenburg Peninsula.

ASHA Consulting was requested to produce an integrated Heritage Impact Assessment (HIA) that addresses archaeology, palaeontology, built environment, graves, cultural landscapes and scenic routes. The palaeontological specialist study was undertaken by another specialist, John Pether, and supplied to ASHA for the purposes of integration.

During the EIR phase certain areas were subjected to a detailed foot survey, while other parts were considered from the vehicle only. The fieldwork took place on 30th July 2014. During the survey the positions of finds were recorded on a hand-held GPS receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

The HIA for the WCDM desalination plant (Orton 2012) examined some of the same ground through which the present project would run. For this reason, fieldwork was restricted to those areas that had not been examined in the earlier survey

7.6.6 Palaeontology

The pipeline routes are in the Langebaan Formation [calcareous aeolianites (old dune sands) and calcretes (“surface limestones”)]. These strata do not appear to be very fossiliferous to the cursory eye, but the fossils that have been found are of profound scientific value, raising international interest in the region. The Langebaan Formation aeolianites have been a prime source of information on Quaternary faunas and archaeology.

The assessment was based on the published scientific literature on the origin and palaeontology of the Saldanha coastal-plain deposits and the author’s field experience of the formations involved and their fossil content.

The TOR for this desktop study is the following:

- Review of provided plans and data on proposed development, e.g., location of footprints and scale of bulk earth works envisaged;
- Desktop review of all relevant palaeontological and geological literature and application of specialist knowledge of the proposed area;
- Identify and rank sensitivities of fossil heritage within project area with respect to the proposed development; and
- Make specific recommendations for palaeontological mitigation, for inclusion in the Construction EMP, including a “Fossil Finds Procedure”.

7.6.7 Economics

The approach involved the following steps in line with accepted assessment practice:

- Investigate the existing economic context within which the project would be established;
- Identify economic impacts;
- Assess economic impacts without mitigation measures;
- Recommend mitigation measures; and
- Re-assess economic impacts with mitigation measures.

In order to establish the existing economic environment affected by the project, information were gathered from the following sources in order to investigate the existing economic situation that would be affected by the project:

- Information generated during consultations with the public and authorities;
- Statistical databases such as Census information; and

- Local economic development and planning documents.

The study would assess the impacts of the project focusing on the local, regional and national scales where relevant. Negative, positive, direct and indirect as well as cumulative impacts would be identified for the construction and operational phases.

Guidance on the approach was taken from the Department of Environmental Affairs and Development Planning (Western Cape) guidelines on economic specialist input to EIA processes (van Zyl *et al.*, 2005).

The TOR are the following:

- Describe the existing economic characteristics/context of the local area and broader region;
- Identify and assess potential economic impacts at local as well as wider scales as relevant. These are expected to include the following:
 - Broad level review of the need and financial viability/risks associated with the project.
 - Degree of fit with local, regional and national economic development visions and plans including water supply plans.
 - Impacts on overall economic development potential in the area including impacts on commercial enterprises nearby the site (incl. tourism, agriculture, mariculture, fisheries and others).
 - Impacts associated with project expenditure on direct and indirect employment and household incomes.
 - Impacts associated with environmental impacts that cannot be mitigated and have economic implications. This would focus on potential negative impacts on neighbouring land owners should they be relevant drawing on the findings of the other specialist studies forming part of the EIA and other relevant sources; and
- Propose and implement additional ToR, if required, based on professional expertise, experience and compliance with the relevant specialist study guidelines and best practice.

7.6.8 Additional technical studies

Additional technical studies were undertaken to inform the EIA process. This includes the Dispersion Modelling study that was undertaken by WorleyParsons. The results of the study was used to inform the Marine Ecological Specialist study that identified potential impacts to the marine environment associated with the construction and operation of the pipeline and the effluent that will be disposed into Danger Bay. The impacts on the marine ecology, the assessment thereof and proposed mitigation measures are included in Chapter 8 of this FEIAR. The actual Marine Ecological Specialist Study is included as Appendix A in Volume II of this report.

The key issues in terms of potential ecological impacts in the marine environment that were to be informed by the brine dispersion modelling study, as well as by inputs from other studies, included:

- altered flows at the discharge location resulting in ecological impacts, e.g. flow distortion/changes at the discharge);
- the effect of elevated salinities in the brines discharged;
- the effect of the discharged effluent having a higher temperature than the receiving environment;
- changes in dissolved oxygen that include:
 - direct changes in dissolved oxygen content due to the difference between the ambient dissolved oxygen concentrations and those in the discharged effluent, and
 - indirect changes in dissolved oxygen content of the water column and sediments due to:
changes in phytoplankton production as a result of changes in nutrient dynamics (both in terms of changes in nutrient inflows and vertical mixing of nutrients),
- the effects of co-discharged waste water constituents; including possible tainting effects affecting both mariculture activities and fish factory processing in the bay(s) or exploited living marine resources;
- changes in remineralisation rates (with related changes in nutrient concentrations in near bottom waters) due to near bottom changes in seawater temperature associated with the brine discharge plume; and
- the potential accumulation of backwash sediments in the vicinity of the discharge and potential effects on dissolved oxygen levels in the near-bottom waters and trace metal concentrations in the sediments, and consequently on the benthic biota in the vicinity of the discharge.

WorleyParsons scope of services specifically included:

- Simulation of effluent discharge from three potential outfall locations as indicated on WorleyParsons' drawing no 277760-CS-DLP-001 Rev B (Refer to Appendix 10 in Part 1 of his report. His report is included as Annexure 2 of Volume III of this FEIAR).
- Simulations of effluent discharge for the following processes from Saldanha Regional Marine Outfall (SRMO) at Outfall Option 1 and 2,
 - (1) SSP
 - (2) SSP +CAPF
 - (3) SSP + CAPF + WWTW
- Assessment of the risk of recirculation of effluent between the discharge outfall and the proposed West Coast District Municipality (WCDM) desalination intake.
- Simulations of effluent discharge for the following processes from combined SRMO and WCDM DP at Outfall Option 4

- (4) SSP + CAPF + WCDM DP
- (5) SSP + CAPF + WWTW + WCDM DP
- Preparation of a report outlining the findings from the simulations in a suitable format for interpretation by the marine ecology specialist, in line with the reporting carried out for the dispersion modelling done for the WCDM Saldanha Bay Desalination EIA.