forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

INVITATION TO BID

BID REFERENCE NUMBER: MLRF192/22

TO APPOINT AN INDEPENDENT SERVICE PROVIDER (SP) AS AN ENVIRONMENTAL CONTROL OFFICER (ECO) BY THE DEPARTMENT OF FORESTRY FISHERIES AND THE ENVIRONMENT (DFFE) / MARINE LIVING RESOURCES FUND (MLRF) IN COMPLIANCE WITH THE STIPULATIONS IN THE ENVIRONMENTAL AUTHORISATION (EA) AND THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE SEA-BASED AQUACULTURE DEVELOPMENT ZONE (ADZ) LOCATED WITHIN ALGOA BAY IN THE EASTERN CAPE, FOR A PERIOD OF THIRTY SIX (36) MONTHS.

Contact person:
Name: Ms Talitha Bikani/ Mr Lwandisa Hoza
Office Telephone No: (021) 402 3260
E-Mail: MLRFTENDERS@DFFE.GOV.ZA

NATIONAL TREASURY CENTRAL SUPPLIER DATABASE (CSD) REGISTRATION INFORMATION

Company name	Supplier registration number	Unique reference number	
			Main contractor
			Sub-contracted/ joint venture comp 1
			Sub-contracted/ joint venture comp 2

CLOSING DATE OF THE BID: 31 JANUARY 2023 AT 11H00

Briefing session:

A compulsory briefing session will be held on the 18th of January 2023 (Wednesday) at 10h00. Link can be requested from MLRFTENDERS@DFFE.GOV.ZA

MS TEAMS DETAILS ARE AS FOLLOWS:

Meeting ID: 316 708 643 282
Passcode: LC2WV7

Drop off Address:
The location of the drop off is: Tender Box, Ground Floor, Foretrust Building, 2 Martin Hammerschlag Way, Foreshore, Cape Town, 8001

PART A
INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (*NAME OF DEPARTMENT/ PUBLIC ENTITY*)					
BID NUMBER:	**MLRF192/22**	CLOSING DATE:	**31 January 2023**	CLOSING TIME:	**11:00**
DESCRIPTION	**TO APPOINT AN INDEPENDENT SERVICE PROVIDER (SP) AS AN ENVIRONMENTAL CONTROL OFFICER (ECO) BY THE DEPARTMENT OF FORESTRY FISHERIES AND THE ENVIRONMENT (DFFE) / MARINE LIVING RESOURCES FUND (MLRF) IN COMPLIANCE WITH THE STIPULATIONS IN THE ENVIRONMENTAL AUTHORISATION (EA) AND THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE SEA-BASED AQUACULTURE DEVELOPMENT ZONE (ADZ) LOCATED WITHIN ALGOA BAY IN THE EASTERN CAPE, FOR A PERIOD OF THIRTHY SIX (36) MONTHS.**				

BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT (*STREET ADDRESS*)

GROUND FLOOR, FORETRUST BUILDING

MARTIN HAMMERSCHLAG WAY

FORESHORE, CAPE TOWN, 8001

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO		**TECHNICAL ENQUIRIES MAY BE DIRECTED TO:**	
CONTACT PERSON	**Ms. Talitha Bikani**	CONTACT PERSON	**Mr Lwandisa Hoza**
TELEPHONE NUMBER	**021-402 3260**	TELEPHONE NUMBER	**021-402 3708**
FACSIMILE NUMBER		FACSIMILE NUMBER	
E-MAIL ADDRESS	**MLRFtenders@dffe.gov.za**	E-MAIL ADDRESS	**MLRFtenders@dffe.gov.za**

SUPPLIER INFORMATION

NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:		**OR**	CENTRAL SUPPLIER DATABASE No:	MAAA
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE	TICK APPLICABLE BOX] ☐ Yes ☐ No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT	[TICK APPLICABLE BOX] ☐ Yes ☐ No	

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES ENCLOSE PROOF]	ARE YOU A FOREIGN BASED SUPPLIER FOR **THE GOODS /SERVICES /WORKS OFFERED?**	☐Yes ☐No [IF YES, ANSWER THE QUESTIONNAIRE BELOW]

QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? ☐ YES ☐ NO

DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO
IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 BELOW.

PART B
TERMS AND CONDITIONS FOR BIDDING

1.	**BID SUBMISSION:**
1.1.	BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
1.2.	**ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR IN THE MANNER PRESCRIBED IN THE BID DOCUMENT.**
1.3.	THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT, 2000 AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
1.4.	**THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (SBD7).**
2.	**TAX COMPLIANCE REQUIREMENTS**
2.1	BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
2.2	BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.
2.3	APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA.
2.4	BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
2.5	IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
2.6	WHERE NO TCS PIN IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
2.7	NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE, COMPANIES WITH DIRECTORS WHO ARE PERSONS IN THE SERVICE OF THE STATE, OR CLOSE CORPORATIONS WITH MEMBERS PERSONS IN THE SERVICE OF THE STATE."

NB: FAILURE TO PROVIDE / OR COMPLY WITH ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.

SIGNATURE OF BIDDER: .....

CAPACITY UNDER WHICH THIS BID IS SIGNED: .....
(Proof of authority must be submitted e.g. company resolution)

DATE: .....

SARS

TAX CLEARANCE

TCC 001

Application for a Tax Clearance Certificate

Purpose

Select the applicable option ..... Tenders ☐ Good standing ☐

If "Good standing", please state the purpose of this application

Particulars of applicant

Name/Legal name (Initials & Surname or registered name)

Trading name (if applicable)

ID/Passport no

Company/Close Corp. registered no

Income Tax ref no

PAYE ref no 7

VAT registration no 4

SDL ref no L

Customs code

UIF ref no U

Telephone no

Fax no

E-mail address

Physical address

Postal address

Particulars of representative (Public Officer/Trustee/Partner)

Surname

First names

ID/Passport no

Income Tax ref no

Telephone no

Fax no

E-mail address

Physical address

Particulars of tender (If applicable)

Tender number

Estimated Tender amount R ,

Expected duration of the tender year(s)

Particulars of the 3 largest contracts previously awarded

Date started	Date finalised	Principal	Contact person	Telephone number	Amount

Audit

Are you currently aware of any Audit investigation against you/the company? YES NO

If "YES" provide details

Appointment of representative/agent (Power of Attorney)

I the undersigned confirm that I require a Tax Clearance Certificate in respect of Tenders or Goodstanding.

I hereby authorise and instruct to apply to and receive from SARS the applicable Tax Clearance Certificate on my/our behalf.

Signature of representative/agent

Date

Name of representative/ agent

Declaration

I declare that the information furnished in this application as well as any supporting documents is true and correct in every respect.

Signature of applicant/Public Officer

Date

Name of applicant/ Public Officer

Notes:

1. It is a serious offence to make a false declaration.
2. Section 75 of the Income Tax Act, 1962, states: Any person who
   (a) fails or neglects to furnish, file or submit any return or document as and when required by or under this Act; or
   (b) without just cause shown by him, refuses or neglects to-
      (i) furnish, produce or make available any information, documents or things;
      (ii) reply to or answer truly and fully, any questions put to him ...

   As and when required in terms of this Act ... shall be guilty of an offence ...
3. **SARS will, under no circumstances, issue a Tax Clearance Certificate unless this form is completed in full.**
4. Your Tax Clearance Certificate will only be issued on presentation of your South African Identity Document or Passport (Foreigners only) as applicable.

PRICING SCHEDULE
(Professional Services)

NAME OF BIDDER: ..... BID NO.: **MLRF192/22**

CLOSING TIME **11H00** CLOSING DATE: **31 JANUARY 2023**

OFFER TO BE VALID FOR **120 DAYS** FROM THE CLOSING DATE OF BID.

ITEM NO	DESCRIPTION	BID PRICE IN RSA CURRENCY **(ALL APPLICABLE TAXES INCLUDED)

TO APPOINT AN INDEPENDENT SERVICE PROVIDER (SP) AS AN ENVIRONMENTAL CONTROL OFFICER (ECO) BY THE DEPARTMENT OF FORESTRY FISHERIES AND THE ENVIRONMENT (DFFE) / MARINE LIVING RESOURCES FUND (MLRF) IN COMPLIANCE WITH THE STIPULATIONS IN THE ENVIRONMENTAL AUTHORISATION (EA) AND THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE SEA-BASED AQUACULTURE DEVELOPMENT ZONE (ADZ) LOCATED WITHIN ALGOA BAY IN THE EASTERN CAPE, FOR A PERIOD OF THIRTHY SIX (36) MONTHS.

1. The accompanying information must be used for the formulation of proposals.

2. Bidders are required to indicate a ceiling price based on the total estimated time for completion of all phases and including all expenses inclusive of all applicable taxes for the project. R.....

3. PERSONS WHO WILL BE INVOLVED IN THE PROJECT AND RATES APPLICABLE (CERTIFIED INVOICES MUST BE RENDERED IN TERMS HEREOF)

4. PERSON AND POSITION

	HOURLY RATE	DAILY RATE
----------	R----------	----------
----------	R----------	----------
----------	R----------	----------
----------	R----------	----------
----------	R----------	----------

5. PHASES ACCORDING TO WHICH THE PROJECT WILL BE COMPLETED, COST PER PHASE AND MAN-DAYS TO BE SPENT

----------	R----------	---------- days
----------	R----------	---------- days
----------	R----------	---------- days
----------	R----------	---------- days

5.1 Travel expenses (specify, for example rate/km and total km, class of airtravel, etc). Only actual costs are recoverable. Proof of the expenses incurred must accompany certified invoices.

DESCRIPTION OF EXPENSE TO BE INCURRED	RATE	QUANTITY	AMOUNT
----------	.....	.....	R.....
----------	.....	.....	R.....
----------	.....	.....	R.....
----------	.....	.....	R.....

TOTAL: R.....

Bid No.: …MLRF192/22……

Name of Bidder: ……

** "all applicable taxes" includes value- added tax, pay as you earn, income tax, unemployment insurance contributions and skills development levies.

5.2 Other expenses, for example accommodation (specify, eg. Three star hotel, bed and breakfast, telephone cost, reproduction cost, etc.). On basis of these particulars, certified invoices will be checked for correctness. Proof of the expenses must accompany invoices.

DESCRIPTION OF EXPENSE TO BE INCURRED	RATE	QUANTITY	AMOUNT
----------	……	……	R……
----------	……	……	R……
----------	……	……	R……
----------	……	……	R……
		TOTAL: R……	

6. Period required for commencement with project after acceptance of bid ……

7. Estimated man-days for completion of project ……

8. Are the rates quoted firm for the full period of contract? *YES/NO

9. If not firm for the full period, provide details of the basis on which adjustments will be applied for, for example consumer price index. ……

……

……

……

*[DELETE IF NOT APPLICABLE]

Any enquiries regarding bidding procedures may be directed to the –

DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

Contact Person: Talitha Bikani
Contact Number: 021 402 3260
E-Mail: MLRFTENDERS@DFFE.GOV.ZA

Or

Contact Person: Mr Lwandisa Hoza
Contact Number: 021 402 3708
E-Mail: MLRFTENDERS@DFFE.GOV.ZA

BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. Bidder's declaration

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest1 in the enterprise, employed by the state? **YES/NO**

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

2.2 Do you, or any person connected with the bidder, have a relationship

1 the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

with any person who is employed by the procuring institution? **YES/NO**

2.2.1 If so, furnish particulars:

.....

.....

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract? **YES/NO**

2.3.1 If so, furnish particulars:

.....

.....

3 DECLARATION

I, the undersigned, (name)..... in submitting the accompanying bid, do hereby make the following statements that I certify to be true and complete in every respect:

3.1 I have read and I understand the contents of this disclosure;

3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;

3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium2 will not be construed as collusive bidding.

3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

3.4 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring

---

2 Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

3.6 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.
I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....	.....
Signature	Date
.....	.....
Position	Name of bidder

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.

---

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2

a) The value of this bid is estimated to not exceed R50 000 000 (all applicable taxes included) and therefore the 80/20 preference point system shall be applicable;

1.3 Points for this bid shall be awarded for:

(a) Price; and

(b) B-BBEE Status Level of Contributor.

1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	80
B-BBEE STATUS LEVEL OF CONTRIBUTOR	20
Total points for Price and B-BBEE must not exceed	100

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.6 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2. DEFINITIONS

(a) **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;

(b) **"B-BBEE status level of contributor"** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

(c) **"bid"** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals;

(d) **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(e) **"EME"** means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

(f) **"functionality"** means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.

(g) **"price"** includes all applicable taxes less all unconditional discounts;

(h) **"proof of B-BBEE status level of contributor"** means:

1) B-BBEE Status level certificate issued by an authorized body or person;
2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;
3) Any other requirement prescribed in terms of the B-BBEE Act;

(i) **"QSE"** means a qualifying small business enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

(j) **"rand value"** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

4. POINTS AWARDED FOR PRICE

4.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right) \text{ or } \qquad Ps = 90\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

4.2 FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME-GENERATING PROCUREMENT

4.3 POINTS AWARDED FOR PRICE

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 + \frac{Pt - P\,max}{P\,max}\right) \text{ or } \quad Ps = 90\left(1 + \frac{Pt - P\,max}{Pmax}\right)$$

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmax = Price of highest acceptable bid

5. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

5.1 In terms of Regulation 6 (2) and 7 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	6	14
4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

6. BID DECLARATION

6.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

7. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

7.1 B-BBEE Status Level of Contributor: . = ...(maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

8. SUB-CONTRACTING

8.1 Will any portion of the contract be sub-contracted?

(***Tick applicable box***)

YES		NO	

8.1.1 If yes, indicate:

i) What percentage of the contract will be subcontracted.....%
ii) The name of the sub-contractor.....
iii) The B-BBEE status level of the sub-contractor.....
iv) Whether the sub-contractor is an EME or QSE
(Tick applicable box)

YES		NO	

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms of Preferential Procurement Regulations,2017:

Designated Group: An EME or QSE which is at last 51% owned by:	**EME √**	**QSE √**
Black people		
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

9. DECLARATION WITH REGARD TO COMPANY/FIRM

9.1 Name of company/firm:.....

9.2 VAT registration number:.....

9.3 Company registration number:.....

9.4 TYPE OF COMPANY/ FIRM

Partnership/Joint Venture / Consortium
One person business/sole propriety
Close corporation
Company
(Pty) Limited
[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....
.....
.....
.....

9.6 COMPANY CLASSIFICATION

Manufacturer
Supplier
Professional service provider
Other service providers, e.g. transporter, etc.
[*TICK APPLICABLE BOX*]

9.7 Total number of years the company/firm has been in business:.....

9.8 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;

iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –

(a) disqualify the person from the bidding process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

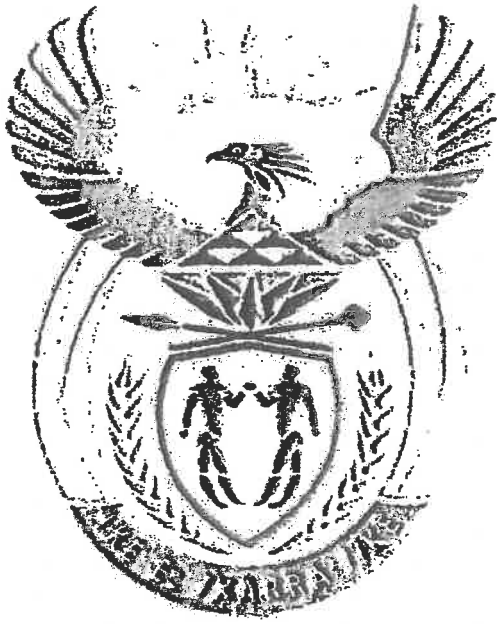
(d) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution.

WITNESSES 1. ..... 2.	..... SIGNATURE(S) OF BIDDERS(S) DATE: ..... ADDRESS ....

THE NATIONAL TREASURY

Republic of South Africa



GOVERNMENT PROCUREMENT:

GENERAL CONDITIONS OF CONTRACT

July 2010

GOVERNMENT PROCUREMENT

GENERAL CONDITIONS OF CONTRACT
July 2010

NOTES

The purpose of this document is to:

(i) Draw special attention to certain general conditions applicable to government bids, contracts and orders; and

(ii) To ensure that clients be familiar with regard to the rights and obligations of all parties involved in doing business with government.

In this document words in the singular also mean in the plural and vice versa and words in the masculine also mean in the feminine and neuter.

- The General Conditions of Contract will form part of all bid documents and may not be amended.

- Special Conditions of Contract (SCC) relevant to a specific bid, should be compiled separately for every bid (if (applicable) and will supplement the General Conditions of Contract. Whenever there is a conflict, the provisions in the SCC shall prevail.

TABLE OF CLAUSES

General Conditions of Contract

1. Definitions

1. The following terms shall be interpreted as indicated:

1.1 "Closing time" means the date and hour specified in the bidding documents for the receipt of bids.

1.2 "Contract" means the written agreement entered into between the purchaser and the supplier, as recorded in the contract form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

1.3 "Contract price" means the price payable to the supplier under the contract for the full and proper performance of his contractual obligations.

1.4 "Corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution.

1.5 "Countervailing duties" are imposed in cases where an enterprise abroad is subsidized by its government and encouraged to market its products internationally.

1.6 "Country of origin" means the place where the goods were mined, grown or produced or from which the services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembly of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from its components.

1.7 "Day" means calendar day.

1.8 "Delivery" means delivery in compliance of the conditions of the contract or order.

1.9 "Delivery ex stock" means immediate delivery directly from stock actually on hand.

1.10 "Delivery into consignees store or to his site" means delivered and unloaded in the specified store or depot or on the specified site in compliance with the conditions of the contract or order, the supplier bearing all risks and charges involved until the supplies are so delivered and a valid receipt is obtained.

1.11 "Dumping" occurs when a private enterprise abroad market its goods on own initiative in the RSA at lower prices than that of the country of origin and which have the potential to harm the local industries in the

RSA.

1.12 "Force majeure" means an event beyond the control of the supplier and not involving the supplier's fault or negligence and not foreseeable. Such events may include, but is not restricted to, acts of the purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

1.13 "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any bidder, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the bidder of the benefits of free and open competition.

1.14 "GCC" means the General Conditions of Contract.

1.15 "Goods" means all of the equipment, machinery, and/or other materials that the supplier is required to supply to the purchaser under the contract.

1.16 "Imported content" means that portion of the bidding price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or his subcontractors) and which costs are inclusive of the costs abroad, plus freight and other direct importation costs such as landing costs, dock dues, import duty, sales duty or other similar tax or duty at the South African place of entry as well as transportation and handling charges to the factory in the Republic where the supplies covered by the bid will be manufactured.

1.17 "Local content" means that portion of the bidding price which is not included in the imported content provided that local manufacture does take place.

1.18 "Manufacture" means the production of products in a factory using labour, materials, components and machinery and includes other related value-adding activities.

1.19 "Order" means an official written order issued for the supply of goods or works or the rendering of a service.

1.20 "Project site," where applicable, means the place indicated in bidding documents.

1.21 "Purchaser" means the organization purchasing the goods.

1.22 "Republic" means the Republic of South Africa.

1.23 "SCC" means the Special Conditions of Contract.

1.24 "Services" means those functional services ancillary to the supply of the goods, such as transportation and any other incidental services, such as installation, commissioning, provision of technical assistance, training, catering, gardening, security, maintenance and other such

obligations of the supplier covered under the contract.

1.25 "Written" or "in writing" means handwritten in ink or any form of electronic or mechanical writing.

2. Application

2.1 These general conditions are applicable to all bids, contracts and orders including bids for functional and professional services, sales, hiring, letting and the granting or acquiring of rights, but excluding immovable property, unless otherwise indicated in the bidding documents.

2.2 Where applicable, special conditions of contract are also laid down to cover specific supplies, services or works.

2.3 Where such special conditions of contract are in conflict with these general conditions, the special conditions shall apply.

3. General

3.1 Unless otherwise indicated in the bidding documents, the purchaser shall not be liable for any expense incurred in the preparation and submission of a bid. Where applicable a non-refundable fee for documents may be charged.

3.2 With certain exceptions, invitations to bid are only published in the Government Tender Bulletin. The Government Tender Bulletin may be obtained directly from the Government Printer, Private Bag X85, Pretoria 0001, or accessed electronically from www.treasury.gov.za

4. Standards

4.1 The goods supplied shall conform to the standards mentioned in the bidding documents and specifications.

5. Use of contract documents and information; inspection.

5.1 The supplier shall not, without the purchaser's prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the purchaser in connection therewith, to any person other than a person employed by the supplier in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.

5.2 The supplier shall not, without the purchaser's prior written consent, make use of any document or information mentioned in GCC clause 5.1 except for purposes of performing the contract.

5.3 Any document, other than the contract itself mentioned in GCC clause 5.1 shall remain the property of the purchaser and shall be returned (all copies) to the purchaser on completion of the supplier's performance under the contract if so required by the purchaser.

5.4 The supplier shall permit the purchaser to inspect the supplier's records relating to the performance of the supplier and to have them audited by auditors appointed by the purchaser, if so required by the purchaser.

6. Patent rights

6.1 The supplier shall indemnify the purchaser against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the goods or any part thereof by the purchaser.

7. Performance security

7.1 Within thirty (30) days of receipt of the notification of contract award, the successful bidder shall furnish to the purchaser the performance security of the amount specified in SCC.

7.2 The proceeds of the performance security shall be payable to the purchaser as compensation for any loss resulting from the supplier's failure to complete his obligations under the contract.

7.3 The performance security shall be denominated in the currency of the contract, or in a freely convertible currency acceptable to the purchaser and shall be in one of the following forms:

(a) a bank guarantee or an irrevocable letter of credit issued by a reputable bank located in the purchaser's country or abroad, acceptable to the purchaser, in the form provided in the bidding documents or another form acceptable to the purchaser; or

(b) a cashier's or certified cheque

7.4 The performance security will be discharged by the purchaser and returned to the supplier not later than thirty (30) days following the date of completion of the supplier's performance obligations under the contract, including any warranty obligations, unless otherwise specified in SCC.

8. Inspections, tests and analyses

8.1 All pre-bidding testing will be for the account of the bidder.

8.2 If it is a bid condition that supplies to be produced or services to be rendered should at any stage during production or execution or on completion be subject to inspection, the premises of the bidder or contractor shall be open, at all reasonable hours, for inspection by a representative of the Department or an organization acting on behalf of the Department.

8.3 If there are no inspection requirements indicated in the bidding documents and no mention is made in the contract, but during the contract period it is decided that inspections shall be carried out, the purchaser shall itself make the necessary arrangements, including payment arrangements with the testing authority concerned.

8.4 If the inspections, tests and analyses referred to in clauses 8.2 and 8.3 show the supplies to be in accordance with the contract requirements, the cost of the inspections, tests and analyses shall be defrayed by the purchaser.

8.5 Where the supplies or services referred to in clauses 8.2 and 8.3 do not comply with the contract requirements, irrespective of whether such supplies or services are accepted or not, the cost in connection with these inspections, tests or analyses shall be defrayed by the supplier.

8.6 Supplies and services which are referred to in clauses 8.2 and 8.3 and which do not comply with the contract requirements may be rejected.

8.7 Any contract supplies may on or after delivery be inspected, tested or

analyzed and may be rejected if found not to comply with the requirements of the contract. Such rejected supplies shall be held at the cost and risk of the supplier who shall, when called upon, remove them immediately at his own cost and forthwith substitute them with supplies which do comply with the requirements of the contract. Failing such removal the rejected supplies shall be returned at the suppliers cost and risk. Should the supplier fail to provide the substitute supplies forthwith, the purchaser may, without giving the supplier further opportunity to substitute the rejected supplies, purchase such supplies as may be necessary at the expense of the supplier.

8.8 The provisions of clauses 8.4 to 8.7 shall not prejudice the right of the purchaser to cancel the contract on account of a breach of the conditions thereof, or to act in terms of Clause 23 of GCC.

9. Packing

9.1 The supplier shall provide such packing of the goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing, case size and weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.

9.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the contract, including additional requirements, if any, specified in SCC, and in any subsequent instructions ordered by the purchaser.

10. Delivery and documents

10.1 Delivery of the goods shall be made by the supplier in accordance with the terms specified in the contract. The details of shipping and/or other documents to be furnished by the supplier are specified in SCC.

10.2 Documents to be submitted by the supplier are specified in SCC.

11. Insurance

11.1 The goods supplied under the contract shall be fully insured in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in the SCC.

12. Transportation

12.1 Should a price other than an all-inclusive delivered price be required, this shall be specified in the SCC.

13. Incidental services

13.1 The supplier may be required to provide any or all of the following services, including additional services, if any, specified in SCC:

(a) performance or supervision of on-site assembly and/or commissioning of the supplied goods;

(b) furnishing of tools required for assembly and/or maintenance of the supplied goods;

(c) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied goods;

(d) performance or supervision or maintenance and/or repair of the supplied goods, for a period of time agreed by the parties, provided that this service shall not relieve the supplier of any warranty obligations under this contract; and

(e) training of the purchaser's personnel, at the supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied goods.

13.2 Prices charged by the supplier for incidental services, if not included in the contract price for the goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the supplier for similar services.

14. Spare parts

14.1 As specified in SCC, the supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the supplier:

(a) such spare parts as the purchaser may elect to purchase from the supplier, provided that this election shall not relieve the supplier of any warranty obligations under the contract; and

(b) in the event of termination of production of the spare parts:

(i) Advance notification to the purchaser of the pending termination, in sufficient time to permit the purchaser to procure needed requirements; and

(ii) following such termination, furnishing at no cost to the purchaser, the blueprints, drawings, and specifications of the spare parts, if requested.

15. Warranty

15.1 The supplier warrants that the goods supplied under the contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the contract. The supplier further warrants that all goods supplied under this contract shall have no defect, arising from design, materials, or workmanship (except when the design and/or material is required by the purchaser's specifications) or from any act or omission of the supplier, that may develop under normal use of the supplied goods in the conditions prevailing in the country of final destination.

15.2 This warranty shall remain valid for twelve (12) months after the goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the contract, or for eighteen (18) months after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless specified otherwise in SCC.

15.3 The purchaser shall promptly notify the supplier in writing of any claims arising under this warranty.

15.4 Upon receipt of such notice, the supplier shall, within the period specified in SCC and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the purchaser.

15.5 If the supplier, having been notified, fails to remedy the defect(s) within the period specified in SCC, the purchaser may proceed to take

such remedial action as may be necessary, at the supplier's risk and expense and without prejudice to any other rights which the purchaser may have against the supplier under the contract.

16. Payment

16.1 The method and conditions of payment to be made to the supplier under this contract shall be specified in SCC.

16.2 The supplier shall furnish the purchaser with an invoice accompanied by a copy of the delivery note and upon fulfillment of other obligations stipulated in the contract.

16.3 Payments shall be made promptly by the purchaser, but in no case later than thirty (30) days after submission of an invoice or claim by the supplier.

16.4 Payment will be made in Rand unless otherwise stipulated in SCC.

17. Prices

17.1 Prices charged by the supplier for goods delivered and services performed under the contract shall not vary from the prices quoted by the supplier in his bid, with the exception of any price adjustments authorized in SCC or in the purchaser's request for bid validity extension, as the case may be.

18. Contract amendments

18.1 No variation in or modification of the terms of the contract shall be made except by written amendment signed by the parties concerned.

19. Assignment

19.1 The supplier shall not assign, in whole or in part, its obligations to perform under the contract, except with the purchaser's prior written consent.

20. Subcontracts

20.1 The supplier shall notify the purchaser in writing of all subcontracts awarded under this contracts if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the supplier from any liability or obligation under the contract.

21. Delays in the supplier's performance

21.1 Delivery of the goods and performance of services shall be made by the supplier in accordance with the time schedule prescribed by the purchaser in the contract.

21.2 If at any time during performance of the contract, the supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the goods and performance of services, the supplier shall promptly notify the purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation and may at his discretion extend the supplier's time for performance, with or without the imposition of penalties, in which case the extension shall be ratified by the parties by amendment of contract.

21.3 No provision in a contract shall be deemed to prohibit the obtaining of supplies or services from a national department, provincial department, or a local authority.

21.4 The right is reserved to procure outside of the contract small quantities or to have minor essential services executed if an emergency arises, the

supplier's point of supply is not situated at or near the place where the supplies are required, or the supplier's services are not readily available.

21.5 Except as provided under GCC Clause 25, a delay by the supplier in the performance of its delivery obligations shall render the supplier liable to the imposition of penalties, pursuant to GCC Clause 22, unless an extension of time is agreed upon pursuant to GCC Clause 21.2 without the application of penalties.

21.6 Upon any delay beyond the delivery period in the case of a supplies contract, the purchaser shall, without canceling the contract, be entitled to purchase supplies of a similar quality and up to the same quantity in substitution of the goods not supplied in conformity with the contract and to return any goods delivered later at the supplier's expense and risk, or to cancel the contract and buy such goods as may be required to complete the contract and without prejudice to his other rights, be entitled to claim damages from the supplier.

22. Penalties

22.1 Subject to GCC Clause 25, if the supplier fails to deliver any or all of the goods or to perform the services within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as a penalty, a sum calculated on the delivered price of the delayed goods or unperformed services using the current prime interest rate calculated for each day of the delay until actual delivery or performance. The purchaser may also consider termination of the contract pursuant to GCC Clause 23.

23. Termination for default

23.1 The purchaser, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate this contract in whole or in part:

(a) if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, or within any extension thereof granted by the purchaser pursuant to GCC Clause 21.2;

(b) if the Supplier fails to perform any other obligation(s) under the contract; or

(c) if the supplier, in the judgment of the purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

23.2 In the event the purchaser terminates the contract in whole or in part, the purchaser may procure, upon such terms and in such manner as it deems appropriate, goods, works or services similar to those undelivered, and the supplier shall be liable to the purchaser for any excess costs for such similar goods, works or services. However, the supplier shall continue performance of the contract to the extent not terminated.

23.3 Where the purchaser terminates the contract in whole or in part, the purchaser may decide to impose a restriction penalty on the supplier by prohibiting such supplier from doing business with the public sector for a period not exceeding 10 years.

23.4 If a purchaser intends imposing a restriction on a supplier or any

person associated with the supplier, the supplier will be allowed a time period of not more than fourteen (14) days to provide reasons why the envisaged restriction should not be imposed. Should the supplier fail to respond within the stipulated fourteen (14) days the purchaser may regard the intended penalty as not objected against and may impose it on the supplier.

23.5 Any restriction imposed on any person by the Accounting Officer / Authority will, at the discretion of the Accounting Officer / Authority, also be applicable to any other enterprise or any partner, manager, director or other person who wholly or partly exercises or exercised or may exercise control over the enterprise of the first-mentioned person, and with which enterprise or person the first-mentioned person, is or was in the opinion of the Accounting Officer / Authority actively associated.

23.6 If a restriction is imposed, the purchaser must, within five (5) working days of such imposition, furnish the National Treasury, with the following information:

(i) the name and address of the supplier and / or person restricted by the purchaser;
(ii) the date of commencement of the restriction
(iii) the period of restriction; and
(iv) the reasons for the restriction.

These details will be loaded in the National Treasury's central database of suppliers or persons prohibited from doing business with the public sector.

23.7 If a court of law convicts a person of an offence as contemplated in sections 12 or 13 of the Prevention and Combating of Corrupt Activities Act, No. 12 of 2004, the court may also rule that such person's name be endorsed on the Register for Tender Defaulters. When a person's name has been endorsed on the Register, the person will be prohibited from doing business with the public sector for a period not less than five years and not more than 10 years. The National Treasury is empowered to determine the period of restriction and each case will be dealt with on its own merits. According to section 32 of the Act the Register must be open to the public. The Register can be perused on the National Treasury website.

24. Anti-dumping and countervailing duties and rights

24.1 When, after the date of bid, provisional payments are required, or anti-dumping or countervailing duties are imposed, or the amount of a provisional payment or anti-dumping or countervailing right is increased in respect of any dumped or subsidized import, the State is not liable for any amount so required or imposed, or for the amount of any such increase. When, after the said date, such a provisional payment is no longer required or any such anti-dumping or countervailing right is abolished, or where the amount of such provisional payment or any such right is reduced, any such favourable difference shall on demand be paid forthwith by the contractor to the State or the State may deduct such amounts from moneys (if any) which may otherwise be due to the contractor in regard to supplies or services which he delivered or rendered, or is to deliver or render in terms of the contract or any other contract or any other amount which

may be due to him

25. Force Majeure

25.1 Notwithstanding the provisions of GCC Clauses 22 and 23, the supplier shall not be liable for forfeiture of its performance security, damages, or termination for default if and to the extent that his delay in performance or other failure to perform his obligations under the contract is the result of an event of force majeure.

25.2 If a force majeure situation arises, the supplier shall promptly notify the purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.

26. Termination for insolvency

26.1 The purchaser may at any time terminate the contract by giving written notice to the supplier if the supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the purchaser.

27. Settlement of Disputes

27.1 If any dispute or difference of any kind whatsoever arises between the purchaser and the supplier in connection with or arising out of the contract, the parties shall make every effort to resolve amicably such dispute or difference by mutual consultation.

27.2 If, after thirty (30) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the purchaser or the supplier may give notice to the other party of his intention to commence with mediation. No mediation in respect of this matter may be commenced unless such notice is given to the other party.

27.3 Should it not be possible to settle a dispute by means of mediation, it may be settled in a South African court of law.

27.4 Mediation proceedings shall be conducted in accordance with the rules of procedure specified in the SCC.

27.5 Notwithstanding any reference to mediation and/or court proceedings herein,

(a) the parties shall continue to perform their respective obligations under the contract unless they otherwise agree; and
(b) the purchaser shall pay the supplier any monies due the supplier.

28. Limitation of liability

28.1 Except in cases of criminal negligence or willful misconduct, and in the case of infringement pursuant to Clause 6;

(a) the supplier shall not be liable to the purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the supplier to pay penalties and/or damages to the purchaser; and

(b) the aggregate liability of the supplier to the purchaser, whether under the contract, in tort or otherwise, shall not exceed the total contract price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

29. Governing language

29.1 The contract shall be written in English. All correspondence and other documents pertaining to the contract that is exchanged by the parties shall also be written in English.

30. Applicable law

30.1 The contract shall be interpreted in accordance with South African laws, unless otherwise specified in SCC.

31. Notices

31.1 Every written acceptance of a bid shall be posted to the supplier concerned by registered or certified mail and any other notice to him shall be posted by ordinary mail to the address furnished in his bid or to the address notified later by him in writing and such posting shall be deemed to be proper service of such notice

31.2 The time mentioned in the contract documents for performing any act after such aforesaid notice has been given, shall be reckoned from the date of posting of such notice.

32. Taxes and duties

32.1 A foreign supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the purchaser's country.

32.2 A local supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted goods to the purchaser.

32.3 No contract shall be concluded with any bidder whose tax matters are not in order. Prior to the award of a bid the Department must be in possession of a tax clearance certificate, submitted by the bidder. This certificate must be an original issued by the South African Revenue Services.

33. National Industrial Participation (NIP) Programme

33.1 The NIP Programme administered by the Department of Trade and Industry shall be applicable to all contracts that are subject to the NIP obligation.

34 Prohibition of Restrictive practices

34.1 In terms of section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, an agreement between, or concerted practice by, firms, or a decision by an association of firms, is prohibited if it is between parties in a horizontal relationship and if a bidder (s) is / are or a contractor(s) was / were involved in collusive bidding (or bid rigging).

34.2 If a bidder(s) or contractor(s), based on reasonable grounds or evidence obtained by the purchaser, has / have engaged in the restrictive practice referred to above, the purchaser may refer the matter to the Competition Commission for investigation and possible imposition of administrative penalties as contemplated in the Competition Act No. 89 of 1998.

34.3 If a bidder(s) or contractor(s), has / have been found guilty by the Competition Commission of the restrictive practice referred to above, the purchaser may, in addition and without prejudice to any other remedy provided for, invalidate the bid(s) for such item(s) offered, and / or terminate the contract in whole or part, and / or restrict the bidder(s) or contractor(s) from conducting business with the public sector for a period not exceeding ten (10) years and / or claim damages from the bidder(s) or contractor(s) concerned.

MARINE LIVING RESOURCES FUND

Foretrust Building ,Martin Hammerschlag Way ,Foreshore, Cape Town, 8001 or Private Bag X2 ,ROGGEBAAI,8012(FASCMILE NO.021-4023228)

MLRF ENTITY MAINTENANCE AND CREDIT ORDER INSTRUCTION

(Please complete or mark with a "X" in black ink where applicable. A bank stamp is required to verify your banking details. In case of a cheque account a cancelled cheque must be included. Please return form by post or by hand delivery or by facsimile.)

TAKE-ON	NEW	UPDATE	ENTITY TYPE	BUSINESS	DEPARTMENT	EMPLOYEE	OTHER

FROM: CREDITOR / ENTITY (DETAILS)

TITLE
SURNAME
FIRST NAME/S
BUSINESS NAME
TRADING NAME
BUSINESS REG No.
VAT REGISTERED Y N
VAT REGISTRATION NO.
ID NO.
DEPARTMENT NAME
PERSAL NO. *

* For employees only

CONTACT DETAILS

STREET / PHYSICAL ADDRESS
POSTAL CODE

POSTAL ADDRESS
POSTAL CODE

BUSINESS TELEPHONE No. DIALLING CODE
BUSINESS FACSIMILE No. DIALLING CODE
NAME OF CONTACT PERSON
E-MAIL ADDRESS
CELLULAR TELEPHONE No.

DETAILS OF FINANCIAL INSTITUTION FOR ELECTRONIC BANKING TRANSFERS:

BANK NAME:
BRANCH NAME & CITY/TOWN
BRANCH NUMBER/CODE
ACCOUNT NUMBER
ACCOUNT TYPE CURRENT SAVINGS TRANSMISSION

BANK DATE STAMP (COMPULSORY)

I / We hereby request, instruct and authorise you to pay any amounts which may accrue to me / us to the credit of my / our account with the abovementioned bank.

I / we understand that the credit transfers hereby authorised will be processed electronically through a system known as the "ACB ELECTRONIC FUNDS TRANSFER SERVICE", and I/we also understand that no additional advice of payment will be provided by my/our bank. Details of each payment will be printed on my/our bank statement or any accompanying voucher.

I / We understand that a payment advice will be supplied by the Marine Living Resource Fund in the normal way, and that it will indicate the date on which funds will be available in my / our account.

This authority may be cancelled / changed by giving prior written notice, by way of registered post or facsimile.

SIGNATURE OF AUTHORISED PERSON
POSITION HELD
PRINT NAME OF AUTHORISED PERSON
DATE (DD/MM/YYYY):

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

THE MARINE LIVING RESOURCES FUND (MLRF), IS A SCHEDULE 3A PUBLIC ENTITY ESTABLISHED IN TERMS OF THE PUBLIC FINANCE MANAGEMENT ACT, 1999 (ACT NO 1 of 1999) AND THE DEPARTMENT OF FORESTRY FISHERIES AND THE ENVIRONMENT (DFFE) (IN ITS COMMITMENT TO THE PRINCIPLES ENSHRINED IN THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996) ADHERES TO THE PROVISIONS OF THE BROAD BASED BLACK ECONOMIC EMPOWERMENT ACT, 53 OF 2003 (B-BBEE), THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT, 5 OF 2000 (PPPF) AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.

TERMS OF REFERENCE

MLRF192/22:TO APPOINT AN INDEPENDENT SERVICE PROVIDER (SP) AS AN ENVIRONMENTAL CONTROL OFFICER (ECO) BY THE DEPARTMENT OF FORESTRY FISHERIES AND THE ENVIRONMENT (DFFE) / MARINE LIVING RESOURCES FUND (MLRF) IN COMPLIANCE WITH THE STIPULATIONS IN THE ENVIRONMENTAL AUTHORISATION (EA) AND THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE SEA-BASED AQUACULTURE DEVELOPMENT ZONE (ADZ) LOCATED WITHIN ALGOA BAY IN THE EASTERN CAPE, FOR A PERIOD OF THIRTHY SIX (36) MONTHS.

Contents

1. PURPOSE

The Department of Forestry, Fisheries and the Environment (DFFE) / Marine Living Resources Fund (MLRF), as the holder of the Environmental Authorisation (EA) for the Algoa Bay Aquaculture Development Zone (ADZ), has the obligation to appoint a suitably qualified and experienced service provider as an independent Environmental Control Officer (ECO) for the sea-based ADZ's construction and operational phases of the development located within Algoa Bay, within the Nelson Mandela Bay Metropolitan Municipality in the Eastern Cape, in compliance with the stipulations outlined in the EA and the Environmental Management Programme (EMPr), for a period of thirty six (36) months.

2. INTRODUCTION AND BACKGROUND

2.1. An ADZ is an area that has been earmarked specifically for aquaculture activities with the purpose of encouraging investor and consumer confidence; creating incentives for industry development, to provide marine aquaculture services; manage the risks associated with aquaculture; as well as to provide skills development and employment for coastal communities. The development of ADZs supports the Policy for the Development of a Sustainable Marine Aquaculture sector in South Africa (2007) aimed at creating an enabling environment that will promote growth and sustainability of the marine aquaculture sector in South Africa, as well as to enhance the industry's contribution to economic growth.

2.2. In 2009 a Strategic Environmental Assessment (SEA) was undertaken for the entire South African coastline to identify suitable aquaculture sites. In this assessment the Eastern Cape was highlighted as an area holding potential for the establishment of ADZs. As part of a finer-scale SEA undertaken by the then Department of Agriculture Forestry and Fisheries (DAFF) in 2011, two sites, namely Algoa 1 and 5 were identified as the most promising alternative sites. An ADZ includes a number of components and activities which may result in negative impacts to the environment. These include (but are not limited to) impacts on biodiversity (marine), the sense of place (visual issues) and national heritage resources. The proposed development triggered a number of activities listed in the Environmental Impact Assessment Regulations promulgated in terms of the National Environmental Management Act (Act No 107 of 1998) (NEMA).

2.3. The MLRF undertook an Environmental Impact Assessment (EIA) for the establishment of an ADZ in Algoa Bay in 2010 and the EA was granted on the 9th July 2014. Appeals against the authorisation were lodged to the "then Minister of Environmental Affairs" and the Minister issued an Appeal Decision letter allowing for further studies to be undertaken to address these appeals by conducting a comparative study, which assessed the potential impacts associated with Algoa 1 and 5.

2.4. In mid-2016, the MLRF under the Department of Agriculture Forestry and Fisheries commissioned three further comparative assessments, including a detailed feasibility study, a socio-economic assessment and a marine ecological assessment for Algoa 1 and 5.

2.5. The DFFE, the new department where the mandate for fisheries and aquaculture management now lies, undertook a new Basic Assessment (BA) process for the establishment of the ADZ with a revised application in 2016/17 and the EA was granted on the 26th February 2020 **(see Annexure A).** Appeals against the EA were again submitted and the Decision on the appeals was issued on the 18th June 2021 upholding the EA decision allowing the DFFE to proceed with the implementation of the ADZ.

2.6. The total area for the proposed activity covers a total area of 1 118.4 ha of which is divided into Algoa 1 Option 1 284.4 ha (bivalves only), Algoa 6 (bivalves only) 479 ha and Algoa 7(finfish only) 355 ha, authorising to farm a variety

of marine species such as Pacific Oyster, Cape Rock Oyster, Black Mussel, Brown Mussel, Mediterranean Mussel, White, Yellowtail, Dusky Kob, Silver Kob, Yellowfin tuna, Sole, Geelbek, Spotted grunter, White Steenbras, White Stumpnose and Red Roman.

2.7. One of the key conditions of the EA and EMPr was the need for the holder of the authorisation to appoint suitably qualified and experienced independent Environmental Control Officer (ECO) that will have the responsibility to ensure that the mitigation/rehabilitation measures and compliance recommendations are implemented and ensure compliance with the conditions contained in the EMPr.

3 COMPULSORY BRIEFING SESSION

The sessions will take place as follows:

- 18 January 2023 at 10:00

The link for the sessions can be requested via email:

Name	Email address
Mr Lwandisa Hoza	MLRFtenders@dffe.gov.za
Ms Talitha Bikani	

**Bidders should use "MLRF192/22: Briefing Session" as the subject of the email of requesting link for the briefing session.*

4 OBJECTIVES OF APPOINTING THE SERVICE PROVIDER (SP)

To ensure that the mitigation/rehabilitation measures and recommendations referred to in the EA are implemented in accordance with the provisions of the ADZ EMPr **(see Annexure B)** and that conditions stated therein are fully adhered to.

5 SCOPE AND EXTENT OF WORK

5.1. The appointed service provider as an independent ECO will be expected to perform the following duties:

5.1.1 Liaise between the MLRF, operator appointed ECO's and Designated Environmental Officers (DEO), relevant authorities, the aquaculture operators and other lead stakeholders on all environmental concerns.

5.1.2 Oversee that the environmental monitoring is in accordance with the EA, EMPr and Sampling Plan.

5.1.3 Monitor monthly performance of the contractor / farmers (and sub-contractors) and ensure compliance with the ADZ EMPr and the site specific EMPrs and associated Method Statements.

5.1.4 Validate the monthly Farm Monitoring Reports (FRMs) submitted by the operators to the ECO through monthly site inspections.

5.1.5 Verify all environmental incident (spills, impacts, legal transgressions, etc.) reports submitted, as well as corrective and preventive actions taken in this regard and maintain an incident register.

5.1.6 Maintain the public comments register in which all complaints/comments are recorded, as well as action/s taken.

5.1.7 Issue compliance directives to the operators for corrective action/s required.

5.1.8 Facilitate and coordinate the resolution of conflicts within the scope of the management of the ADZ.

5.1.9 Communicate all modifications made to the ADZ EMPr to the relevant stakeholders.

5.1.10 Conduct monthly site inspections of all operators located in the ADZ to ensure compliance with the EA and ADZ EMPr and validate production data submitted by operators monthly (a site inspection schedule to be developed which

would need to cater for travel and accommodation costs to Algoa Bay if the appointed ECO does not reside in Gqeberha).

5.1.11 Ensure that monthly ECO inspections and auditing considers environmental aspects of the operations relevant to the minimisation of environmental impacts and achievement of environmental goals as stipulated in the EMPr.

5.1.12 Review environmental recommendations contained in the environmental monitoring reports undertaken by suitably qualified specialists and ensure updates to EMPr or Method Statement to address such.

5.1.13 Draft an ADZ Emergency Response Protocol (ERP) within the first 12 months of the appointment, a similar protocol exists for the Saldanha bay ADZ which can be utilised as a template **(see Annexure C).** This ERP is to be reviewed and updated on an annual basis and ensure (as a minimum) that the contact details of all persons and organisations on the contact list are current.

5.1.14 Liaise with the Competent Authority to ensure that all operational monitoring provides sufficient, relevant information for the Competent Authority to be assured that aquaculture activities are suitably managed to minimise impact on the environment. This may require revision of the monthly ECO site inspection format.

5.1.15 Draft monthly ADZ reports, starting from date of appointment, to registered stakeholders and submit these to the Competent Authority of which a summarised version must be submitted to the Consultative Forum (CF).

5.1.16 One of the conditions of the EA is the establishment of two management bodies, namely the Aquaculture Development Zone Management Committee (AMC) and Consultative Forum (CF). These committees need to be established and need to be managed.

- The AMC is an intergovernmental forum comprised of national, provincial and local government departments and State-Owned Entities. AMC's functions include overseeing, facilitating, managing, advising, and monitoring aquaculture operations in Algoa Bay ADZ and a multi-stakeholder forum (public, industry, and government) aimed at promoting transparency and formal presentation and acknowledgement of public interest, prior to the commencement of the activity. The AMC meetings are to be held every two months or/and as the need arises with two meetings being held physically during an annual period while the rest are to be held virtually. The AMC fulfils a coordination and supervising role and oversees compliance with the EMPr throughout all phases of the aquaculture farming in the ADZ. The Chairperson of the AMC must be an independent person with experience in the environmental management and marine aquaculture field and/or industry.
- The CF meetings are held every three months or/and as the need arises with one meeting to be held physically during an annual period in Algoa Bay at public venues, and the rest of the meetings are to be held virtually. The responsibility of the CF is to consider and comment on the environmental monitoring data, advise on ADZ management, and make recommendations to the AMC. The CF will provide feedback to the AMC through the outputs (recommendations and advice) that it provides to the AMC for consideration.

5.1.17 The ECO is required to perform secretariat duties for both committees as outlined below:

5.1.17.1 Perform secretariat duties of the AMC and CF by arranging meetings, printing documents (i.e., agendas and meeting minutes), archiving and filing all documents on the Departments Electronic Management System (EDMS), reporting back and fulfil the role of rapporteur for both committees.

5.1.17.2 Drafting of three annual AMC report summarising the activities achieved over the period of review and submit to the Competent Authority.

5.1.17.3 Preside as the Chairperson of the CF.

5.2 Booking of cost-effective venues for the AMC and CF meetings should be budgeted for, inclusive of tea and coffee.

5.3 Attendance of twenty-four (24) ad hoc physical stakeholder meetings in Algoa Bay should be budgeted for during the thirty-six (36) month contract period.

5.4 In fulfilment of the requirements of Condition 35 of the EA and Appendix 7 of the EIA regulations 2014, a competent and external auditor will have to be contracted by the ECO to undertake an EA and EMPr compliance audit and the appointed ECO must make provision for this work. The audit must consider the processes for such auditing as prescribed in Regulation 34 of GN R. 982. Auditing of compliance with EA, EMPr and closure plan. The external auditor, who must be independent of MLRF and the appointed ECO, is to conduct the annual external audits (i.e., three audits) of the Algoa Bay ADZ.

5.5 Update the ADZ EMPr according to findings of the environmental audit reports, where necessary. The updated EMPr must be submitted to the Competent Authority for approval together with the audit report and make provision for amendments as indicated by the Competent Authority. Cost for and undertaking of the Public Participation Process for the updated EMPr after each audit process should be catered for i.e., EMPr amendments and associated public participation processes should be costed for if required.

5.6 In fulfilment of the requirements of the EMPr (Table 18 Condition 8) *"Appoint / nominate a suitably qualified independent specialist to compile a comprehensive Sampling Plan for the ADZ and present the Sampling Plan to the AMC and consultative forum for review"*. The service provider is to draft the Sampling Plan for the ADZ in consultation with the MLFR to inform the environmental monitoring and must present the plan to the AMC for endorsement and CF for noting. The Saldanha Bay ADZ Sampling Plan can be utilised as a template for the drafting of this plan **(see Annexure D).**

5.7 The secretariat will also need to customise existing reporting templates for the ADZ; these may include but not limited to the following: Farm Monitoring Reports; daily visual logging sheets; ECO summary reporting; ECO ADZ level reporting; ECO site inspection reporting; AMC letter head; compliance database capturing excel spread sheet; maintenance of the stakeholder data base for the ADZ; incident reporting; communications register; documents register; monthly project progress reports; and agenda and minute templates.

5.8 Bi-monthly (every two months) progress meetings will be held in Cape Town, virtual meetings may be arranged at the discretion of the MLRF. Progress meeting minutes to be drafted by the service provider and approved by the MLRF Project Manager. Monthly progress reports should be submitted to the MLRF Project Manager.

5.9 Facilitation of a hand over meeting and all relevant documents to the next service provider to allow for continuation of the work to the succeeding ECO at the end of the thirty-six (36) month contract period.

6 EXPECTED DELIVERABLES / OUTCOMES

6.1 Monthly site inspection of operators on a rotational basis and recording of validated production data.
6.2 Validation of monthly FRM's by conducting site inspections and drafting reports and a site inspection schedule.
6.3 Monthly ECO report for the ADZ.
6.4 Summary version of the monthly ECO report.
6.5 Maintenance of compliance data base (ongoing).
6.6 Maintenance of records on EDMS (online system).
6.7 Submission of documents to the Competent Authority monthly.
6.8 Update the monthly documents received register.
6.9 Update the monthly communications register.
6.10 Update the monthly incident register.
6.11 Drafting, and the subsequent review and updating of the ADZ Emergency Response Protocol annually.
6.12 Review environmental recommendations contained in environmental monitoring reports when required.
6.13 Revise monthly ECO site inspection format when required. Provide secretariat functions of the AMC and CF.
6.14 Reporting back and fulfil role of rapporteur at the AMC and CF meetings.

6.15 Chairing the CF meetings in accordance with the Terms of Reference for the Forum.
6.16 Logistical arrangements for the AMC and CF meetings.
6.17 Drafting the Annual AMC reports.
6.18 Appointment of the external auditor and submission of audit report to the Competent Authority.
6.19 Appointment of an independent and competent service provider to draft the Sampling Plan and review annually.
6.20 Updating of the EMPr if required, submitting the application and conducting the public participation process as per the legal requirements.
6.21 Attendance at 24 stakeholder meetings in Algoa Bay if required.
6.22 Attendance at bi-monthly (every two months) progress meetings with the MLRF Project Manager held in Cape Town, or virtually at the discretion of the MLRF.
6.23 Drafting templates as per 4.7 above.
6.24 Compile and ensure safe storage of all monthly progress reports and meeting minutes.
6.25 Facilitation of hand over meeting and documentation to the next appointed service provider at completion of the contract.

7 PERIOD / DURATION OF APPOINTMENT

7.1 The contract with the Service Provider will run for a period of thirty-six (36) months and will commence as agreed in the Service Level Agreement, Project Scope, signed between the MLRF and the Service Provider.

8 COSTING / COMPREHENSIVE BUDGET

8.1. A comprehensive costing **(see Annexure E – pricing guideline)** ***must*** be provided in a separate envelope inclusive of a breakdown of all disbursement costs and related expenditure inclusive of Value Added Tax (VAT). Refer to (SBD 3.3 for details). The Service Provider must quote for all activities in accordance with the scope of the project (demonstrating how the breakdown has been derived) and the costs should be quoted in South African currency.

8.2. The MLRF shall not pay for any unproductive or duplicated time spent by the Service Provider on any assignment because of staff changes, sub-contracting or re-drafting of reports due to errors, corrections or incorrect / incomplete findings.

8.3. The MLRF reserves the right to negotiate with one or more preferred bidder(s) identified in the evaluation process, regarding any terms and conditions, including prices without offering the same opportunity to any other bidder(s) who have not been awarded the status of the preferred bidder(s).

9 EVALUATION METHOD

9.1 The evaluation for this bid will be carried out in three (3) phases:

- Phase 1: Pre-compliance or Initial Screening
- Phase 2: Functional and Technical Evaluation Criteria,
- Phase 3: Price and B-BBEE.

9.2 **PHASE 1: Pre-compliance or Initial Screening**

9.2.1 During this phase, bid documents will be reviewed to determine compliance with Supply Chain Management (SCM) Standard Bidding Documents and any other required returnable, tax matters and whether the Central Supplier Database (CSD) report has been submitted with the bid documents at the closing date and time of the bid. Bids which do not satisfy the compliance criteria will not be evaluated further.

9.2.2 The bid proposal will be screened for compliance with administrative requirements as indicated below:

Item No.	Administrative Requirements	Check/Compliance	Non-submission will result in disqualification
Included in the Bid Document			
1	SCM - SBD 1 - Invitation to Bid	Completed and signed	*YES
2	SCM - SBD 2 - Tax Clearance Certificate Requirements	CSD registration number/SARS PIN and CSD summary report	**NO
3	SCM- SBD 3.3- Pricing Schedule	Completed and signed	*YES
4	SCM – new SBD 4 - Declaration of Interest	Completed and signed	*YES
5	SCM - SBD 6.1 - Preference Points Claim Form in terms of the Preferential Procurement Regulations 2017	Completed and signed, supported by B-BBEE Certificate if applicable or Affidavit if applicable	**NO
6	In case of bids where Consortia / Joint Ventures, agreement signed by both parties must be submitted with bid proposal	JV agreement completed and signed, if applicable	*YES
7	Comprehensive Curriculum Vitae (CV) – Team Leader and Team Members	Detailed CV of the proposed resources, supported by copies of qualification (s). Mandatory qualifications to be certified	*YES

***YES** – MLRF reserves the right to reject proposals that are not submitted in the prescribed format or where information presented is illegible or incomplete and will not be further evaluated for Phase 2.

****NO** – MLRF reserve the right to request such information during the evaluation process of the proposal and such information must be presented within short notice.

9.3 **PHASE 2: Functionality and Technical Criteria**

9.3.1 Only bid proposals that meet Mandatory requirements will be considered to be evaluated further on functionality and technical criteria. The Bidder must complete the section below by answering **YES or NO**. If, Yes, the Bidder must attach proof.

	Requirements	Documents required	Comply: Yes or No
Mandatory requirements:	The ECO is registered with the South African Council for Natural Scientific Professionals (SACNASP) as a professional in natural sciences and has appropriate and proven relevant experience to undertake and lead the execution of the scope of work in SECTION 4 above. In cases where the ECO is a legal entity, this requirement applies to the Project Team Leader or to the competent practitioner recommended by the ECO.	SACNASP certificate	
	The ECO has conducted at least two marine environmental management projects of a multi stakeholder nature with experience as a senior Project manager/ Senior natural marine scientist.	Company Profile/ CV of ECO	
	The ECO (or individuals of the team) has demonstrable knowledge in marine environmental management and/ or aquaculture required to draft and undertake the reports listed above or be supported by a team with the required skills.	Company Profile/ CV of ECO	

NOTE: Failure to meet all the Mandatory requirements will lead to the service provider being disqualified and not evaluated further for functionality (Phase 2).

9.3.2 Only bid proposals that meet the Mandatory requirements will be evaluated further on functionality criteria.

9.3.3 The bidder must score a minimum of 60% during Phase 2 (functionality / technical) of the evaluation to qualify for Phase 3 of the evaluation where only points for Price and B-BBEE will be considered.

9.3.4 The following values/ indicators will be applicable when evaluating functionality:

0 = Non-compliance; 1 = Poor; 2 = Fair; 3 = Average; 4 = Good; 5 = Excellent.

PHASE 2				
No.	**GUIDELINES FOR CATEGORY CRITERIA**	**FUNCTIONALITY (GUIDELINES FOR CRITERIA APPLICATION)**		**WEIGHT**
1.	**Bidder's experience in the marine environmental management/ assessment field (EIA/ ECO) (attached signed contactable reference letters from successfully completed projects). Note: MLRF will not accept appointment letters, Purchase Orders or reference letters which are not issued in the name of the bidder.**	Number of projects completed by bidder within the field of marine environmental management/ assessment field (EIA / ECO) and/ or aquaculture projects.	Indicator	**45**
		No successful projects completed covering the criteria within the scope.	0	
		1 to 3 successful projects completed covering the criteria within the scope.	1	
		3 successful projects completed covering the criteria within the scope, of which at least one (1) is an aquaculture related project.	2	
		4 successful projects completed covering the criteria within the scope, of which at least one (1) is an aquaculture related project.	3	
		5 or more successful projects completed covering the criteria within the scope, of which at least one (1) is an aquaculture related project.	4	
		5 or more successful projects completed covering the criteria within the scope of which two (2) are aquaculture related projects.	5	
2.	**Bidders are to demonstrate number of years of the combined teams experience as an ECO in the marine environmental management/ assessment field (attach summary table of the project teams individual members' ECO experience and comprehensive Curriculum Vitae of Team Leader and Team Members).**	In the proposal bidders should supply a summary table indicating individual project team member's ECO experience in relevant past projects with start and end dates indicated. However, combined ECO experience of project team members will be used for scoring purposes.	**Indicator**	**45**
		Less than one year experience.	0	
		1 and less than 2 years of experience.	1	
		2 and less than 3 years of experience.	2	
		3 and less than 4 years of experience.	3	
		4 and less than 7 years of experience.	4	
		7 and more years of experience.	5	

3.	**A comprehensive and detailed project plan/ proposal with deliverables, timeframes/ milestones, cost, understanding and management of the scope of work.**	Bidders are required to provide a detailed project plan/ proposal with clearly identified deliverables, timeframes/ milestones to achieve the scope of work.	Indicator	**10**
		No information provided.	0	
		Project plan/ proposal is not relevant and does not cover the scope of work.	1	
		Project plan/ proposal provided with no clear deliverables, timeframes/ milestones.	2	
		Project plan/ proposal covers scope but has no detailed information regarding deliverables, timeframes/ milestones.	3	
		Project plan/ proposal covers a detailed scope with clear deliverables, timeframes/ milestones.	4	
		Project plan/ proposal covers a comprehensive and detailed scope with additional information and is broken down with details of deliverables, timeframes/ milestones.	5	
	Total points on functionality			**100**

9.4 **PHASE 3: Preference Point System 80/20**

9.4.1 The **third phase** is to perform an evaluation of Price and BBBEE on the bidders that successfully qualified on phase 2 (functional and technical evaluation).

9.4.2 **Calculation of points for price** - The Preferential Procurement Policy Framework Act (PPPFA) prescribes that the lowest acceptable bid will score 80 points (for tenders under R50m) or 90 points (for tenders above R50m) for price. The bidder that quoted higher prices will score lower points for price on a pro-rata basis. Where functionality is set as criteria, only bid proposals that meets functionality requirements will be evaluated on price and B-BBEE.

9.4.3 The 80/20 as an appropriate preference point system will be used in the evaluation and adjudication of this tender. However, it must be extended that the lowest acceptable tender will be used to determine the applicable preference point system as per regulation (Section 3(a)(ii) of the Preferential Procurement Regulations (PPR) 2017, which states: "If it is unclear which preference point system will be applicable, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system". Therefore, either 80 or 90 points, depending on the rand value of the tender, will be awarded to the bidder who offers the lowest price, and proportionately fewer points are awarded to those with higher prices. Either 20 or 10 points are then available as preference points for EMEs, QSEs or B- BBEE contributors, as applicable. The contract will be awarded to the bidder that scores the highest total number of adjudication points per category.

9.5 **Calculating of points for B-BBEE status level of contribution**

9.5.1 Points will be awarded to a bidder for attaining the B-BBEE status level of contribution by submitting original and valid B-BBEE Status Level Verification Certificate issued by SANAS Accredited Verification Agency or certified copies thereof; or B-BBEE Certificate issued by CIPC, or Sworn Affidavit commissioned by Commissioner of Oaths together with their bids, to substantiate their B-BBEE rating claims. SBD 6.1 must also be duly completed,

signed, and submitted alongside the bid to claim preference points. Failure to do so will result in B-BBEE preference points being forfeited.

9.5.2 Points will be awarded to a bidder for attaining the B-BBEE status level of contribution or an affidavit certified by the commissioner of oath in accordance with the table below:

Phase 3: The following table must be used to calculate the B-BBEE scores (80/20)	
PRICE	
B-BBEE Status Level Contributor	**Number of points (80/20)**
1	20
2	18
3	14
4	12
5	8
6	6
7	4
8	2
Non –compliant contributor	0

9.5.3 The SCM unit of the MLRF will allocate preferential points (B-BBEE) to each company for its contribution towards empowerment of the black designated groups as prescribed in the Preferential Procurement Regulations of 2017, women, people with disabilities, youth as well as local economic development as set out in the Broad-Based Black Economic Empowerment Codes.

9.5.4 A tender will not be disqualified from the tender process if the bidder does not submit a certificate substantiating the B-BBEE status level of contribution or is a non-compliant contributor. Such a bidder will score 0 for B-BBEE.

9.5.5 Tenders will be subject to SCM conditions of the Department. The Preferential Procurement Regulations, 2011 issued in terms of section 5 of the Preferential Procurement Policy Framework Act (Act No 5 of 2000) (PPPFA), aligned with the aims of the Broad-Based Black Economic Empowerment Act 53 of 2003 as amended by the Broad-Based Black Economic Empowerment Amendment Act 46 of 2013, and Phase 2 of its Codes of Good Practice.

9.5.6 The PPPFA prescribes that the lowest acceptable bid will score 80 or 90 points for price (as explained above, depending on whether the bid prices is more or less than R50million). Bidders that quoted higher prices will score lower points for price on a pro-rata basis. Where functionality is set as a criterion, only bid proposals that meets functionality requirements will be evaluated on price and B-BBEE.

9.5.7 The contract will be awarded to the tenderer scoring the highest points. However, a contract may be awarded to a SP that did not score the highest points, only under regulation 2(1) (f) of the Preferential Procurement Regulation (PPR), 2017. The PPR mentions that objective criteria may be used to justify awarding the contract to another SP who has not scored the highest points. These objective criteria include contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination based on race, gender or disability.

10 BID SUBMISSION REQUIREMENTS

10.1 **All completed documentation must be returned to the Marine Living Resource Fund (MLRF) the entity of the Department of Forestry, Fisheries and the Environment (DFFE) before 11:00 on the 31st of January 2023. The location of the drop off is: Tender Box, Ground Floor, Foretrust Building, 2 Martin Hammerschlag Way, Cape Town, 8000.**

10.2 Bidders should ensure that the following submission requirements, which will be needed for evaluation purposes are included in their bid proposal and are as follows:

10.2.1 The SP must draft a table of content which will indicate where each document is located in the proposal.

10.2.2 The proposal shall consist of two parts, namely the technical bid and the pricing bid (master and copies).

10.2.3 ***Add documents that are required to be submitted with the bids. These documents include those included in phase one (1) and two (2) of evaluation criteria.***

10.2.4 Completed table of pre-qualification requirements, as set out in the table in paragraph 9.3.1 of this document, together with all necessary supporting documents and required documentary proof.

10.2.5 Standard bidding documents (SBD 2, 3.3, 4 and 6.1) completed and signed.

10.2.6 A valid copy of the Tax Clearance Certificate/ Tax Compliance Status Pin issued by SARS to the supplier/copy of Central Supplier Database (CSD)/ MA supplier Number must be submitted together with the bid.

10.2.7 In case of bids where Consortia / Joint Ventures / Sub-contractors are involved; such must be clearly indicated, and each party must submit a separate copy of a valid Tax Clearance Certificate or copy of Tax Compliance Status Pin or CSD/ MAAA supplier Number together with the bid.

10.2.8 Certified copies of identity documents of directors and shareholders of the company.

10.2.9 Entity registration Certificate (e.g., CK1).

10.2.10 Letter of Authority to sign documents on behalf of the company.

11 SPECIAL CONDITIONS OF CONTRACT

11.1 On appointment, the performance measures for the delivery of the agreed services will be closely monitored by the MLRF.

11.2 The MLRF will not be held responsible for any costs incurred by the service providers in the preparation, presentation, and submission of the proposal.

11.3 The Project Manager allocated to the service by the MLRF shall do the ongoing management of the Service Level Agreement (SLA).

11.4 The SP will be required to submit soft copies of the monthly reports to the MLRF Project manager, within four (4) working days after the end of each month for the duration of the project. Failure to submit these reports on time may result in penalties.

11.5 The SP's must guarantee the presence of the Team Leader in charge of the project throughout the duration of the contract. Prior to the appointment of a replacement, the MLRF Project Manager must approve such appointment. If the Team Leader must leave the project, a period of at least one month is required in which the senior consultant must work parallel with the next person (senior consultant with similar expertise and equal years of experience) appointed to be able to transfer skills and knowledge.

11.6 All the conditions specified in the General Conditions of Contract (GCC) will apply and where the conditions in the special conditions of contract contradicts the conditions in the general conditions of contract the special conditions of contract will prevail.

11.7 The bid proposals should be submitted with all required information as per the requirements stipulated in these Terms of Reference.

11.8 Travelling costs and time spent or incurred between home and office of the SP and MLRF office will not be for the account of MLRF.

11.9 Bidders failing to meet all the pre-qualification requirements will automatically be disqualified.

11.10 SPs are requested to submit the original and valid B-BBEE Status Level Verification Certificate or certified copies thereof issued by verification agencies accredited by SANAS only or an original or certified copy of DTI affidavit in terms of Codes of good practice" indicating that service provider is an EME/ QSE.

11.11 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as a legal entity, provided that the entity submits their B-BBEE status level certificate.

11.12 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate proposal.

11.13 Poor or non-performance by the bidder will result in cancellation of the bid and the SLA.

11.14 Should the service provider fail to perform, the MLRF reserves the right to cancel the appointment of such service provider immediately and without any notice. The MLRF also reserves the right to recover the costs incurred in arranging such training e.g. salaries/wages of attendees and any other costs deemed necessary for the successful execution of the training.

11.15 Activity Interruptions

- The successful SP shall under no circumstances intentionally interrupt performance on the Project for more than fifteen working days without prior written notification of 7 (seven) working days to the MLRF.

11.16 Completion of Projects

- Upon completion of the project or the end of the contract period a close-out process should be followed to ensure that all project deliverables have been achieved. A final project assessment will be done by the Contract Manager (CM) as per the SP's contract requirements. Once the CM is satisfied with the quality of the deliverables, a Close-out Report will be completed by the SP. The Report will entail details on the stages of the project plan and feedback on the implementation of each stage.
- The documents required as part of the Close-out Report will be submitted as per the contract requirements.
- The Close-out Report must accompany the last invoice to process the final payment to the SP.

12 SUB-CONTRACTING CONDITIONS/ REQUIREMENTS

12.1 In a case whereby sub-contracting is not set as a pre-qualification criterion, however the tenderer is intending to sub-contract portion of work, such tenderer awarded a contract may only enter sub-contracting arrangements with the approval of the MLRF.

12.2. In relation to a designated sector, a contractor will not be allowed to subcontract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.

12.3. A tenderer / bidder will not be awarded the points claimed for B-BBEE status level of contribution or contract if it is indicated in the bid documents that such a bidder intends subcontracting more that 25% of the contract value to any other enterprise that does not qualify for at least the same number of points that the bidder qualifies for, unless the intended sub-contractor is an Exempted Micro Enterprises (EME) that has the capability and ability to execute the sub-contract.

12.4. The contractor is not allowed to sub-contract more than 25% of the contract value to another enterprise that does not have equal or higher B-BBEE status level, unless the intended sub-contractor is an EME that has the capability and ability to execute the sub-contract.

13 PAYMENT TERMS

13.1. The MLRF undertakes to pay out in full or as per deliverables within 30 (thirty) days all valid claims for work done to its satisfaction upon presentation of a substantiated claim and the required reports stipulated in special conditions. No payment will be made where there is outstanding information/work not submitted by the SPs until that outstanding information is submitted.

13.2. Payment by the MLRF shall be made by means of an electronic transfer into the SP's bank account.

13.3. Payment requirements

- The successful SP shall render services to the MLRF in accordance with the Project Plan and Project Scope.
- The amounts are inclusive of VAT and all disbursements shall be paid in South African Rands.
- The MLRF reserves the right to, after consultation with the successful SP, increase, reduce or cancel the budget.
- Disbursements of project funding will be agreed on for each project and disbursements will be made on agreed and verified deliverables and indicators (targets) that are included in the Project Plan
- The successful SP shall provide the MLRF with an original tax invoice for the services rendered. Once the MLRF has approved such an invoice and is satisfied with the services rendered as outlined in the Project Plan, it will make payment to the successful SP within 30 days of approval of such a request.
- The successful SP are required to submit the following documents with each invoice.
    - Acting letter of the manager of SP (if applicable)
    - Monthly/Period Project Progress Report
- The MLRF requires that a new order number be raised after 1 April of each of the financial years of the contract period.

14 ENQUIRIES

14.1 Should you require any further information in this regard, please do not hesitate to email:

Name	Email address
Mr Lwandisa Hoza	MLRFtenders@dffe.gov.za
Ms Talitha Bikani	

**Bidders should use "MLRF192/22: Enquiries" as the subject of the email of requesting link for the briefing session.*

Due to office closure, inquiries will be responded to until the 12th of December 2022 and resume on the 9th of January 2023.

ANNEXURE A

ENVIRONMENTAL AUTHORISATION.

forestry, fisheries & the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Private Bag X 447· PRETORIA ·0001· Environment House ·473 Steve Biko Road, Arcadia· PRETORIA

DFFE Reference: 14/12/16/3/3/1/2055
Enquiries: Ms Mathodi Mogorosi
Telephone: (012) 399 9388 **E-mail:** MMogorosi@environment.gov.za

Ms Zimasa Jika
Department of Forestry, Fisheries and the Environment: Aquaculture and Economic Development
Private Bag X2
VLAEBERG
8018

Telephone Number: 021 402 3116
Email Address: zjika@environment.gov.za

PER MAIL / EMAIL

Dear Ms Jika

RE-ISSUE OF THE ENVIRONMENTAL AUTHORISATION ISSUED ON 26 FEBRUARY 2020 WITH AMENDMENTS BASED ON THE APPEAL DECISION DATED 18 JUNE 2021 FOR THE ESTABLISHMENT OF THE SEA-BASED AQUACULTURE DEVELOPMENT ZONE (ADZ) IN ALGOA BAY WITHIN THE NELSON MANDELA BAY METROPOLITAN MUNICIPALITY IN THE EASTERN CAPE PROVINCE

The Environmental Authorisation (EA) issued for the abovementioned application by this Department on 26 February 2020 and the Appeal Decision issued by the Minister of Justice and Correctional Services on 18 June 2021, refer.

Please be advised that the Department has re-issued the EA dated 26 February 2020 with amendments (corrections to typographical errors) based on the Appeal Decision dated 18 June 2021. The amended Environmental Authorisation (EA) is attached herewith.

The Appeal Decision dated 18 June 2021 found that the applicant intends to farm only indigenous finfish species, according to the information presented in the Basic Assessment Report (BAR), the approved Environmental Management Programme (EMPr) and on page 6 of the EA. However, pages 7 and 20 of the EA dated 26 February 2020 erroneously referred to Meagre (*Agyrosomus regius*), an alien finfish species. The Minister viewed this as a typographical error that does not detract from the overall reasons for approving the application. The Chief Director: Integrated Environmental Authorisations was directed to remove all references to Meagre (*Agyrosomus regius*) in the EA issued on 26 February 2020, and thereafter issue the applicant with the amended EA. The EA dated 26 February 2020 has accordingly been amended to remove all references to Meagre (*Agyrosomus regius*).

The attached amended EA replaces the EA dated 26 February 2020. All further applications for amendment of the EA in terms of the EIA Regulations, 2014, as amended, must be lodged on the attached EA.

Yours faithfully

Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Forestry, Fisheries and the Environment
Date: 27/09/2021

CC:	Dr B Clark	Anchor Research and Monitoring (Pty) Ltd	Tel: 021-701-3420	Email: vera@anchorenvironmental.co.za
	Mr D Govender	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism	Tel: 041-508-5800	Email: davalan.govender@dedea.gov.za
	Mr J Mkosana	Nelson Mandela Bay Metropolitan Municipality	Tel: 041-506-5444	Email: JMkosana@mandelametro.gov.za

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Environmental Authorisation

In terms of regulation 25 of the Environmental Impact Assessment Regulations, 2014

The establishment of the Sea Based Aquaculture Development Zone (ADZ) in Algoa Bay within the Nelson Mandela Bay Metropolitan Municipality in the Eastern Cape Province

Nelson Mandela Bay Metropolitan Municipality

Authorisation register number:	*14/12/16/3/3/1/2055*
Last amended:	*Second issue*
Holder of authorisation:	*Department of Forestry, Fisheries and the Environment: Aquaculture and Economic Development*
Location of activity:	*EASTERN CAPE PROVINCE: Algoa Bay, Within Nelson Mandela Bay Metropolitan Municipality.*

This environmental authorisation does not negate the holder of the authorisation's responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the activity.

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Decision

The Department is satisfied, on the basis of information available to it and subject to compliance with the conditions of this environmental authorisation, that the applicant should be authorised to undertake the activities specified below.

Non-compliance with a condition of this environmental authorisation may result in criminal prosecution or other actions provided for in the National Environmental Management Act, 1998 (NEMA) and the Environmental Impact Assessment (EIA) regulations.

Details regarding the basis on which the Department reached this decision are set out in Annexure 1.

Activities authorised

By virtue of the powers conferred on it by the National Environmental Management Act, 1998 (Act No.107 of 1998) and the Environmental Impact Assessment Regulations, 2014 the Department hereby authorises –

Department of Forestry, Fisheries and the Environment: Aquaculture and Economic Development

(hereafter referred to as the **holder of the authorisation**)

with the following contact details –

Ms Zimasa Jika
Department of Forestry, Fisheries and the Environment: Aquaculture and Economic Development
Private Bag X2
VLAEBERG
8018
Tel: 021 402 3116
Cell: 082 332 7943
E-mail: zjika@environment.gov.za

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to undertake the following activities (hereafter referred to as "the activity") indicated in Listing Notice 1 (GN R. 983):

Listed activities	Activity/Project description
GN R983 Item 7: *The development and related operation of facilities, infrastructure or structures for aquaculture of sea-based cage culture of finfish, crustaceans, reptiles, amphibians, molluscs, echinoderms and aquatic plants, where the facility, infrastructure or structures will have a production output exceeding 50 000 kg per annum (wet weight).*	*Production output for finfish is proposed as a phased approach, commencing with a pilot scale for 1000 tons/annum and potentially expanding over a period of 3-5 years to carrying capacity (species and location specific).*
GN R983 Item 15: *The development of structures in the coastal public property where the development footprint is bigger than 50 square metres*	*Structures associated with the fish cages, bivalve structures, and boat mooring facilities. The total ADZ area will exceed 50 square metres in coastal public property.*
GN R983 Item 17: *Development-* *(i) in the sea;* *In respect of-* *(e) infrastructure or structures with a development footprint of 50 square metres or more*	*Individual operators will moor the finfish cages and bivalve farming structures to the seafloor. The combined footprint is likely to exceed 50 square metres.*
GN R983 Item 19A: *The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from—* *(iii) the sea*	*Individual operators will moor the finfish cages and bivalve farming structures to the seafloor. The combined volume to be deposited on the sea floor exceeds 5 cubic metres.*
GN R983 Item 42: *The expansion and related operation of facilities, infrastructure or structures for aquaculture of sea-*	*There is an existing oyster farming facility (Zwembesi Farms, Knysna Oyster Company*

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Listed activities	Activity/Project description
based cage culture of finfish, crustaceans, reptiles, amphibians, molluscs, echinoderms and aquatic plants where the annual production output of such facility, infrastructure or structures will be increased by 50 000 kg (wet weight) or more.	*(Pty) Ltd), which will be expanded as part of the ADZ.*
GN R983 Item 54: *The expansion of facilities-* *(i) in the sea;* *in respect of-* *infrastructure or structures where the development footprint is expanded by 50 square metres or more,*	*There is an existing oyster farming facility (Zwembesi Farms, Knysna Oyster Company (Pty) Ltd), which will be expanded as part of the ADZ.*
GN R983 Item 67: *Phased activities for all activities—* *(i) listed in this Notice, which commenced on or after the effective date of this Notice similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;* *where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.*	*The proposed development will occur in stages, where individual operators will contribute to the expansion of the ADZ as a whole.*

as described in the Basic Assessment Report (BAR) dated October 2019 at:

Algoa 1 Option 1 – Summerstrand

Points	Latitude	Longitude
Centre	33° 58.610'S	25° 42.322'E
Corner points, clockwise from the northwest corner:	33° 57.440'S	25° 41.311'E
	33° 58.452'S	25° 42.781'E
	33° 59.409'S	25° 42.726'E
	33° 59.283'S	25° 42.630'E
	33° 59.296'S	25° 42.224'E

Algoa 6 – Port Elizabeth Harbour

Points	Latitude	Longitude
Centre	33° 56.020'S	25° 37.651'E
Corner points, clockwise from the northwest corner	33° 54.624'S	25° 37.668'E
	33° 54.619'S	25° 37.979'E
	33° 57.258'S	25° 37.998'E
	33° 57.256'S	25° 37.519'E
	33° 56.571'S	25° 37.210'E
	33° 55.551'S	25° 37.272'E

Algoa 7 – Ngqura Harbour

Points	Latitude	Longitude
Centre	33° 50.105'S	25° 43.098'E
Corner points, clockwise from the northwest corner	33° 50.105'S	25° 43.098'E
	33° 49.722'S	25° 41.996'E
	33° 49.717'S	25° 43.652'E
	33° 50.472'S	25° 44.148'E
	33° 50.468'S;	25° 42.497'E

the location indicated in the locality plan, attached as Annexure 2 of this authorisation

- for the establishment of a Sea-Based Aquaculture Development Zone (ADZ) in Algoa Bay in the Nelson Mandela Metropolitan Municipality, Eastern Cape Province, hereafter referred to as "the property".

The recommended post-mitigation scenario for the project will include the following sites:

(a) **ADZ Precincts**

The precincts considered in this application include Algoa 1 Option 1, 6 and 7, and each of these sites has been described in more detail below.

- **Algoa 1 Option 1 (Summerstrand Site) – Bivalve culture (Oyster and Mussels)**

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Algoa 1 Option 1 measures approximately 284.4ha and lies approximately 2km offshore from the popular beaches of the southern suburbs of Port Elizabeth (King's Beach, Humewood Beach, Hobie Beach, and Pollock Beach).

- **Algoa 6 (Port Elizabeth Harbour Site) – Bivalve culture (Oyster and Mussels)**
  The site measures approximately 479ha and is located in water ranging in depth from 5-12m. This site is situated adjacent to the Port Elizabeth harbour wall and extends parallel to the shoreline for approximately 4.8km.

- **Algoa 7 (Ngqura Harbour site) – Finfish Culture**
  Algoa 7 has been identified as a potential site for finfish culture. This site measures 355ha in size and is positioned approximately 3km offshore from the Ngqura harbour and adjacent to the recently promulgated Addo Marine Protected Area (MPA)

Precinct	Size (ha)
Algoa 1 Option 1 – Summerstrand	*284.4 ha*
Algoa 6 - Port Elizabeth Harbour	*479 ha*
Algoa 7 – Ngqura Harbour	*355 ha*
Total ADZ size	*1 118.4 ha*

(b) **Species and methods for aquaculture production**

The following species are considered for farming in the ADZ:

- Currently cultivated bivalve species:
  - Pacific oyster (*Crassostrea gigas*) (alien)
- New bivalve species:
  - Cape Rock Oyster *Striostrea margaritacea* (indigenous)
  - Black mussel *Choromytilus meridionalis* (indigenous)
  - Brown mussel *Perna perna* (indigenous)
  - Mediterranean mussel *Mytilus galloprovincialis* (alien)
- New finfish species (only indigenous species are considered):
  - Yellowtail (*Seriola lalandi*)
  - Dusky kob (*Argyrosomus japonicas*)
  - Silver kob (*Argyrosomus inodorus*)

- Yellowfin tuna (*Thunnus albacares*)
- Sole
- Geelbek (*Atractoscion aequidens*)
- Spotted grunter (*Pomadasys commersonnii*)
- White steenbras (*Lithognathus lithognathus*)
- White stumpnose (*Rhabdosargus globiceps*)
- Red roman (*Chrysoblephus laticeps*)

Viable production methods for farming in the ADZ:

- Longlines for bivalve culture, comprising a surface rope with floats and moored at each end to fix the line in position. The production ropes for mussels or oyster racks are then suspended from the surface rope;
- Cages for finfish production, constructed of circular flexible high-density polyethylene with multimooring systems.

(c) Finfish Production Volumes

Precinct	Species	Total annual production per ADZ precinct
Algoa 7	*Seriola lalandi*	3 555

A precautionary phased approach *is proposed for finfish farming in the ADZ, where activities in the first year of operation would be limited to pilot operations producing 1000 tonnes finfish per annum for the entire ADZ. Bio-physical and socio-economic monitoring studies will be conducted during the first phase of the establishment of the ADZ and would determine the acceptable maximum scale of the ADZ based on observed environmental impacts. The phased approach would be overseen by the ADZ Management Committee (AMC) and the Consultative Forum.*

(d) Sea-based Aquaculture Activities

Sea-based activities associated with aquaculture in the ADZ include:

- Servicing and maintenance of aquaculture structures (such as rafts, lines, cages);
- Seeding/acclimating and harvesting of cultivated species;
- Harvesting of cultivated species;

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- Initial processing of bivalves, including de-clumping and grading, typically on the raft or support vessel; and
- Vessel trips between the shore and aquaculture areas, e.g. to service structures or harvest species.

(e) Associated Sea-based Infrastructure

Besides the rafts, lines, cages and barrels (including moorings and flotation devices) required for aquaculture, the following associated sea-based infrastructure is required:

- Navigational lights demarcating aquaculture areas; and
- Mooring facilities for boats.

*Note that this environmental authorisation **does not include the following:***

1) *Authorisation of the land based facilities, since the detailed information for land based facilities will depend on the specific cultivated species and production methods chosen by the individual operators within the ADZ. Should the land based activities of the individual operators leasing areas within the ADZ trigger any listed activities in terms of the NEMA EIA Regulations, authorisation for those land based activities will need to be obtained from the relevant Competent Authority prior to commencement of the activity by the individual operators; and*
2) Authorisation of currently allocated and farmed areas within the ADZ, since these areas are already existing.
3) *Algoa 1 – Option1- : Summerstrand, with a total areas of 27.6 ha located as per the below geographic coordinates:*

Points	Latitude	Longitude
Excised Area as per recommendations in the marine ecology and socio-economic studies:	33° 58.811'S	25° 42.025'E
	33° 58.685'S	25° 42.407'E
	33° 58.468'S	25° 42.302'E
	33° 58.593'S	25° 41.921'E

Conditions of this Environmental Authorisation

Scope of authorisation

1. The post mitigation scenario presented as Option B (bivalve farming at Algoa 1 Option 1, bivalve farming at Algoa 6 and finfish farming at Algoa 7) as the preferred Alternative Option for the establishment of the Sea-Based Aquaculture Development Zone (ADZ) in Algoa Bay, within the Nelson Mandela Metropolitan Municipality in the Eastern Cape Province is approved as per the geographic coordinates cited above (excluding currently allocated and farmed areas, and areas where authorisations have been issued to other aquaculture operators for the same areas, as per the above).
2. Authorisation of the activity is subject to the conditions contained in this environmental authorisation, which form part of the environmental authorisation and are binding on the holder of the authorisation.
3. The holder of the authorisation is responsible for ensuring compliance with the conditions contained in this environmental authorisation. This includes any person acting on the holder's behalf, including but not limited to, an agent, servant, contractor, sub-contractor, employee, consultant or person rendering a service to the holder of the authorisation.
4. The activities authorised may only be carried out at the property as described above.
5. Any changes to, or deviations from, the project description set out in this environmental authorisation must be approved, in writing, by the Department before such changes or deviations may be effected. In assessing whether to grant such approval or not, the Department may request such information as it deems necessary to evaluate the significance and impacts of such changes or deviations and it may be necessary for the holder of the authorisation to apply for further environmental authorisation in terms of the regulations.
6. The holder of an environmental authorisation must apply for an amendment of the environmental authorisation with the competent authority for any alienation, transfer or change of ownership rights on the property on which the activity is to take place.
7. This activity must commence within a period of five (05) years from the date of issue of this environmental authorisation. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken.

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8. Commencement with one activity listed in terms of this environmental authorisation constitutes commencement of all authorised activities.
9. Construction must be completed within five (05) years of the commencement of the activity on site.

Notification of authorisation and right to appeal

10. The holder of the authorisation must notify every registered interested and affected party, in writing and within 14 (fourteen) calendar days of the date of this environmental authorisation, of the decision to authorise the activity.
11. The notification referred to must –

11.1. specify the date on which the authorisation was issued;

11.2. inform the interested and affected party of the appeal procedure provided for in the National Appeal Regulations, 2014;

11.3. advise the interested and affected party that a copy of the authorisation will be furnished on request; and

11.4. give the reasons of the competent authority for the decision.

Commencement of the activity

12. The authorised activity shall not commence until the period for the submission of appeals has lapsed as per the National Appeal Regulations, 2014 and no appeal has been lodged against the decision. In terms of section 43(7), an appeal under section 43 of the National Environmental Management Act, 1998 will suspend the environmental authorisation or any provision or condition attached thereto. In the instance where an appeal is lodged you may not commence with the activity until such time that the appeal has been finalised.

Management of the activity

13. The Environmental Management Programme (EMPr) submitted as part of the Application for EA is hereby approved. This EMPr must be implemented and strictly adhered to. Individual operators must compile individual site specific EMPrs for the individual farms that are to be leased in the ADZ. The individual EMPrs must be in line with the recommendations of this overarching approved EMPr and the conditions of this EA. The individual EMPrs must be submitted to the ADZ Monitoring

Committee (AMC) (see Condition 14 below) for endorsement and to the Department for record keeping purposes, before commencement of operations by the individual operator.

ADZ Management

14. To ensure appropriate ADZ management, two management bodies must be established by the holder of the authorisation prior to commencement of the activity.

14.1. An ADZ Management Committee (AMC), comprising of, but not limited to, the following:

- Department of Forestry, Fisheries and the Environment (DFFE):
  - Aquaculture and Economic Development;
  - Oceans and Coasts;
  - Biodiversity Management;
  - Compliance Monitoring;
- Eastern Cape Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT);
- The Nelson Mandela Bay Municipality;
- Transnet National Port Authority:
  - Port of Ngqura;
  - Port of Port Elizabeth;
- South African Civil Aviation: Environment Department; and
- Department of Sport and Recreation (national, provincial and local).

14.2. A Consultative Forum that includes other relevant government departments and relevant local/public interest organisations, to review environmental monitoring data, advise on management and recommend measures to the AMC. The Consultative Forum will therefore feed into the AMC through outputs that it provides to the AMC for consideration..

15. Upon establishment of the Consultative Forum, a notice must be published in a local newspaper announcing the creation of the Consultative Forum, providing contact details for the Consultative Forum Secretariat and inviting interested stakeholders to register on a stakeholder database to receive relevant notifications about the ADZ.

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ADZ Management Committee

16. The function of the AMC is to oversee, facilitate, manage and monitor aquaculture operations in the ADZ. The Department of Forestry, Fisheries and the Environment: Aquaculture and Economic Development (DFFE: AED), as the applicant, is primarily responsible for day-to-day management of the ADZ and ensuring the implementation of and adherence to the overarching approved EMPr, with appropriate support and guidance provided by the other AMC members:
17. The AMC must meet before the commencement of construction activities to appoint a Chairperson, an Environmental Control Officer (ECO), and to discuss the Terms of Reference (the member constitution, purpose, outcomes, roles and functions of the AMC, including but not limited those specified in this authorisation). From then on, the AMC must sit once every two months and special meetings can be convened on special or emergency situations.
18. The AMC must be consulted before the appointment of the project ECO, to ensure that they are suitably qualified and have the relevant expertise to monitor and ensure compliance with the conditions of the EA and EMPr.
19. The Chairperson must be an independent person, with experience in the environmental management and marine aquaculture field and/ or industry.
20. Key functions of the AMC are to:
    - 20.1. Monitor aquaculture operators' compliance with the EMPr and ADZ EA conditions;
    - 20.2. Oversee environmental monitoring related to aquaculture in Algoa Bay;
    - 20.3. Monitor production volumes in the ADZ;
    - 20.4. Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised ADZ;
    - 20.5. Settle disputes regarding the interpretation of requirements in the EMPr and EA;
    - 20.6. Receive and manage stakeholder comments;
    - 20.7. Record and, if necessary, coordinate a response to environmental incidents related to aquaculture operations;
    - 20.8. Review and comment on new / expanded aquaculture farm proposals within the approved ADZ; and
    - 20.9. Provide updated information to the public (*e.g.* farm coordinates, water quality information, and notification of new aquaculture operations).
21. The AMC organisational structure must make provision for various functions, including:
    - 21.1. Chairperson: Calls and chairs meetings of the AMC;

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21.2. Secretariat: Fulfils secretariat functions, including:

21.2.1. Maintenance of member details and arrangement of meetings;

21.2.2. Compiling and distribution of meeting notes;

21.2.3. Distribution of communication to AMC members and aquaculture farmers in the ADZ;

21.2.4. Maintenance of a database of registered (public) stakeholders;

21.2.5. Drafting and distribution of regular (at least biannual) AMC Reports to all Consultative Forum members and registered stakeholders on activities in the ADZ;

21.2.6. Administration of and responding to stakeholder comments on aquaculture activities in the ADZ; and

21.2.7. Reporting on stakeholder aspects at AMC meetings.

21.3. Environmental Representative: Fulfils environmental control functions, including:

21.3.1. Liaising with the suitably qualified service provider(s) appointed to attend to environmental sampling, monitoring and auditing aspects in the ADZ to ensure that monitoring is implemented as per the requirements;

21.3.2. Receiving and reviewing monthly Farm Monitoring Reports;

21.3.3. Receiving and reviewing environmental sampling, monitoring and audit results;

21.3.4. Notifying the Chairperson in the event any aspects require immediate attention of the AMC;

21.3.5. Notifying the Secretariat in the event any aspects require immediate attention of other aquaculture farmers in the ADZ; and

21.3.6. Reporting on environmental aspects at AMC meetings.

Consultative Forum

22. The holder of the authorisation must invite representatives of other relevant government departments, authorities, relevant local / public interest organisations and ADZ operators to become members of the Consultative Forum, including the following institutions / organisations:

22.1. Government and authorities:

- South African National Parks (SANParks);
- Eastern Cape Department of Agriculture and Land Affairs;
- South African Heritage Resource Agency (SAHRA) – Maritime and Underwater Cultural Heritage (MUCH) Unit;

- Nelson Mandela Bay Metropolitan Municipality; and
- Sarah Baartman District Municipality.

22.2. Aquaculture Industry:

- Local industry association representing operators in the ADZ; and
- Farmers operating in the ADZ.

22.3. Other organisations:

- Eastern Cape Parks and Tourism Agency;
- Representatives from the various user groups (tourism, fisheries, diving, yachting, surfing, lifesaving etc.);
- Representatives of sport events and festivals including, but not limited to:
  - Splash Festival;
  - Jendamark Nelson Mandela Bay Bell Buoy Challenge;
  - City Lodge Hotels' 3 Beaches Challenge;
  - Summer Triathlon Series;
  - City Surf Pro;
  - aQuellé Ocean Racing Series;
  - Lifesaving competitions;
  - International Yachting Volvo Ocean Race;
  - National and international Hobie 16 Championships;
  - Mirror Worlds Championships;
- Scientific representatives from NMU and/or Rhodes Universities;
- South African Environmental Observation Network (SAEON);
- Wildlife and Environmental Society of South Africa (WESSA);
- Southern African Foundation for the Conservation of Coastal Birds (SANCCOB);
- Endangered Wildlife Trust (EWT);
- Ratepayers Associations and members of the public; and
- Airports Company South Africa Port Elizabeth.

23. Forum members will join on a voluntary basis and at no costs to DFFE: AED.

24. Key functions of the Consultative Forum are to:

24.1. Review environmental monitoring data related to aquaculture in Algoa Bay;

24.2. Make recommendations to the AMC based on the outcomes of environmental monitoring; and

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24.3. Provide a platform for discussion of environmental management in the ADZ and advise the AMC on ADZ Management.

Frequency and process of updating the EMPr

25. The EMPr must be updated where the findings of the environmental audit reports, contemplated in Condition 32 below, indicate insufficient mitigation of environmental impacts associated with the undertaking of the activity, or insufficient levels of compliance with the environmental authorisation or EMPr.
26. The updated EMPr must contain recommendations to rectify the shortcomings identified in the environmental audit report.
27. The updated EMPr must be submitted to the Department for approval together with the environmental audit report, as per Regulation 34 of GN R. 982. The updated EMPr must have been subjected to a public participation process, which process has been agreed to by the Department, prior to submission of the updated EMPr to the Department for approval.
28. In assessing whether to grant approval of an EMPr which has been updated as a result of an audit, the Department will consider the processes prescribed in Regulation 35 of GN R.982. Prior to approving an amended EMPr, the Department may request such amendments to the EMPr as it deems appropriate to ensure that the EMPr sufficiently provides for avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.
29. The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. In assessing whether to grant such approval or not, the Department will consider the processes and requirements prescribed in Regulation 37 of GN R. 982.

Monitoring

30. The holder of the authorisation must appoint a suitably qualified and experienced independent Environmental Control Officer (ECO) for the construction and operational phase of the development that will have the responsibility to ensure that the mitigation/rehabilitation measures and recommendations referred to in this authorisation are implemented and to ensure compliance with the provisions of the EMPr.

30.1. The ECO must be appointed before commencement of any authorised activities.

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30.2. Once appointed, the name and contact details of the ECO must be submitted to the *Director: Compliance Monitoring* of the Department.

30.3. The ECO must keep record of all activities on site, problems identified, transgressions noted and a schedule of tasks undertaken by the ECO.

30.4. All monitoring studies conducted/commissioned by the Department of Agriculture, Forestry and Fisheries within Algoa Bay must be reviewed by an independent specialist to verify findings before the report is submitted to the AMC.

30.5. *Individual operators must ensure that daily monitoring is undertaken. Findings of the daily monitoring must be verified* and signed off by the ECO on a monthly basis and reflected in the ECO reports, which must be presented by the ECO to the AMC at the bi-monthly meetings.

30.6. The ECO must also submit a detailed and comprehensive monitoring report to the Directorate: Compliance Monitoring on a monthly basis. A summarised version of this report must also be made available to all AMC members on a monthly basis.

Recording and reporting to the Department

31. All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the Department in terms of this environmental authorisation, must be submitted to the *Director: Compliance Monitoring* of the Department at Directorcompliance@environment.gov.za.
32. The holder of the environmental authorisation must, for the period during which the environmental authorisation and EMPr remain valid, ensure that project compliance with the conditions of the environmental authorisation and the EMPr are audited, and that the audit reports are submitted to the *Director: Compliance Monitoring* of the Department at Directorcompliance@environment.gov.za.
33. The frequency of auditing and of submission of the environmental audit reports must be as per the frequency indicated in the EMPr, taking into account the processes for such auditing as prescribed in Regulation 34 of GN R. 982.
34. The holder of the authorisation must, in addition, submit an environmental audit report to the Department within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and a final environmental audit report within 30 days of completion of rehabilitation activities.
35. The environmental audit reports must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014 and must indicate the date of the audit, the name of the auditor and the outcome

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of the audit in terms of compliance with the environmental authorisation conditions as well as the requirements of the approved EMPr.

36. Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

Notification to authorities

37. A written notification of commencement must be given to the Department no later than fourteen (14) days prior to the commencement of the activity. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence, as well as a reference number.

Operation of the activity

38. A written notification of operation must be given to the Department no later than fourteen (14) days prior to the commencement of the activity operational phase.

Site closure and decommissioning

39. Should the activity ever cease or become redundant, the holder of the authorisation must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and competent authority at that time.

Specific conditions

40. Carrying capacity for Algoa 7 must be verified through environmental monitoring
41. Access to the Basket Star dive site must be maintained to reduce impacts on the diving industry.
42. An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Any solid waste must be disposed of at a landfill licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No.59 of 2008).
43. Mariculture infrastructure must not be moored over long-lived biogenic habitats (*e.g.* reefs). The extent of the of the reef must be confirmed prior to commencement of construction activities and no

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mariculture infrastructure must be situated within 200m buffer zone around the geographic coordinates S33° 58. 620'; E25° 42. 223'.

44. Underwater videography; diver operated or by using drop cameras or remotely operated vehicles must be used to determine the extent of the reef.
45. A finfish biosecurity management plan must be developed to provide mitigation measures to (1) reduce the likelihood of finfish escape occurring; (2) ensure comprehensive training of staff; (3) monitor stock comprehensively for disease and/parasites as part of a formalised stock health monitoring programme and take necessary action to eliminate pathogens through the use of therapeutic chemicals or improved farm management (lowest effective dose); (4) locate cages stocked with different cohorts of the same species as far apart as possible (no less than 100m).
46. Genetic compatibility between wild and cultured finfish stock must be facilitated by the implementation of the "Genetic Best Practice Management Guidelines for Marine Finfish Hatcheries" developed by DFFE: AED and ensure adequate genetic monitoring.
47. Appropriate predator nets and visual deterrents must be installed and maintained for finfish culture. A protocol for dealing with problem piscivores in conjunction with experts and officials should be developed.
48. The cleaning of biofouled infrastructure (ropes *etc.*) for oysters must be conducted in such a way as to minimise deposition to the seafloor beneath the farms (*i.e.* biofouling must be collected as deposited of at a suitable onshore disposal facility). Routine surveillance on and around marine farm structures, associated vessels and infrastructure must be undertaken for indications of non-native fouling species. If spat import cannot be avoided, culture facilities should only be permitted to use spat sourced from biosecure certified hatcheries and/or quarantine facilities.
49. Diver surveys must be completed during the activities required for setting anchor arrays. Commercial divers working on the project must be provided with brief orientation training. If wreck material is identified, archaeologists must be contracted to make an assessment.
50. Benthic Mapping / survey of the area under individual farms must be undertaken by prospective operators before the commencement of the operational phase in order to establish baseline conditions for monitoring purposes.
51. Monitoring points must be established before the commencement of farming activities on each site in order to measure pre-farming baseline conditions with observed conditions during the operational phase. The number and placement of these monitoring points, and the parameters measured, must be appropriate to the mariculture activity type (and its by-products) at that site, the benthic habitat at that site, as well as the prevailing environmental conditions (such as the dominant current

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directions). The information gathered from monitoring points must be used to guide the phased development of each site.

52. Predictive dispersion models must be developed within 2 years of new aquaculture activities commencing and these must be used together with monitoring and other information to inform the continuous management of the Algoa Bay Aquaculture Development Zone.
53. Any geophysical data generated to support the development of aquaculture in this area must be archaeologically reviewed for the presence of historical shipwrecks or related material and to ground truth proposed mooring locations. Datasets that are particularly useful in this regard are magnetometer, side scan sonar and multibeam bathymetric data. An archaeologist must be consulted before data are collected to ensure that the survey specifications and data outputs are suitable for archaeological review.
54. Any video footage collected support to development of aquaculture in the three areas should ideally also be reviewed by the archaeologist for evidence of shipwreck material on the seabed.
55. If geophysical data are not collected, the proposed positions of all moorings must be ground truthed by suitably qualified divers.
56. Should the reviews and ground truthing set out above identify wreck material at or near the location of any proposed mooring, micro-siting of the mooring and the possible implementation of an exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site.
57. Should any archaeological material, be accidentally encountered during the course of developing aquaculture operations in any of the proposed areas, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.
58. A detailed anchor distribution plan must be provided to the Maritime and Underwater Cultural Heritage Unit at SAHRA once this has been finalised. This plan can be used to reassess potential shipwreck impacts to assist developers in determining whether to amend placement plans to avoid incurring further heritage intervention costs.

ADZ phasing-in of aquaculture expansion

59. Due to the impact level observed even after mitigation and the inclusion of Algoa 7 (MPA site) in options A, B and C, it is recommended that no more than three finfish operators should be approved for an initial pilot phase, with a total annual production for the ADZ not exceeding 1 000 tonnes in the first year.

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60. Should monitoring reveal acceptable impacts as defined by the environmental quality objectives, indicators and performance measures, operators should be permitted to increase production from pilot phase to full commercial scale (not exceeding the carrying capacity at each site for *Seriola lalandi* and *Argyrosomus sp.* as recommended in over at least a three year period, provided that resource quality objectives are maintained.

Precinct	Species	Total annual production per ADZ precinct
Algoa 7	*Seriola lalandi*	3 555

61. The holder of the authorisation must ensure that the findings of the dispersion modelling inform the site specific EMPrs (to be compiled individual operators), Sampling Plan, ADZ layout and expansion.
62. Environmental monitoring must be implemented to inform management and expansion of operations as part of the phased approach

General

63. A copy of this environmental authorisation, the audit and compliance monitoring reports, and the approved EMPr, must be made available for inspection and copying-

63.1. at the site of the authorised activity;

63.2. to anyone on request; and

63.3. where the holder of the environmental authorisation has a website, on such publicly accessible website.

64. National government, provincial government, local authorities or committees appointed in terms of the conditions of this authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the holder of the authorisation or his/her successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the holder of the authorisation with the conditions of authorisation as set out in this document or any other subsequent document emanating from these conditions of authorisation.

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Date of First Issue of the Environmental Authorisation: 26 February 2020

Date of Second Issue: 27/01/2021

Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Forestry, Fisheries and the Environment

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Annexure 1: Reasons for Decision

1. Information considered in making the decision

In reaching its decision, the Department took, *inter alia,* the following into consideration -

a) The information contained in the final BAR dated October 2019;
b) The comments received from DFFE: Branch: Oceans and Coasts; Eastern Cape Department of Economic Development, Environmental Affairs and Tourism; the Nelson Mandela Bay Metropolitan Municipality; SANParks; WESSA; SAHRA; and Interested and Affected Parties as included in the final BAR dated October 2019;
c) Mitigation measures as proposed in the BAR dated October 2019 and the EMPr;
d) The information contained in the specialist studies contained in the BAR; and
e) The objectives and requirements of relevant legislation, policies and guidelines, including section 2 of the National Environmental Management Act, 1998 (Act No.107 of 1998).

2. Key factors considered in making the decision

All information presented to the Department was taken into account in the Department's consideration of the application. A summary of the issues which, in the Department's view, were of the most significance is set out below.

a) The existing areas are not authorised as part of this environmental authorisation, however the approved ADZ EMPr must inform and be used to manage any future expansion of allocated existing areas.
b) The findings of all the specialist studies conducted and their recommended mitigation measures.
c) In terms of need and desirability, the proposed project could indirectly improve food security by providing job opportunities and contributing to the local and regional economy. Furthermore, the proposed project could contribute to import substitution and therefore create local opportunities instead of purchasing products were socio economic impacts are realised elsewhere, (although this benefit is incumbent on ensuring that existing and planned projects and plans related to the tourism industry are not impacted negatively). Emerging trends, which are also applicable to

South Africa have shown that aquaculture (including marine finfish culture) could positively contribute to addressing the following:

- Increasing demand for fish products in the coming decades as a result of continued growth in the world population;
- Major increases in fish food production are forecasted to come from aquaculture;
- Lack of fresh water and space; and
- Marine aquaculture holds potential for sustained growth due to declining fishing catches.

d) The project forms part of a presidential initiative to unlock the potential of the oceans to create employment and income in coastal communities, and specifically aims to create incentives for development of the aquaculture industry in Algoa Bay, which has historically already provided skills development and employment in the area. As such, the project forms part of a government initiative and aims to further the objectives of the National Development Plan in terms of economic development.

e) Due to the impact level observed even after mitigation and the inclusion of Algoa 7 (MPA site) in options A, B and C, through a precautionary approach, it is recommended that no more than three finfish operators should be approved for an initial pilot phase, with a total annual production for the ADZ not exceeding 1 000 tonnes in the first year. Should monitoring reveal acceptable impacts as defined by the environmental quality objectives, indicators and performance measures, operators should be permitted to increase production from pilot phase to full commercial scale (not exceeding the carrying capacity at each site for *Seriola lalandi* and *Argyrosomus sp.* as recommended in over at least a three year period, provided that resource quality objectives are maintained.

f) The establishment of an ADZ Management Committee (AMC) and Consultative Forum will also help to ensure compliance with the approved EMPr and appropriate ADZ management.

g) The final BAR dated October 2017 identified all relevant environmental legislation and guidelines that have been considered in the preparation of the final BAR dated October 2019.

h) The methodology used in assessing the potential impacts identified in the final BAR dated October 2019 and the specialist studies has been adequately indicated.

i) A sufficient public participation process was undertaken and the applicant has satisfied the minimum requirements as prescribed in the EIA Regulations, 2014, as amended, for public involvement.

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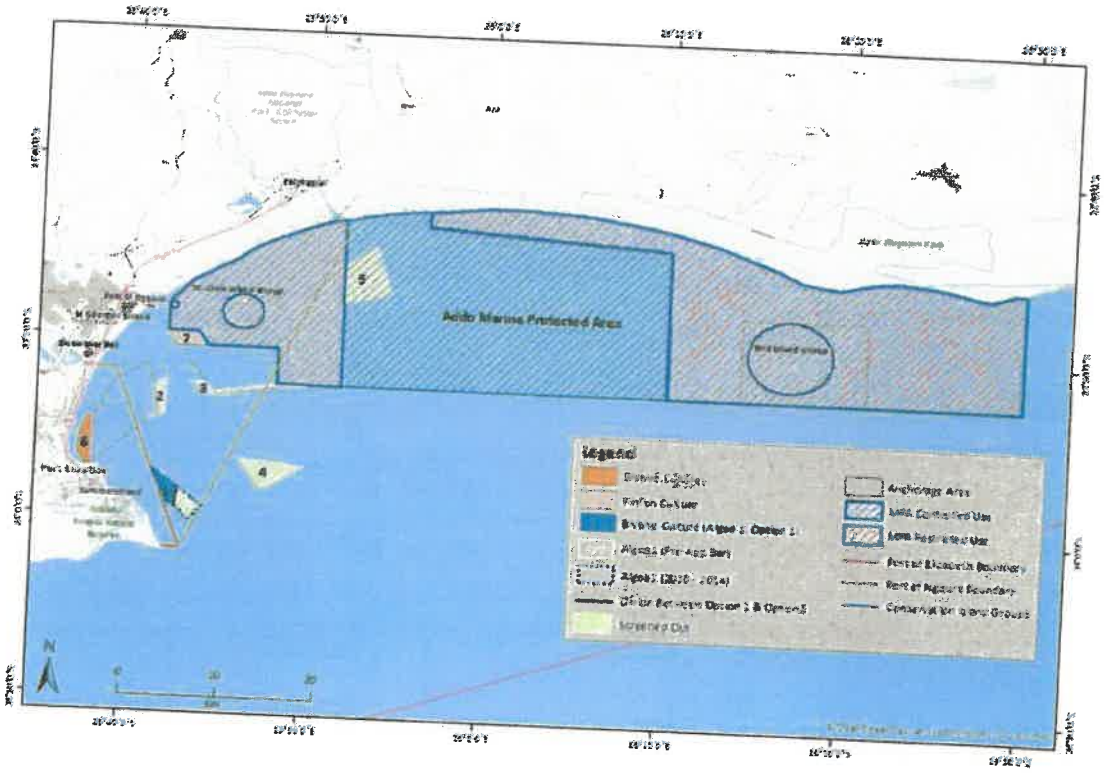
3. Findings

After consideration of the information and factors listed above, the Department made the following findings -

a) The identification and assessment of impacts are detailed in the final BAR dated October 2019 and sufficient assessment of the key identified issues and impacts have been completed.
b) The procedure followed for impact assessment is adequate for the decision-making process.
c) The proposed mitigation of impacts identified and assessed adequately curtails the identified impacts.
d) According to the independent Environmental Assessment Practitioner, the information contained in the final BAR dated October 2019 is accurate and credible.
e) EMPr measures for the pre-construction, construction and rehabilitation phases of the development were proposed and included in the final BAR and will be implemented to manage the identified environmental impacts during the construction phase.

In view of the above, the Department is satisfied that, subject to compliance with the conditions contained in the environmental authorisation, the authorised activities will not conflict with the general objectives of integrated environmental management laid down in Chapter 5 of the National Environmental Management Act, 1998 and that any potentially detrimental environmental impacts resulting from the authorised activities can be mitigated to acceptable levels. The environmental authorisation is accordingly granted.

Annexure 2: Locality Plan



ANNEXURE B

Environmental Management Programme

B

agriculture,
forestry & fisheries
Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

ALGOA BAY SEA-BASED AQUACULTURE DEVELOPMENT ZONE

FINAL BASIC ASSESSMENT REPORT

BASIC ASSESSMENT PROCESS IN TERMS OF THE
NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)

APPENDIX A: ENVIRONMENTAL MANAGEMENT PROGRAMME

ANCHOR
research & monitoring

Anchor Research & Monitoring Report No, 1808/3

ALGOA BAY
SEA-BASEDAQUACULTURE DEVELOPMENT ZONE

FINAL BASIC ASSESSMENT REPORT

BASIC ASSESSMENT PROCESS IN TERMS OF THE
NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)

APPENDIX A:
ENVIRONMENTAL MANAGEMENT PROGRAMME

October 2019

Report Prepared for:
Department of Agriculture, Forestry & Fisheries

Report Prepared by:

ANCHOR
research & monitoring

8 Steenberg House, Silverwood Close, Tokai 7945, South Africa
https://anchorenvironmental.co.za

Authors: Vera Massie, Ken Hutchings and Barry Clark

Citation: Massie V, Hutchings K and Clark B, 2019. Algoa Bay sea-based Aquaculture Development Zone – Final Basic Assessment Report: Appendix A Environmental Management Programme. Supporting documentation for the Basic Assessment process conducted in terms of the National Environmental Management Act (No. 107 of 1998). Report prepared for the Department of Agriculture, Forestry and Fisheries by Anchor Research and Monitoring (Pty) Ltd. Anchor Report Number: 1808/3, October 2019.

Title Page Photo Credit: Shutterstock

PROJECT DETAILS

Objective	Application for Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998)
Applicant	Department of Agriculture, Forestry & Fisheries
Environmental Assessment Practitioner (EAP)	Vera Massie under supervision of Dr Barry Clark from Anchor Research & Monitoring (Pty) Ltd
Anchor Project Name	Algoa Bay Sea-based Aquaculture Development Zone Basic Assessment Process
Anchor Project Number	1808
Report name	Algoa Bay sea-based Aquaculture Development Zone – Final Basic Assessment Report: Appendix A Environmental Management Programme. Supporting documentation for the Basic Assessment process conducted in terms of the National Environmental Management Act (No. 107 of 1998).
Status	Decision-making phase
Application submission date	19 July 2019
Competent Authority Reference	14/12/16/3/3/1/2055
Case Officer	Ms Matlhodi Mogorosi

OVERVIEW OF PROJECT OUTPUTS
BASIC ASSESSMENT REPORT AND APPENDICES

Basic Assessment Report (BAR)	Pre-Application BAR – Released for comment between 28 March and 30 April 2019 Draft BAR – Released for comment between 23 July 2019 and 4 September 2019 **Final BAR – Current – For submission to Competent Authority**
Appendix A	**Environmental Management Programme (EMPr)**
Appendix B	Details of EAP, Expertise and Declaration
Appendix C	Details of Specialists, Expertise and Declaration
Appendix D	Specialist studies: 1. Benthic Mapping Assessment for the Proposed Algoa Bay Sea-based Aquaculture Development Zone (Dawson *et al.* 2019) 2. Dispersion Modelling Study for the Proposed Algoa Bay Sea-based Aquaculture Development Zone (Wright *et al.* 2019) 3. Marine Specialist Study 2019 (Hutchings *et al.* 2019) 4. Maritime Underwater Heritage Specialist Study (Gribble 2019) 5. Comparative Assessments for the Development of the Proposed Sea-based Aquaculture Development Zone Located within Algoa Bay in the Eastern Cape in South Africa (Rhodes University August 2016) a. Socio-economic Report b. Ecological Report c. Feasibility study
Appendix E	Background Information Document
Appendix F	Stakeholder Consultation Report
Appendix G	Stakeholder comments and response table 1. Pre-application-phase stakeholder consultation 2. Application-phase stakeholder consultation
Appendix H	Additional Information

NOTE:

In response to stakeholder comments, the Draft Basic Assessment Report (BAR) and Appendices were updated at the end of the application-phase commenting period (23 July – 4 September 2019) to produce the Final BAR.

All changes to the content in the Final BAR and Appendices are underlined for easier reference (note that changes incorporated in the Draft BAR following pre-application consultation are no longer highlighted in the Final BAR).

Stakeholder comments received during the pre-application and application phase stakeholder engagement processes and responses by Anchor, specialists and DAFF, are included in Appendix F and G of the Final BAR.

PROFILE AND EXPERTISE OF EAP

Anchor Research and Monitoring (Pty) Ltd (Anchor) have been appointed by the Department of Agriculture, Forestry and Fisheries as the independent consultants to undertake the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 or 1998 (NEMA).

The Anchor group of companies is based in Cape Town, South Africa and have a core staff of sixteen professionals with tertiary level qualifications in environmental science and management. We offer ecological and economic expertise to inform management and decision making regarding the use and conservation of natural resources. Our main areas of focus are marine, estuarine and freshwater ecosystems, terrestrial, ecosystems, ecosystem services, livelihoods and socio-economics, resource economics, conservation policy, strategy and planning, natural resource management, environmental management and environmental flows. Our work includes ecological and socio-economic research and baseline studies, environmental impact assessments, environmental management plans and environmental flow assessments. We are experienced in ecological sampling methods, social survey methods, statistics and econometrics, ecological-economic modelling, geographic information systems as well as stakeholder coordination, engagement and maintaining of stakeholder relations.

As required by NEMA, the qualifications and expertise of the key individual practitioners responsible for this project are detailed below.

Project Director: Dr Barry Clark

Dr Barry Clark has twenty-one years' experience in marine biological research and consulting on coastal zone and marine issues. He has worked as a scientific researcher, lecturer and consultant and has experience in tropical, subtropical and temperate ecosystems. He is presently Director of the Anchor Group of Companies and Research Associate at the University of Cape Town. As a consultant has been concerned primarily with conservation planning, monitoring and assessment of human impacts on estuarine, rocky shore, sandy beach, mangrove, and coral reef ecosystems as well as coastal and littoral zone processes, aquaculture and fisheries. Dr Clark is the author of 27 scientific publications in class A scientific journals as well as numerous scientific reports and popular articles in the free press. Geographically, his main area of expertise is southern Africa (South Africa, Lesotho, Namibia, Mozambique, Tanzania, Seychelles, Mauritius and Angola), but he also has working experience from elsewhere in Africa (Cote d'Ivoire, Ghana, Nigeria), the Middle East (UAE) and Europe (Azerbaijan).

Project Manager: Vera Massie, BSc Hons (Environmental Management), MSc (Conservation Biology)

Vera earned degrees in marine biology, environmental management and conservation biology (MSc) from the University of Cape Town. Her training has equipped her to consult on research projects incorporating the maintenance and conservation of marine and estuarine ecosystems. She also consults on the biophysical, socio-economic and legal aspects in the assessment of human impacts on coastal and terrestrial environments in the temperate and tropical regions of South Africa. Working at the Anchor Group of Companies, she has gained experience in conducting environmental impact assessments, drafting environmental legislation, preparing guidelines and developing frameworks to facilitate successful implementation of legislation. Many of her projects involve the monitoring and evaluation of compliance with environmental laws and their associated regulations across varying economic sectors.

Project Review: Dr Ken Hutchings

Dr Hutchings has research and consulting experience in the fields of fisheries management, mariculture, estuarine research and management, marine and estuarine spatial planning, marine impact assessment, research and conservation strategy development, fishery socio-economic surveys and analyses, biological sampling and life-history analyses of fish (age and growth, reproduction, mortality, migration, diet, ecology), taxonomic methodology, population genetics, fisheries modelling, marine ecotoxicity trials, trace metal pollution and physico-chemical, ecological and biodiversity surveys of marine, estuarine and freshwater habitats. Dr Hutchings is experienced in developing estuarine and coastal management plans and in conducting public participation processes. Dr Hutchings is a research associate of the University of Cape Town's Marine Research Institute. He has excellent verbal and writing communication skills, is competent with most software packages used in scientific research and consulting projects. He has published 17 scientific papers and compiled more than 50 consulting reports. Dr Hutchings is comfortable working as part of a team in both a leadership and mentoring position or as a team member. Dr Hutchings has participated in international collaborative studies in Angola, Tanzania, Namibia, Sierra Leone and Mauritius and has visited and participated in fisheries in Mozambique, Madagascar, Seychelles, New Zealand and Belize. He was actively involved in commercial fishing around Cape Town for 14 years, has practical experience in several sectors and has good understanding of most commercial fishing methods (line, spear, pole, gill net, trammel, net, beach seine net, trap, longline, trawl and purse-seine). He has personally collected scientific data for the demersal trawl and longline hake fisheries, designed, implemented and managed fishery observer training programmes for line, longline, lobster trap and demersal trawl fisheries. He has project managed and completed two, three-year contract research projects for the South African Department of Environmental Affairs and Tourism (Marine and Coastal Management) and numerous consulting projects for state and private sector clients.

STATEMENT OF INDEPENDENCE: ANCHOR RESEARCH & MONITORING (PTY) LTD.

Neither Anchor nor any of the authors of this report have any material present or contingent interest in the outcome of this report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of Anchor.

Anchor has no prior association with the Department of Agriculture, Forestry and Fisheries (DAFF) in regard to the development that is the subject of this report, other than being the sub-consultant marine specialist during the previous EIA process conducted between 2010 and 2014. Anchor has no beneficial interest in the outcome of the assessment, which is capable of affecting its independence.

The fee paid to Anchor for completing this report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the report.

TABLE OF CONTENTS

GLOSSARY

Abalone	Abalone is a common name for any of a group of small to very large sea snails, marine gastropod molluscs in the family *Haliotidae*. Here it refers to the species *Haliotis midae*.
Alien	An organism occurring outside its natural past or present range and dispersal potential including any parts of the organism that might survive and subsequently reproduce (organisms whose dispersal is caused by human action).
Biosecurity	A set of preventive measures designed to reduce the risk of transmission of infectious diseases, quarantined pests, invasive alien species, and living modified organisms.
Conditional buffer zone	A sensitive area within a specified activity is not allowed unless the relevant specialist study has been conducted.
Invasive	Alien organisms that have naturalised in a new area and expanding their range.
No-go area	An area within no activities other than rehabilitation of the natural environment is permitted. (Note that this excludes areas outside the property boundary such as the Estuarine Functional Zone of the Buffels Estuary).
Partial no-go area	An area within no activities other than those specified in the Environmental Authorisation is permitted.
Solid waste	All solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
Species	Defined in terms of the National Environmental Management: Biodiversity Act (Act No 10 of 2004), which means a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind, and includes any subspecies, cultivar, variety, geographic race, strain, hybrid or geographically separate population.

LIST OF ABBREVIATIONS

ADZ	Aquaculture Development Zone
AMC	Aquaculture Development Zone Management Committee
AR&M	Anchor Research & Monitoring
BA	Basic Assessment
BAR	Basic Assessment Report
BBBEE	Broad-Based Black Economic Empowerment
CDC	Coega Development Corporation
CF	Consultative Forum
COD	Chemical Oxygen Demand
CWDP	Coastal Waters Discharge Permit
DAFF	Department of Agriculture Forestry and Fisheries
DEA	Department of Environmental Affairs
DEA:O&C	Department of Environmental Affairs Branch: Oceans & Coasts
DEDEAT	Eastern Cape Provincial Department of Economic Development, Environmental Affairs and Tourism
DM	District Municipality
DO	Dissolved oxygen
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
I&AP	Interested and Affected Party
ICMA	National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008)
IDP	Integrated Development Plan
LM	Local Municipality
MCM	Marine Coastal Management
MLRA	Marine Living Resources Act (Act 18 of 1998)
MPA	Marine Protected Area
NEM: WA	National Environmental Management: Waste Act (Act 59 of 2008)
NEM:BA	National Environmental Management: Biodiversity Act (Act No 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act 57 of 2003)
NEMA	National Environmental Management Act (Act 107 of 1998)

NHRA	National Heritage Resources Act
RMZ	Recommended Mixing Zone
SAHRA	South African Heritage Resources Agency
SAMSA	South African Maritime Safety Authority
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEZ	Special Economic Zone
SoE	State owned Enterprise
TSS	Total Suspended Solids
U.S.	United States
UNFAO	United Nations Food and Agriculture Organisation
VIA	Visual Impact Assessment
VRM	Visual Resource Management Africa CC
WWTW	Waste Water Treatment Works

1 INTRODUCTION

The Department of Agriculture, Forestry and Fisheries (DAFF[1]), as the lead agent for aquaculture management and development in South Africa, intends to establish and manage a sea-based Aquaculture Development Zone (ADZ) in Algoa Bay in the Eastern Cape. DAFF recently successfully established the first sea-based ADZ in Saldanha Bay in the Western Cape and has received an Environmental Authorisation for a land based ADZ in the Eastern Cape at Qolora. A Sea-based ADZ typically consists of a selection of designated precincts that provide opportunities for existing aquaculture operations to expand and new ones to be established. ADZs are intended to boost investor confidence by providing 'investment ready' platforms with strategic environmental approvals and management policies already in place, allowing commercial aquaculture operations to be set up without the need for lengthy, complex and expensive approval processes. It is anticipated that an ADZ will create incentives for industry growth, provide marine aquaculture services and enhance consumer confidence. An ADZ can provide economic benefits to the local community through job creation and regional economic diversification.

Aquaculture is one of the sectors that form part of Operation Phakisa under the Ocean's Economy in South Africa. Operation Phakisa is an initiative of the South African government which aims to implement priority economic and social programmes better, faster and more effectively. Operation Phakisa was launched by the President of the Republic in October 2014. The sector offers significant potential for rural development, especially for marginalised coastal communities. The proposed development will provide employment opportunities for the local and regional communities.

DAFF appointed Anchor Research & Monitoring (Pty) Ltd (Anchor) to undertake the Basic Assessment (BA) process for the proposed Aquaculture Development Zone in terms of the National Environmental Management Act 107 of 1998, as amended (NEMA). NEMA requires that an Environmental Management Programme (EMPr) be submitted with the Basic Assessment Report (BAR) to demonstrate how environmental management and mitigation measures will be implemented. An Environmental Management Programme (EMPr) applicable to the full project cycle of the proposed development is required for the effective management of environmental impacts.

The original EMPr for the ADZ during the previous EIA process was compiled by CapeEAPrac (Mackay and van Zyl 2012)[2]. Selected components of the EMPr compiled by CapeEAPrac were integrated into this EMPr and were updated where appropriate. The ADZ management structure and management measures contained in the EMPr produced by SRK Consulting for the Saldanha Bay ADZ (du Toit and

[1] Please note that the Presidency announced a new cabinet and appointed new Ministers in May 2019. The Department of Environmental Affairs was merged with the Fisheries and Forestry divisions of the Department of Agriculture, Forestry and Fisheries (formerly known as DAFF). The new merged Ministry is legally referred to as the Department of Environment, Forestry and Fisheries (DEFF). However, the implementation of the new Departments is still in progress and the Basic Assessment Report continues to refer to DAFF as the applicant and National DEA as the Competent Authority.

[2] Mackay and van Zyl 2012. Algoa Bay Sea-based Marine Aquaculture Development Zones –Basic Assessment Report: Appendix G Environmental Management Programme. Supporting documentation for the Basic Assessment process conducted in terms of the National Environmental Management Act (No. 107 of 1998). Report prepared for the Department of Agriculture, Forestry and Fisheries by CapeEAPrac, Report Reference: NMM101/18 Version 30 July 2012.

Reuther 2017)[3] were also integrated into this EMPr. The organisational structure as detailed in du Toit and Reuther (2017) is currently being implemented for the Saldanha Bay ADZ by DAFF (*pers. comm.* Michelle Pretorius 2019) and a similar structure for both ADZs will assist in the successful implementation of the EMPr.

This document, if approved by the National Department of Environmental Affairs (DEA -Competent Authority), represents the binding EMPr for the full project cycle of the ADZ at ADZ Management Level. Each operator must compile a farm-specific EMPr based on this ADZ EMPr, which is to be approved and continuously reviewed by the ADZ Management Committee (AMC) (i.e. adaptive management process).

The management and mitigation measures identified during the BA process apply to the following phases of the development:

- The Design Phase: These measures are applicable to the planning and design of the ADZ (Section 4). Note, however, that no environmental impacts are associated with the planning phase. All mitigation measures listed in this section have the purpose to minimise impacts during the construction and operational phase.
- The Construction Phase: These measures are applicable during the construction phase of the development (Section6).
- The Operation Phase: These measures are applicable during the long-term operation and maintenance of the ADZ (Section 7).
- The Decommissioning Phase: These mitigation measures are applicable during the decommissioning phase and refer to removal of mariculture infrastructure at sea (Section 8).

The measures listed for the various phases are either:

- **Essential:** Mitigation measures which must be implemented and are non-negotiable; or
- **Best practice:** Recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented. *These measures have been italicised for ease of reference.*

Note that the EMPr will be submitted to DEA for approval along with the BAR. In the event that an Environmental Authorisation is issued by the DEA, this document may need to be updated to ensure that all relevant conditions of authorisation are adequately captured. It is also recommended that the EMPr is reviewed regularly and, where necessary, amended and submitted to the DEA for acceptance.

It should be noted that DAFF has elected to exclude the southern portion of Algoa 1 from the application process. The remaining Algoa 1 area is referred to as 'Algoa 1 Option 1' in the Final BAR (Refer to the BAR Section 3.5.1 for more information). The footprint has been reduced from 522 to 312 ha. Furthermore, Based on the 'high' significance of negative economic impacts linked

[3] du Toit J and Reuther S. 2017. Proposed Sea-Based Aquaculture Development Zone in Saldanha Bay. Environmental Management Programme. Report prepared by SRK Consulting for the Department of Agriculture, Forestry and Fisheries. Report Number 499020/6. August 2017.

to finfish farming at Algoa 1 Option 1 after implementation of mitigation measures, DAFF has revised its priorities in respect of mariculture in Algoa Bay and has nominated Option B (bivalve farming at Algoa 1 Option 1, bivalve farming at Algoa 6 and finfish farming at Algoa 7) as the preferred Alternative Option. (Refer to Section 2.3 for more information on the alternative options).

1.1 Content of the Environmental Management Programme

The 2014 EIA Regulations (as amended in 2017) prescribe the required content of an EMPr. These requirements, and the sections of this EMPr in which they are addressed, are summarised in Table 1.

Table 1 Content of the EMPr as prescribed by the 2014 EIA Regulations.

GN 326	Item	Section Ref.:
(a)(i)	Details of the EAP who prepared the EMPr	Title Page, Page i
(a)(ii)	Expertise of that EAP to prepare an EMPr, including a curriculum vitae (company profile enclosed)	Page i
(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Chapter 2
(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Chapter 1
(d)	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Chapter 3
(d)(i)	Planning and design	Chapter 3
(d)(ii)	Pre-construction activities	Chapter 3
(d)(iii)	Construction activities	Chapter 3
(d)(iv)	Rehabilitation of the environment after construction and where applicable post closure; and	N/A
(d)(v)	Where relevant, operation activities	Chapter 3
(f)	A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to —	5-8
(f)(i)	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	5-8
(f)(ii)	Comply with any prescribed environmental management standards or practices;	5-8
(f)(iii)	Comply with any applicable provisions of the Act regarding closure, where applicable; and	N/A
(f)(iv)	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A
(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	9
(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	9

GN 326	Item	Section Ref.:
(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	5-9
(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	5-9
(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f)	5-9
(l)	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	10
(m)	An environmental awareness plan describing the manner in which-	
(m)(i)	The applicant intends to inform his or her employees of any environmental risk which may result from their work; and	5-8
(m)(ii)	Risks must be dealt with in order to avoid pollution or the degradation of the environment;	5-8
(n)	Any specific information that may be required by the competent authority.	5-8

2 SITE AND PROJECT DESCRIPTION

Aquaculture is defined as the propagation, improvement, rearing, regular stocking, feeding or protection from predators and harvesting of aquatic organisms (plant and animal) in controlled or selected aquatic environments (fresh, sea or brackish waters, on land or at sea) for any commercial, subsistence, recreational or other public or private purposes (DEA&T 2007, South African Aquaculture Development Bill 2018). Marine aquaculture, or mariculture, is the process of cultivating and harvesting sea based aquatic organisms. Marine aquaculture includes the commercial farming of all marine organisms such as finfish, shellfish (i.e. abalone, mussels, prawns) and seaweed. Operations generally involve some form of intervention in the rearing process to enhance production (i.e. regular stocking, feeding, and protection from predators). The proposed Aquaculture Development Zone is sea-based, which means that marine organisms are reared in the sea. Land-based facilities for the processing of fish and bivalves are not included in this project and therefore the project does not have any water, sewage, waste, and electricity requirements. These aspects are therefore not covered by this Environmental Management Programme.

2.1 Site description

Algoa Bay is located on the south eastern coast of South Africa. Port Elizabeth is the largest city in the area and is South Africa's second oldest city. Port Elizabeth represents the commercial capital of the Eastern Cape. Port Elizabeth is a major seaport, with the most significant ore loading facilities in the southern hemisphere. Industrial activities have lately shifted towards Coega where a Special Economic Zone (SEZ) was established in 1999. The Coega Development Corporation (CDC), a state-owned enterprise (SoE), is mandated to develop and operate the 9 003 hectares. Situated on the shores of Algoa Bay the area also has a thriving tourist economy based on activities such as scuba diving, game fishing charters, surfing and kiteboarding with many popular scenic beaches. A detailed description of the receiving environment is included in the Basic Assessment Report Chapter 8.

2.2 ADZ precincts

A Sea-based ADZ typically consists of a selection of designated precincts that provide opportunities for existing aquaculture operations to expand and new ones to be established. The precincts considered in this application include Algoa 1 Option 1, 6 and 7 (refer to the BAR for more information on the site selection process) (Figure 1). Each of these sites has been described in more detail below.

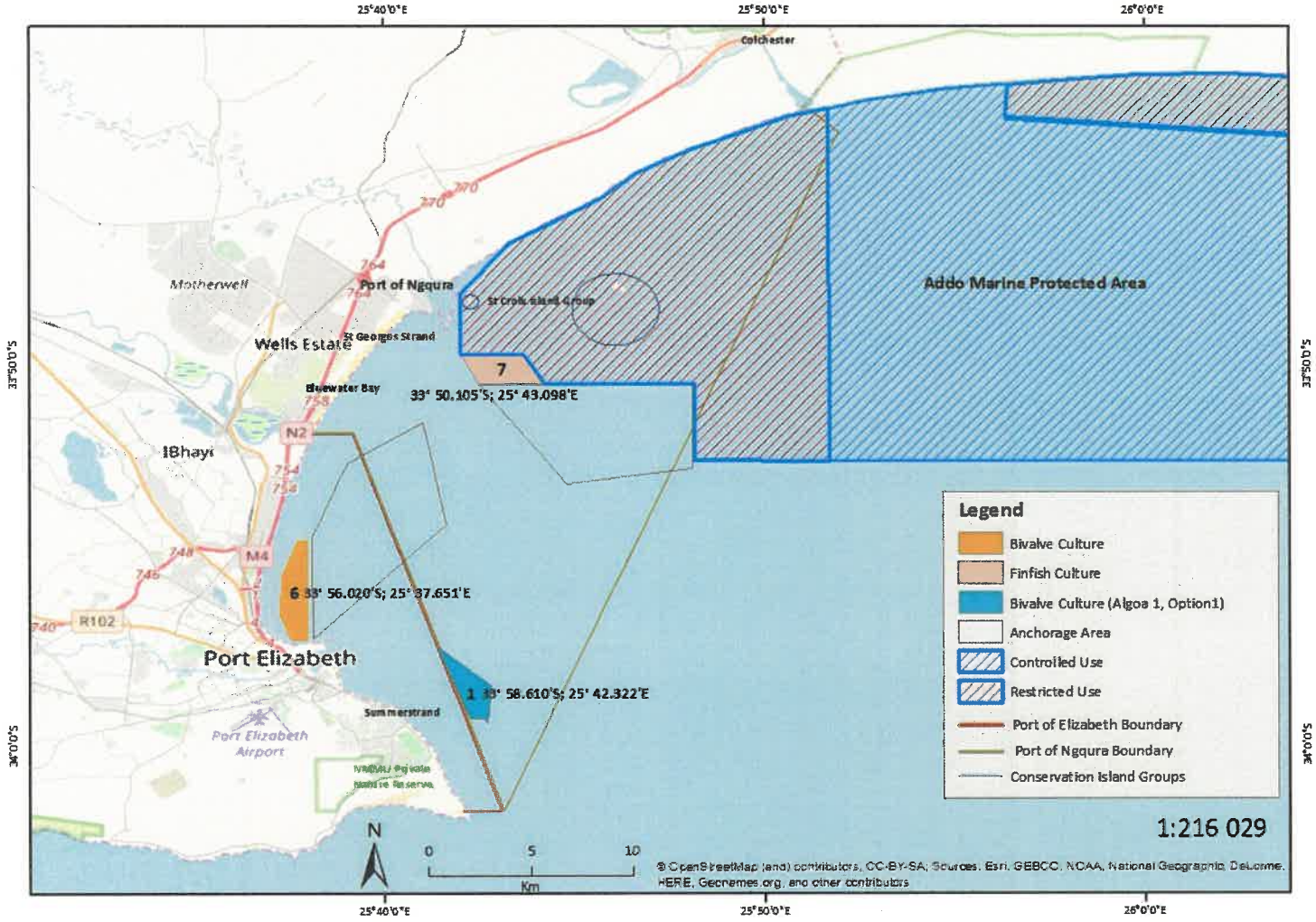


Figure 1 **Precincts considered during the 2019 application for environmental authorisation for a sea-based Aquaculture Development Zone in Algoa Bay, Eastern Cape. Precincts 1 (Option 1), 6 and 7 constitute economically feasible precincts and have been considered during the present Basic Assessment process.**

2.2.1 Algoa 1 Option 1 (Summerstrand Site)

Algoa 1 Option 1 measures approximately 312 ha and lies approximately 2 km offshore from the popular beaches of the southern suburbs of Port Elizabeth (King's Beach, Humewood Beach, Hobie Beach, and Pollock Beach). Although initially put forward as a site suitable for bivalve and/or finfish, DAFF no longer intends to apply for finfish farming at Algoa 1 Option 1 and is applying for bivalve culture (oyster and mussels) only at this site.

Centre geographic coordinates (WGS 1984): 33° 58.610'S; 25° 42.322'E

Geographic coordinates (WGS 1984) of corner points, clockwise from the northwest corner are listed below:

33° 57.440'S; 25° 41.311'E
33° 58.452'S; 25° 42.781'E
33° 59.409'S; 25° 42.726'E
33° 59.283'S; 25° 42.630'E
33° 59.296'S; 25° 42.224'E

During the pre-application stakeholder process, the diving industry provided updated coordinates of dive sites, which indicates that contrary to the information obtained in 2012/13, a low-profile reef is likely to be present near the centre of Algoa 1 Option 1, at an approximate depth of 25-29 m (refer to Benthic Habitat mapping study in Appendix D of the BAR, Dawson *et al.* 2019) (Basket Star dive site). The Draft BAR recommends that this reef with an appropriate buffer is excluded from Algoa 1 Option 1 as per exclusionary criteria applied in the original Strategic Environmental Assessment (Hutchings *et al.* 2011). Furthermore, access to this dive site should be maintained to reduce impacts on the diving industry. This condition would be applicable to both, finfish and bivalve farming at Algoa1 Option 1 and would therefore be required for Alternative Options A and B.

The Geographic Coordinates for the excised area as per recommendations in the marine ecology and socio-economic studies are shown below:

33° 58.811'S; 25° 42.025'E
33° 58.685'S; 25° 42.407'E
33° 58.468'S; 25° 42.302'E
33° 58.593'S; 25° 41.921'E

Figure 2 **Basket star dive site identified by Prodive near the centre of Algoa 1 Option 1 and recommended buffer and access zone to be excluded from the proposed Aquaculture Development Zone. The area to be excluded is 27.6 ha in size.**

2.2.2 Algoa 6 (Port Elizabeth Harbour Site)

Algoa 6 has been identified as a potential site for bivalve culture. The site measures approximately 479 ha and is located in water ranging in depth from 5-12 m. This site is situated adjacent to the Port Elizabeth harbour wall and extends parallel to the shoreline for approximately 4.8 km. This site is not suitable for finfish farming as it is too shallow for adequate dispersal of waste from finfish cages. Algoa 6 is, however, suitable for bivalve farming.

The immediate coastal area is characterised by urban industrial development and a mostly modified shoreline fringed by railway tracks and the Settlers Highway (M4). During the previous EIA, stakeholders indicated support for Algoa 6 due to much reduced conflict with other user groups when compared to Algoa 1 Option 1 (recreational, fisheries, tourism activities and conservation). Economic feasibility of this site is considered good for bivalve aquaculture. The coordinates delineating the centre and boundaries of Algoa 6 are shown below.

Centre geographic coordinates (WGS 1984): 33° 56.020'S; 25° 37.651'E

Geographic coordinates (WGS 1984) of corner points, clockwise from the northwest corner are listed below:

33° 54.624'S; 25° 37.668'E
33° 54.619'S; 25° 37.979'E
33° 57.258'S; 25° 37.998'E
33° 57.256'S; 25° 37.519'E
33° 56.571'S; 25° 37.210'E
33° 55.551'S; 25° 37.272'E

2.2.3 Algoa 7 (Ngqura Harbour site)

Algoa 7 has been identified as a potential site for finfish culture. This site measures 355 ha in size and is positioned approximately 3 km offshore from the Ngqura harbour. Algoa 7 is not expected to impact significantly on shipping traffic. This site lies adjacent to the recently promulgated Addo Marine Protected Area (MPA) and a precautionary as well as risk adverse approach should be applied as the operation of an aquaculture farm is in direct conflict with conservation goals of the MPA. The coordinates delineating the centre and boundaries of Algoa 7 are shown below.

Centre geographic coordinates (WGS 1984): 33° 50.105'S; 25° 43.098'E

Geographic coordinates (WGS 1984) of corner points, clockwise from the northwest corner are listed below:

33° 49.722'S; 25° 41.996'E
33° 49.717'S;25° 43.652'E
33° 50.472'S; 25° 44.148'E
33° 50.468'S; 25° 42.497'E

2.3 Alternative options

DAFF is seeking to promote farming of bivalves as well as finfish in Algoa Bay. Rather than considering each of the three sites (Algoa 1 Option 1, 6 and 7) in isolation, three alternative configurations of precincts, Options A, B and C, as outlined in Table 2, are being considered in this Basic Assessment process. Potential environmental impacts associated with each of these options have been assessed in this Basic Assessment Report.

Table 2 **Proposed alternative options to be assessed in the Basic Assessment process for the proposed Algoa Bay Aquaculture Development Zone.**

Alternative options	Algoa 1 Option 1 (Summerstrand site) Size: 312 ha	Algoa 6 (Port Elizabeth Harbour site) Size: 479 ha	Algoa 7 (Ngqura Harbour site) Size: 355 ha
A	Finfish & bivalves	Bivalves	Finfish
B (DAFF preferred)	Bivalves	Bivalves	Finfish
C	X	Bivalves	Finfish
D (No-go option)	X	X	X

The environmental impacts of various farming intensity levels in Algoa Bay are assessed by way of three options. **Option A** includes both finfish and bivalve culture at Algoa 1 Option 1. This option would allow for finfish farming at two precincts. Furthermore, this option would offer a protected environment as a nursery site for bivalves (Algoa 6) as well as a clean, comparatively unpolluted environment as a bivalve grow-out site (Algoa 1 Option 1). **Option B** includes only one site for finfish farming (Algoa 7) but provides the same opportunities to bivalve farmers as Option A. **Option C** excludes Algoa 1 Option 1 altogether and limits bivalve culture to Algoa 6.

The **Status Quo Alternative** proposes that the Algoa Bay ADZ does not go ahead. The Eastern Cape coast is one of the few areas along the South African coastline considered suitable for marine based aquaculture. Therefore the 'No-go/Status Quo' alternative will eliminate the potential associated with the area as a whole, which will result in the loss of potential benefits associated with the aquaculture industry, as well as the opportunity to meet growing seafood product demand. Not establishing ADZ will leave only current fishing production methods to supply the growing demand for seafood products. The sustainability of these methods is questionable in the long term, and the negative impact on wild stocks has been flagged by DAFF as a critical concern. Irrespective of the potential positive impacts, a number of negative impacts are associated with developing an ADZ and as such, the No-Go option must be considered as the status quo against which the alternative options must be measured.

2.4 Proposed species and farming methods

The following species are considered for farming in the ADZ:

- Currently cultivated bivalve species
  - Pacific oyster *Crassostrea gigas* (alien)
- New bivalve species:
  - Cape Rock Oyster *Striostrea margaritacea* (indigenous)
  - Black mussel *Choromytilus meridionalis* (indigenous)
  - Brown mussel *Perna perna* (indigenous)
  - Mediterranean mussel *Mytilus galloprovincialis* (alien)
- New finfish species (only indigenous species are considered):
  - Yellowtail (*Seriola lalandi*)
  - Dusky kob (*Argyrosomus japonicas*)
  - Silver kob (*Argyrosomus inodorus*)
  - Yellowfin tuna (*Thunnus albacares*)
  - Sole
  - Geelbek (*Atractoscion aequidens*)
  - Spotted grunter (*Pomadasys commersonnii*)
  - White steenbras (*Lithognathus lithognathus*)
  - White stumpnose (*Rhabdosargus globiceps*)
  - Red roman (*Chrysoblephus laticeps*)

Note that environmental conditions are suitable for the above listed species, however, suitability for cage farming must be established through research.

The following production methods are considered most viable for farming in the ADZ:

- Longlines for bivalve culture, comprising a surface rope with floats and moored at each end to fix the line in position. The production ropes for mussels or oyster racks are then suspended from the surface rope;
- Rafts for mussel culture are currently not feasible in Algoa Bay due to rough seas. However, should the technology be developed in future, structures would comprise of a floating top structure moored to the seabed from which mussel ropes are suspended;
- Cages for finfish production, constructed of circular flexible high-density polyethylene with multimooring systems;

2.5 Finfish production volumes

In this current EIA process a dispersion modelling study was undertaken to estimate carrying capacity and inform the assessment of potential impacts (Wright *et al* 2019). Carrying capacity was estimated on the premise that:

1. the benthic fauna beneath the farm site must not be allowed to disappear due to accumulation of organic material;
2. the water quality in the net pens must be kept high; and,
3. the water quality in the areas surrounding the farm must not deteriorate.

The estimated **maximum** carrying capacities for each of the two proposed precincts are summarized in Table 3 below. Note that Wright *et al.* 2019 modelled the carrying capacity for the extent of Algoa 1 as shown in the pre-application BAR (i.e. Option 1 and part of Option 2). This footprint has since been reduced by 40%. The carrying capacity for this site cannot be estimated by reducing the original amount proportionally and is therefore no longer accurate for Algoa 1 Option 1. It is important to consider that DAFF has submitted an application for Alternative Option B, which excludes finfish farming from Algoa 1 Option 1. These results do not, however, account for disease control. Alvial *et al.* (2012) recommended a minimum 2.5 km buffers zone be implemented to prevent disease transferral between farms. Should this buffer zone be implemented, Algoa 1 Option 1 and 7 each have the capacity for one farm of either *S. lalandi*, or *A. regius*.

Table 3 **Summary of dispersion modelling results as per Wright et al. (2019) showing carrying capacities for Algoa 1 (pre-application BAR extent) and 7 for two species, namely *Seriola lalandi* and *Argyrosomus regius*. Note that either *S. lalandi* OR *A. regius* can be maintained at each site at the carrying capacities indicated.**

Precinct	Species	Total annual production per ADZ precinct
Algoa 1 Option 1	*Seriola lalandi*	3 252
	Argyrosomus regius	4 911
Algoa 7	*Seriola lalandi*	3 555
	Argyrosomus regius	4 947

A precautionary phased approach is proposed for finfish farming in the ADZ, where activities in the first year of operation would be limited to pilot operations producing 1000 tonnes finfish per annum for the entire ADZ. Bio-physical and socio-economic monitoring studies would be conducted during the first phase of the establishment of the ADZ (see Chapter 9) and would determine the acceptable maximum scale of the ADZ based on observed environmental impacts. The phased approach would be overseen by the ADZ Management Committee (AMC) and the Consultative Forum (See Chapter 4).

2.6 Sea-based aquaculture activities

Sea-based activities associated with aquaculture in the ADZ include:

- Servicing and maintenance of aquaculture structures (such as rafts, lines, cages);
- Seeding/acclimating and harvesting of cultivated species;
- Initial processing of bivalves, including de-clumping and grading, typically on the raft or support vessel; and
- Vessel trips between the shore and aquaculture areas, e.g. to service structures or harvest species.

2.7 Associated sea-based infrastructure

Aside from rafts, lines, cages and barrels (including moorings and flotation devices) required for aquaculture, the following associated sea-based infrastructure is required:

- Navigational lights demarcating aquaculture areas;
- Mooring facilities for boats.

2.8 Associated land-based infrastructure and activities

Land-based infrastructure and activities depend on cultivated species, production methods and processing. Mussels can largely be harvested, de-clumped and graded on the raft or support vessel.

Basic land-based support infrastructure includes:

- Landing quays (catering to personnel, equipment and product) that are accessible for vehicles;
- Mooring space in protected harbour areas for support vessels; and
- Product holding facilities (which can be off-site if they do not rely on seawater).

The capacity of existing quays at Port of Port Elizabeth and Port of Ngqura is deemed sufficient to accommodate a moderate expansion of the aquaculture industry.

Detailed information on land-based facilities, as would be required for the authorisation of such facilities in terms of NEMA and the ICMA, could not be provided as part of this study. As such, no land-based facilities that require Environmental Authorisation are included in this assessment. Where authorisations or permits are required, these must be obtained by individual applicants. A more detailed project description is provided in Chapter 3 of the BAR (Massie *et al.* 2019a).

2.9 Overview of the project development cycle

Many international assistance institutions distinguish between five stages in the cycle of existence of a project, namely, identification, preparation, appraisal and agreement, implementation, and monitoring and evaluation (Insull and Nash 1990). Individual operators will first enter the pilot phase to establish feasibility, environmental impacts and scalability of the finfish and bivalve projects. Only then will the project enter full scale production. The project development cycle is illustrated in Figure 3.

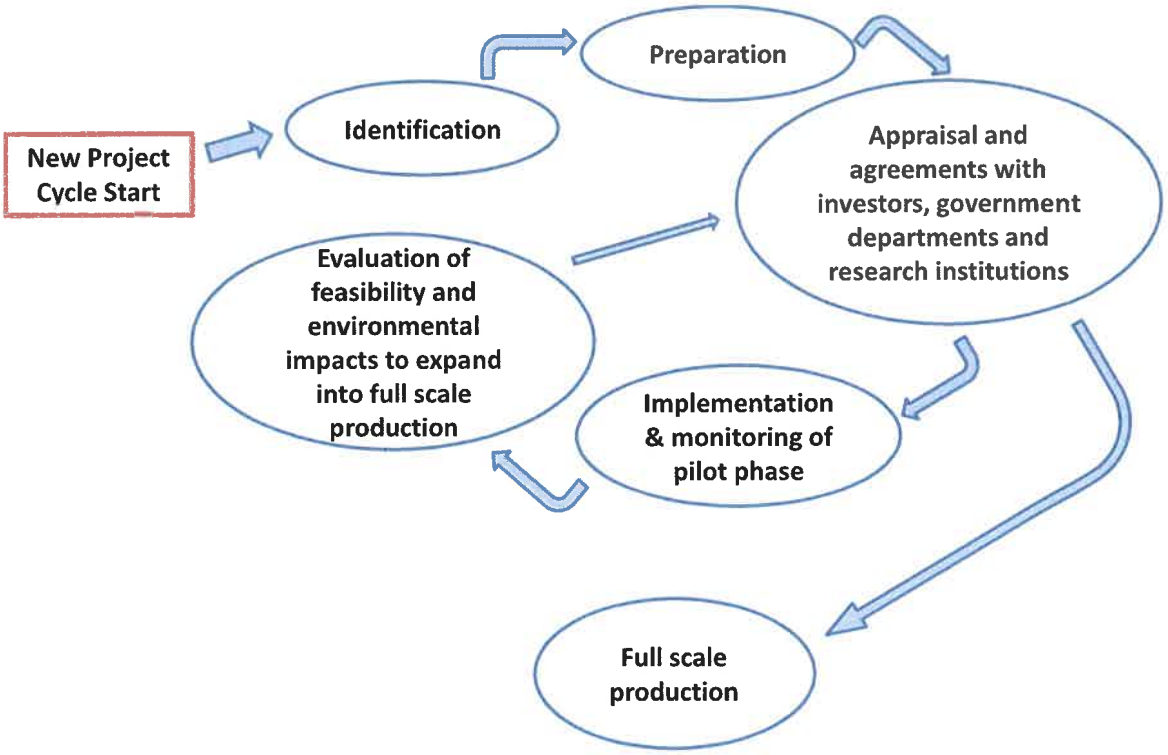


Figure 3 **Schematic of the project cycle for the proposed Aquaculture Development Zone in Algoa Bay, Eastern Cape.**

2.10 Project phasing

2.10.1 Construction phase

The construction phase of the development refers to the actual construction of the development. This refers to the placing of the sea cages, longlines and/or mussel rafts within the designated areas, as well as the anchoring / mooring activities required. Although the construction process of a farm is relatively swift and associated with few environmental impacts, it must be noted that the construction phase within the ADZ is an ongoing process as individual operators will develop farms until the capacity of the ADZ is reached. This means that the construction and operational phases for the ADZ as a whole will overlap. Individual operators will therefore be required to submit a construction programme to the AMC. The farm specific EMPr for the construction phase remains applicable should an extension to the construction phase be required.

2.10.2 Operational phase

The operational phase of the development will commence once the construction activities are completed and the development is officially handed over to the Concessionaires/Operators. This would also include the transfer of any properties to new owners and/or companies. This EMPr includes several recommendations regarding the Operational Phase of the project but should not be seen as exhaustive. The Concessionaires/Operators should ensure that the Operational Phase of the projects maintains the underpinning principles and ideals of sustainable development.

2.10.3 Closure and decommissioning phase

Decommissioning refers to the process of removing the operating assets of the project after completion of the operating life cycle. Due to the nature of the proposal and the fundamental uncertainties associated with such a new industry in South Africa, the likelihood exists that the project may have to be decommissioned in the event that that the monitoring protocol identifies impacts of concern. In the event that decommissioning is required, all relevant legal processes must be complied with.

3 POTENTIAL IMPACTS

Based on the professional experience of the environmental assessment practitioner, legal requirements, the nature of the proposed activity, the nature of the receiving environment, the following key environmental issues – potential negative impacts and potential benefits – were identified:

- Marine ecology – potential alteration of the marine ecology due to sea-based farming in Algoa Bay.
- The proposed development will have visual impacts. Visual impacts will alter the sense of place in the area, which can have socio-economic knock on effects such as beach front property devaluation and marine-based tourism activities.
- Social and socio-economic – potential socio-economic benefits to the wider community in the form of job creation, skills development, increased investment and growth. Negative impacts due to user conflict (recreational boating, yachting, swimming, surfing, SCUBA diving etc.). The local fishing industry could also be affected if sites overlap with productive fishing grounds.
- Heritage – potential impact on underwater heritage resources, notably wrecks and associated artefacts.

Note that due to the scale of the proposed ADZ and potential long-term impacts on the marine environment, Anchor conducted a marine ecology specialist study, which is included in Appendix D of the Basic Assessment Report. The disturbance on the seabed will be associated with mooring/anchoring mechanism for the cages.

The proposed project will affect the surface environment of the ocean more so than the sea bottom. The disturbance on the seabed will be associated with mooring/anchoring mechanism for the cages. Anchor appointed ACO Associates cc to conduct a desktop Maritime and Underwater Cultural Heritage Study as the Maritime and Underwater Cultural Heritage (MUCH) Unit at SAHRA indicated that such a study would likely to be requested (the specialist study has been included as a standalone document in Appendix D).

A summary of the potential impacts of the proposed development are presented in Sections 3.1.1 - 3.1.5. Potential impacts are denoted by first listing the phase of the development (i.e. CP = Construction Phase; OP = Operation Phase) followed by the impact category:

- Marine Ecology = ME
- Visual and aesthetics = VA
- Socio-Economy= SE
- UMH = Underwater and Maritime Heritage Resources

Impacts are numbered consecutively and separately for the construction and operation phases.

3.1.1 Planning and design phase

The planning and design phase of the proposed sea-based Aquaculture Development Zone is not associated with any environmental impacts.

3.1.2 Construction phase

Table 4 **Summary of potential impacts for the *construction* of the proposed Aquaculture Development Zone in Algoa Bay after mitigation. CP stands for Construction Phase. The following codes are used for the various impact types: ME = Marine Ecology, SE = Socio-economic.**

Impact	Description	Significance
Biological	Disturbance of subtidal habitat	VERY LOW
Socio-economic	Investment in the local, regional and national economy for Algoa Bay (all precincts)	LOW
	Increased employment, income and skills development (all precincts)	LOW
Underwater cultural heritage	Impacts on Submerged Prehistoric Heritage Resources: All Precincts	VERY LOW
	Impacts on Maritime Archaeological Resources: Algoa 1 Option 1 & 7	INSIGNIFICANT
	Impacts on Maritime Archaeological Resources: Algoa 6	INSIGNIFICANT

3.1.3 Operational phase impacts

Table 5 **Summary of potential impacts of *finfish and bivalve culture* on marine ecology (denoted ME) for the *operation* of the proposed Aquaculture Development Zone in Algoa Bay after mitigation. OP stands for Operation Phase.**

Impact	Description	Significance
Marine Ecology – finfish culture	Disease and parasite transmission to wild fish stocks (may be reversible) (-ve): Algoa 1 Option 1 & 7	HIGH
	Organic waste discharge impacting on the water column and benthic environment arising from mariculture operations (ongoing but reversible).	MEDIUM
	Organic waste discharge impacting on the water column and benthic environment (long-term but reversible) (-ve): Algoa 1 Option 1 & 7	LOW
	Use of chemical therapeutants and antifoulants in finfish cage culture at Algoa 1 Option 1 (ongoing but reversible).	LOW
	Genetic interactions with wild stocks with escapees (long-term but reversible) (-ve): Algoa 1 Option 1 & 7	MEDIUM
	Accidental entanglement of cetaceans in mariculture infrastructure (ongoing but reversible).	LOW

Impact	Description	Significance
	Use of chemical therapeutants and antifoulants (long-term but reversible) (-ve): Algoa 1 Option 1	LOW
	Piscivorous marine animals interfering with finfish cage culture operations at Algoa 1 Option 1 (ongoing but reversible).	LOW
	Use of chemical therapeutants and antifoulants (long-term but reversible) (-ve): Algoa 7	MEDIUM

Impact	Description	Significance
Marine Ecology – bivalve culture	Introduction of alien bivalve species (Mediterranean mussel *Mytilus galloprovincialis*) to the wild (unlikely to be reversible) (-ve): Algoa 1 Option 1 & 6	VERY LOW
	Introduction of alien bivalve species (Pacific oyster *Crassostrea gigas*) to the wild	LOW
	Introduction of alien bivalve species (Pacific oyster *Crassostrea gigas*) to the wild (unlikely to be reversible) (-ve): Algoa 1 Option 1 & 6	LOW
	Disease and parasite transmission to wild bivalve stocks (ongoing, may be reversible).	LOW
	Introduction of alien fouling species to the wild and provision of habitat to alien fouling species (unlikely to be reversible) (-ve): Algoa 1 Option 1 & 6	LOW
	Genetic contamination of wild stocks from bivalve mariculture at Algoa 1 Option 1 and 6 (ongoing and irreversible).	VERY LOW
	Disease and parasite transmission to wild bivalve stocks (may be reversible) (-ve): Algoa 1 Option 1 & 6	LOW
	Possible impacts on cetaceans resulting from alterations in habitat use or migration patterns (ongoing but reversible).	LOW

Table 6 **Summary of potential impacts of *finfish culture and bivalve culture* on the seascape character (denoted VA) for the *operation* of the proposed Aquaculture Development Zone in Algoa Bay after mitigation. OP stands for Operation Phase.**

Impact	Description	Significance
Visual aesthetics – *finfish and bivalve culture*	Negative impact on seascape character (long-term but reversible) (-ve) by *finfish culture*: Algoa 1 Option 1	HIGH
	Negative impact on seascape character by Algoa 1 Option 1 by *bivalve* culture	LOW
	Negative impact on seascape character (long-term but reversible) (-ve) by *bivalve* culture: Algoa 1 Option 1	VERY LOW
	Negative impact on seascape character by Algoa 7 *finfish* culture	VERY LOW

Table 7 **Summary of potential impacts by *finfish and bivalve* culture on the socio-economic environment (denoted SE) for the *operation* of the proposed Aquaculture Development Zone in Algoa Bay after benefit enhancing measures/mitigation. OP stands for Operation Phase.**

Impact	Description	Significance
Socio-economic impact for finfish and bivalve culture	Investment in the local, regional and national economy (long-term but reversible) (+ve) for *finfish* culture: Algoa 1 Option 1 & 7	MEDIUM
	Investment in the local, regional and national economy (long-term but reversible) (+ve) for *bivalve* culture: Algoa 1 Option 1	MEDIUM
	Investment in the local, regional and national economy (long-term but reversible) (+ve) for *bivalve* culture: Algoa 6	MEDIUM
	New employment, income and skills development (long-term but reversible) (+ve) for *finfish* culture: Algoa 1 Option 1 & 7	MEDIUM
	New employment, income and skills development (long-term but reversible) (+ve) for *bivalve* culture: Algoa 1 Option 1	HIGH
	New employment, income and skills development (long-term but reversible) (+ve) for *bivalve* culture: Algoa 6	HIGH
	Impacts on existing mariculture activities (+ve): all precincts and both culture types)	MEDIUM
	Impacts on water sport participants (excluding SCUBA diving) (long-term but reversible) (-ve) by *finfish* culture: Algoa 1 Option 1	MEDIUM
	Impacts on water sport participants (excluding SCUBA diving) (long-term but reversible) (-ve) by *finfish* culture: Algoa 7	LOW
	Impacts on water sport participants (excluding SCUBA diving) (long-term but reversible) (-ve) by *bivalve* culture: Algoa 1 Option 1	VERY LOW
	Impacts on water sport participants (excluding SCUBA diving) (long-term but reversible) (-ve) by *bivalve* culture: Algoa 6	VERY LOW
	Impacts on SCUBA diving activities (long-term but reversible) (-ve) by *finfish* culture: Algoa 1 Option 1	LOW
	Impacts on SCUBA diving activities (long-term but reversible) (-ve) by *finfish* culture: Algoa 7	VERY LOW
	Impacts on SCUBA diving activities (long-term but reversible) (-ve) by *bivalve* culture: Algoa 1 Option 1	VERY LOW
	Impact on Port Elizabeth's economy (long-term may be irreversible) (-ve) by *finfish* culture: Algoa 1 Option 1	HIGH
	Impact on Port Elizabeth's economy (long-term but reversible) (-ve) by *finfish* culture: Algoa 7	LOW
	Impact on Port Elizabeth's economy (long-term but reversible) (-ve) by *bivalve* culture: Algoa 1 Option 1	LOW
	Impact on Port Elizabeth's economy (long-term but reversible) (-ve) by *bivalve* culture: Algoa 6	VERY LOW

Impact	Description	Significance
	Impact of income leakage on local economic development of the area (long-term but reversible) (-ve) by *finfish* culture: Algoa 1 Option 1 & 7	MEDIUM
	Impact of income leakage on local economic development of the area (long-term but reversible) (-ve) by *bivalve* culture: Algoa 1 Option 1 & 6	LOW
	Risk of collision between vessels and aquaculture farms as a result of drifting ships from the chokka squid sanctuary zone (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: Algoa 1 Option 1	VERY LOW
	Risk of collision between vessels and aquaculture farms as a result of drifting ships from the anchorage area (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: Algoa 6	VERY LOW
	Risk of collision between vessels and aquaculture farms as a result of drifting ships from the anchorage area (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: Algoa 7	VERY LOW
	Impact on vessel navigation routes (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: All precincts	LOW
	Impact on local fisheries (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: Algoa 1 Option 1	MEDIUM
	Impact on local fisheries (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: Algoa 7	MEDIUM
	Impact on local fisheries (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: Algoa 6	LOW
	Impact on land-based infrastructure (long-term but reversible) (-ve) by *bivalve* and *finfish* culture: All precincts	LOW
	Impact on coastal real estate for (long-term but reversible) (-ve) by *finfish* culture: Algoa 1 Option 1	MEDIUM
	Impact on coastal real estate (long-term but reversible) (-ve) by *bivalve* culture: Algoa 1 Option 1	VERY LOW
	Impact on coastal real estate (long-term but reversible) (-ve) by *bivalve* culture: Algoa 6	VERY LOW
	Increased risk of bird strikes affecting aircrafts landing at and departing from the Port Elizabeth International Airport (long-term but reversible) (-ve) by bivalve and finfish culture: All precincts	INSIGNIFICANT
	Impacts on the Addo Elephant Marine Protected Area (irreversible) (-ve): Algoa 7	MEDIUM

3.1.4 Decommissioning phase impacts

The DAFF facility does not have a specified life span. Partial or full decommissioning of the farm may or may not occur. Potential impacts associated with the decommissioning phase include:

- Conditional need for rehabilitation of terrestrial and coastal environment
- Loss of jobs

The foreseen activities associated with the decommissioning of the DAFF will not trigger additional listed activities to those identified in this BAR. Any disturbance of vegetation or habitat is considered to be low. The EMPr compels DAFF to ensure that decommissioning is conducted in an environmentally responsible manner. An impact assessment for the decommissioning phase has therefore not been completed here. Rehabilitation should be conducted as detailed in the EMPr.

Rehabilitation of bare soil resulting from the decommissioning of infrastructure will not be required on land (i.e. Farm 654 Portion 1 or any part thereof) that is decommissioned as part of a legal agreement between DAFF and the buyer of the land, and where the buyer assumes responsibility for rehabilitation. Rehabilitation requirements should be explicitly mentioned in the sales agreement. In the event that the sales agreement is not followed through and the land remains in the possession of DAFF, rehabilitation must be completed as per the conditions contained in this EMPr.

3.1.5 Impact significance of alternative options

The outcomes of the impact assessments for Algoa 1 Option 1, 6 and 7 for finfish and bivalve culture (as shown in the summary tables above) were summed for each alternative option (after mitigation). Positive impacts (or benefits) cannot cancel out negative impacts and therefore have to be assessed separately (Table 8 and Table 9 respectively). Positive impacts are limited to socio-economic benefits arising from new employment opportunities, business opportunity and skills development in the aquaculture sector. Furthermore, note that in Option A, both finfish and bivalve culture are proposed for Algoa 1 Option 1, however, these impacts are not additive and therefore the impact scoring for the best/worst case scenario was considered for positive and negative impacts respectively.

After benefit enhancing measures, Option A and B have the same number of high, medium and low positive impacts on the socio-economic environment (Table 8). Option C excludes Algoa 1 Option 1 which means that less area will be available for mariculture and therefore the benefits will be lower when compared to option A and B. The number of negative socio-economic impacts for options A and B are however substantially higher than option C. Option C excludes Algoa 1 Option 1, which means that less area will be available for mariculture and therefore the benefits will be lower when compared to option A and B. While in isolation, Option A and B appear to be more socio-economically beneficial, the proposed development will only contribute to a net positive impact on the economy as a whole if the established and growing tourism and water sport industries of Port Elizabeth is not (or minimally) negatively impacted. With regards to negative socio-economic impacts, the impact assessment clearly demonstrates that Option A has a much higher impact than Option B. Most noticeably, the negative economic impact after mitigation has been rated as 'high' for finfish culture at Algoa 1 Option 1. This is discussed in more detail below.

Table 8 **Comparison of the sum of positive (i.e. socio-economic) impact significance of alternative options A, B, C and D for the proposed sea-based Algoa Bay Aquaculture Development Zone (after mitigation). In Option A, both finfish and bivalve culture are proposed for Algoa 1 Option 1, however, these impacts are not additive and therefore the impact scoring for the best case scenario (i.e. finfish only) was considered. Note that Algoa 1 refers to Algoa 1 Option 1 in this table.**

Impact significance after mitigation	Alternative Options			
	A Algoa 1: finfish and bivalves Algoa 6: bivalves Algoa 7: finfish	B Algoa 1: bivalves Algoa 6: bivalves Algoa 7: finfish	C Algoa 6: bivalves Algoa 7: finfish	D No-go
Very high	0	0	0	0
High	2	2	1	0
Medium	7	7	5	0
Low	0	0	0	0
Very low	0	0	0	0
Insignificant	0	0	0	0
Total	9	9	6	**0**

Table 9 **Comparison of the sum of negative impact significance of alternative options A, B, C and D for the proposed sea-based Algoa Bay Aquaculture Development Zone (after mitigation). In Option A, both finfish and bivalve culture are proposed for Algoa 1, however, these impacts are not additive and therefore, the impact scoring for the worst-case scenario (i.e. finfish only) was considered. Note that Algoa 1 refers to Algoa 1 Option 1 in this table.**

Impact significance after mitigation	Alternative Options			
	A Algoa 1: finfish and bivalves Algoa 6: bivalves Algoa 7: finfish	B Algoa 1: bivalves Algoa 6: bivalves Algoa 7: finfish	C Algoa 6: bivalves Algoa 7: finfish	D No-go
Very high	0	0	0	0
High	4	1	1	0
Medium	12	8	7	0
Low	34	30	18	0
Very low	12	15	10	0
Insignificant	6	6	4	0
Total	**68**	**60**	**40**	**0**

Option C would involve bivalve farming at Algoa 6 and finfish farming at Algoa 7, excluding Algoa 1 Option 1 altogether and is the most favourable option in terms of negative impacts on the environment. This Alternative has a total of 40 negative impact ratings, of which most are considered low after mitigation measures have been implemented. A moderate number of medium negative impact ratings and only one high negative impact rating makes Option C the most environmentally acceptable option aside from the No-go option (Option D). The comparatively low environmental impact is mostly attributable to the exclusion of an entire site (Algoa 1 Option 1). Alternative Option C covers the smallest area and therefore has the lowest aquaculture development potential.

Option A and B have 68 and 60 negative impact ratings respectively, as both options include Algoa 1 Option 1 as a precinct, although Option B only allows bivalve culture at this precinct. The exclusion of finfish from Algoa 1 makes Option B generally more environmentally favourable with only one 'high', eight 'medium' and more 'very low' negative ratings than Option A. This difference can be ascribed to fact that bivalve culture is not likely to attract sharks, has a lower visual impact and contributes less to water quality deterioration than finfish culture. Consequently, the negative economic impact rating for Option B is considerably lower than Option A.

The proposed development has the potential to create job opportunities, increase skill development and contribute towards the local economy. However, the impact assessment also showed that the relatively high number of negative impacts rated moderately significant after mitigation (mainly socio-economic and marine ecology) and at least one high rating for each alternative option indicate that a rigorous approach to adaptive management must be implemented.

3.1.6 Recommendations by the EAP

South Africa's coastline is very exposed and there are few suitable precincts for sea-based aquaculture and Algoa Bay was identified as a potential site in the Strategic Environmental Assessment (SEA) conducted in 2011. Based on the available information commercial *bivalve* farming at Algoa 1 Option 1 and Algoa 6 is a desirable use of the sea space within Algoa Bay provided that the mitigation measures recommended in this impact assessment are implemented. The desirability of *finfish* farming in Algoa Bay is unpacked in more detail below.

The outcomes of the social preference study and expert opinion, as well as the comments provided by the public to date (which are mostly congruent with the Britz *et al.* 2016 study), have guided the EAP in concluding that ***finfish* culture at Algoa 1 Option 1 has the potential to cause significant economic losses in the tourism and water sports sectors of Port Elizabeth** (the impact was rated as **high** after the implementation of mitigation measures), with potentially significant knock-on effects on existing businesses and jobs. The city would also run the risk of losing its status as the "Water Sport Capital" of Africa as a number of sport events would likely be moved or stopped. The pre-application stakeholder consultation process demonstrated that *finfish farming* at Algoa 1 Option 1 (Summerstrand) lacks social support from the Port Elizabeth community.

The Marine Ecological Specialist Study (Appendix D3 of the BAR) found that *finfish* farming at Algoa 7 could have significant residual marine ecological impacts after the implementation of mitigation measures as this site is situated adjacent to the recently promulgated Addo Marine Protected Area and St Croix Island Group. A precautionary approach with diligent environmental monitoring would be required to minimise residual risks.

At the same time, additional employment opportunities in the Port Elizabeth area are desperately needed and the proposed project has the potential to create new employment opportunities and boost local economic growth. Overall, the environmental impact assessment shows that Alternative Option B, which proposes bivalve farming at Algoa 1 Option 1 (Summerstrand site) and Algoa 6 (PE Harbour site), as well as finfish farming at Algoa 7 (Ngqura Harbour site), constitutes the best practicable environmental option for Algoa Bay. Alternative Option B has a greater potential with regards to economic development (business and employment opportunities) when compared to Alternative Option C (excludes Algoa 1 Option 1 from the ADZ), while also ensuring that user conflicts with the existing tourism and water sport sectors are significantly reduced when compared to Alternative Option A, which proposes finfish farming at Algoa 1 Option 1.

The proposed Alternative Option B has therefore the potential to address the socio-economic need for new employment opportunities and economic growth in the Port Elizabeth area while also minimising conflict with the local tourism industry and water sport activities.

Based on the information available to date and the impact assessment conducted as part of the Basic Assessment process, the EAP supports DAFF's application for environmental authorisation for the preferred Option B (i.e. no finfish farming at Algoa 1 Option 1), provided that rigorous environmental monitoring is conducted and the implementation of the ADZ is overseen by a well organised management structure involving key government bodies (see more information on the proposed approach below). Furthermore, the recently identified reef near the centre of Algoa 1 Option 1 must be excluded from the ADZ as recommended in the marine specialist study in Appendix D3 of the BAR (Hutchings *et al.*2019) and the socio-economic impact assessment.

4 ADZ MANAGEMENT

The Project proponent/developer is the person or entity who is responsible for carrying out the Activity that is authorised in terms of NEMA and/or this EMPr. In this case the Project Proponent is the Department of Agriculture, Forestry & Fisheries (DAFF), which is responsible for the management of the ADZ. The ADZ comprises of three precincts within which individual operators (i.e. companies or individuals) can manage finfish or bivalve aquaculture farms. Individual operators lease sea space from the Transnet National Port Authority (TNPA) within the boundaries of the ADZ and obtain a mariculture right (valid for 15 years) and annually renewed mariculture permits from DAFF. Individual operators are permitted to engage in activities as per the Environmental Authorisation for the ADZ. The EMPr is applicable to DAFF as the manager, individual operators and sub-contractors. Note however, that each individual operator must compile, have approved and implement a farm specific EMPr.

This Chapter has been adopted from du Toit and Reuther (2017) and has been amended by DAFF based on experiences in establishing the ADZ Management structure for the Saldanha Bay ADZ.

Two management bodies are to be established:

- An ADZ Management Committee (AMC), comprising of DAFF, DEA (Oceans and Coasts / Biodiversity Branches), DEDEAT (Eastern Cape Provincial Department of Economic Development, Environmental Affairs and Tourism), The Nelson Mandela Bay Municipality and TNPA, to fulfil a coordinating and supervising role and ensure compliance with the EMPr throughout all phases of aquaculture farming in the ADZ (see Section 4.1); and
- A Consultative Forum that includes other relevant government departments, authorities (e.g. SANParks, ACSA) and relevant local/public interest organisations, to review environmental monitoring data, advise on management and recommend measures (see Section 4.2).

Due to the sensitivity of the environment it is strongly recommended that a suitably qualified Environmental Control Officer (ECO) be appointed to oversee all activities for the duration of the Construction, Operation and decommissioning phases and to ensure compliance with the EMPr. The ECO will constitute an integral part of AMC (see Section 4.1). The ECO must have a minimum of a tertiary level qualification in the natural sciences field. The ECO should have at least 3 years of experience and proven competency as an ECO. It is recommended that the ECO has some experience in the marine environment, including diving or marine observation experience.

4.1 ADZ Management Committee (AMC)

4.1.1 Inception

The ADZ Management Committee (AMC) comprises of but not limited to the following:

- Department of Agriculture, Forestry and Fisheries (DAFF)
- National Department of Environmental Affairs (DEA) Branches:
    - Oceans and Coasts
    - Biodiversity Branches
- Eastern Cape Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)
- The Nelson Mandela Bay Municipality
- Transnet National Port Authority:
    - Port of Ngqura
    - Port of Port Elizabeth
- Department of Sport and Recreation (national, provincial and local)

DAFF must establish the AMC promptly after the declaration of the ADZ.

Upon establishment, a notice shall be published in a local newspaper announcing the inception of the AMC, providing contact details for the AMC Secretariat and inviting interested stakeholders to register on a stakeholder database for the Consultative Forum (CF) (see below) to receive relevant notifications about the ADZ.

4.1.2 Functions of the AMC

The overarching function of the AMC is to oversee, facilitate, manage and monitor aquaculture operations in the ADZ. DAFF, as the applicant, is primarily responsible for day-to-day management of the ADZ and ensuring the implementation of and adherence to the EMPr, with appropriate support and guidance provided by the other AMC Departments:

Key functions of the AMC are to:

- Monitor aquaculture operators' compliance with the EMPr and ADZ EA conditions;
- Oversee environmental monitoring related to aquaculture in Algoa Bay;
- Monitor production volumes in the ADZ;
- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised ADZ;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents related to aquaculture operations;
- Review and comment on new / expanded aquaculture farm proposals within the approved ADZ; and
- Provide updated information to the public (e.g. farm coordinates, water quality information, notification of new aquaculture operations).

4.1.3 Structure and roles

It is suggested that the AMC organisational structure should make provision for various functions, including:

- **Chairperson** - Calls and chairs meetings of the AMC;
- **Secretariat -** Fulfils secretariat functions, including:
    - Maintenance of member details and arrangement of meetings;
    - Compiling and distribution of meeting notes;
    - Distribution of communication to AMC members and aquaculture farmers in the ADZ;
    - Maintenance of a database of registered (public) stakeholders;
    - Drafting and distribution of regular (at least biannual) AMC Reports to all Consultative Forum members and registered stakeholders on activities in the ADZ;
    - Administration of and responding to stakeholder comments on aquaculture activities in the ADZ; and
    - Reporting on stakeholder aspects at AMC meetings;
- **Environmental Control Officer -** Fulfils environmental control functions, including:
    - Liaising with the suitably qualified service provider(s) appointed to attend to environmental sampling, monitoring and auditing aspects in the ADZ to ensure that monitoring is implemented as per the requirements;
    - Receiving and reviewing monthly Farm Monitoring Reports;
    - Receiving and reviewing environmental sampling, monitoring and audit results;
    - Notifying the Chairperson in the event any aspects require immediate attention of the AMC;
    - Notifying the Secretariat in the event any aspects require immediate attention of other aquaculture farmers in the ADZ; and
    - Reporting on environmental aspects at AMC meetings.

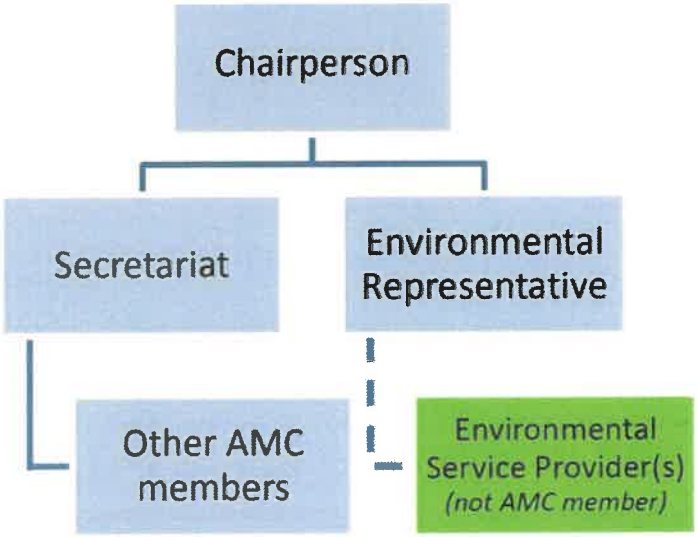


Figure 4 **Suggested Organisational Structure of the Aquaculture Development Zone Management Committee (Source: du Toit and Reuther 2017).**

4.2 Consultative Forum

The Consultative Forum (CF) must be established prior to any construction commencing. The body must remain active for the lifespan of the activity.

4.2.1 Membership of the Consultative Forum

DAFF should invite representatives of relevant government departments, authorities, local organisations and ADZ operators to become members of the Consultative Forum, including but are not limited to the following institutions / organisations:

- Government and authorities:
  - (2) South African National Parks (SANParks);
  - (3) Eastern Cape Department of Agriculture and Land Affairs;
  - (4) South African Heritage Resource Agency (SAHRA) – Maritime and Underwater Cultural Heritage (MUCH) Unit;
  - (5) Nelson Mandela Bay Metropolitan Municipality;
  - (6) Sarah Baartman District Municipality
- Aquaculture industry:
  - (1) Local industry association representing operators in the ADZ;
  - (2) Farmers operating in the ADZ;
- Other organisations:
  - (1) Eastern Cape Parks and Tourism Agency; and
  - (2) Representatives from the various user groups (tourism, fisheries, diving, yachting, surfing, lifesaving etc.)
  - (3) Representatives of sport events and festivals including, but not limited to:
    - Ironman

- Splash Festival
- Jendamark Nelson Mandela Bay Bell Buoy Challenge
- City Lodge Hotels' 3 Beaches Challenge
- Summer Triathlon Series
- City Surf Pro
- aQuellé Ocean Racing Series
- Lifesaving competitions
- International Yachting Volvo Ocean Race
- National and international Hobie 16 Championships
- Mirror Worlds Championships

(4) Scientific representatives from NMU and/or Rhodes Universities;
(5) South African Environmental Observation Network (SAEON);
(6) Wildlife and Environmental Society of South Africa (WESSA);
(7) Southern African Foundation for the Conservation of Coastal Birds (SANCCOB);
(8) Endangered Wildlife Trust (EWT); and
(9) Ratepayers Associations and members of the public.
(10) Airports Company South Africa Port Elizabeth

Forum members will join on a voluntary basis and at no costs to DAFF.

4.2.2 Functions of the Consultative Forum (CF)

Key functions of the Consultative Forum are to:

- Review environmental monitoring data related to aquaculture in Algoa Bay;
- Make recommendations to the AMC based on the outcomes of environmental monitoring; and
- Provide a platform for discussion of environmental management in the ADZ.

4.3 Environmental Induction and Training

The ECO in consultation with the contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMPr. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The contractor should provide a translator from their staff for the purpose of translating should this be necessary.

As a minimum, training should include:

- Explanation of the importance of complying with the EMPr and the employee's accountability.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.

- Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractors Health and Safety Representative).
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this EMPr and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.
- Induction attendance registers must be included in any ECR documents.
- Should the staff turnover be high and with additional appointment of sub-contractors, it may be necessary to undertake additional induction training sessions. This is at the discretion of the ECO.
- The contractor must keep records of all environmental training sessions, including names, dates and the information presented.

4.4 Social engagement co-ordinator (SEC)

The Socio-Economic specialist has recommended that a Social Engagement Co-ordinator (SEC) is appointed for the activity. Continuous and periodic monitoring and evaluation is required to ensure the achievement of milestones and the overall success of achieving the socio-economic objectives envisaged for the project and stated below. The following activities are geared towards achieving acceptable and on-going monitoring standards:

- Regular field visits to the project and stakeholders benefiting from the social engagement programme shall be conducted by the Social Engagement Co-ordinator (SEC), which in turn shall prepare a quarterly report to the AMC and a copy will be provided to the Project Managers of the Developer and the Consultative Forum. The reports shall be both narrative and financial.
- A review after the first six months after implementation shall be conducted focusing on an assessment of the overall progress and achievement of the objectives and milestones related to the specified targets of employment, enterprise development, preferential procurement and socio-economic development.

5 MEASURES APPLICABLE TO THE DESIGN PHASE

The design phase of the ADZ will be applicable to ADZ as a whole (i.e. aquaculture specifications) during the inception phase. Furthermore, aquaculture farms will establish over time and the design measures are therefore applicable to each individual farm that is proposed for the ADZ. Finally, environmental measures are also applicable to existing farms that are intending to expand their aquaculture facilities.

The overall management structure, roles and responsibilities of each party involved in this project are detailed in Chapter 4. The specific roles and responsibilities for this phase are explained in Section 5.1 below (adopted and amended from du Toit (2017)).

5.1 Roles and Responsibilities

The key role players during the design phase of the project are (1) AMC (with DAFF primarily responsible); and (2) Concessionaries/operators of new or expanding ADZ aquaculture farms. Their roles and responsibilities during the detailed design phase with respect to the implementation of the EMPr are outlined below.

AMC (with DAFF primarily responsible)

- Ensure that the individual aquaculture operators are aware of and implement relevant measures in the EMPr and EA;
- Review and comment on new/expanded aquaculture farm proposals within the ADZ;
- Review and approve EMPr for individual farming operations;
- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA; and
- Provide updated information to the public (e.g. notification of proposed new aquaculture operations.

Aquaculture operators:

- Take cognisance of all relevant measures in the EMPr and ensure integration thereof in the design of aquaculture operations;
- Submit proposals for aquaculture farm establishment/expansion to the AMC for review and comment prior to insatallation; and
- Take into account formal AMC review comments and amend proposals accordingly.

DAFF and other authorities will fulfil specific authority oversight functions as per legal requirements.

5.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the design phase, as well as timelines for the implementation of these measures and monitoring thereof, are laid out below:

- Table 10 specifies ADZ-level measures that must be implemented by the DAFF / AMC; and
- Table 11 specifies farm-level measures that must be implemented by individual operators.

Environmental monitoring requirements during the design phase are addressed in Chapter 9.

Table 10 **Aquaculture Development Zone (ADZ) – level management and mitigation measures that must be implemented during the Design Phase of the Algoa Bay ADZ by the Department of Agriculture, Forestry and Fisheries (DAFF)/ Aquaculture Development Zone Management Committee (AMC) (adopted from du Toit and Reuther 2017).**

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
ADZ Layout	(1) Ensure that individual operators have completed an underwater archaeological survey that identifies any ship wreck material at the mooring sites and that exclusion zones identified by a qualified archaeologist are avoided by the proposed layout (note that avoidance is only applicable to structures anchored into the seabed and not the entire footprint of the farm).	Upon establishment of the ADZ	Survey and map farm boundaries.
	(2) Compile detailed site-layout plans for ADZ precincts approved as part of the EA, including recommended layout of farms within precincts and longlines / rafts / cages within individual farms.	Within 6 months of establishment of the ADZ	Review layout maps against approved boundaries.
	(3) Do not restrict access to fishing rights areas where practically possible.	Upon establishment of the ADZ	Map fishing grounds and confirm access is maintained.
ADZ phasing	(4) Implement a phased approach for the development of finfish cage culture in the ADZ: First phase: Pilot phase, no more than 3 operators, restriction to 1000 t for entire ADZ. Only if monitoring results indicate that environment health has been maintained and impacts remain manageable, expand to full commercial scale (i.e. up to carrying capacity per species).	Until maximum production per farm is phased in, or production limits are reduced due to environmental impacts	Compare actual production to phasing requirements
ADZ management specifications	(5) Specify requirements applicable to all existing and future operators with regards of aquaculture farms, which must be in compliance with farm-specific measures listed in the EMPr and include specifications with regards to: a. Lighting; b. Equipment visible at the surface; c. Safety and security; d. Waste management; e. Biosecurity management; and f. Vessel launch, mooring and loading / offloading protocols. g. Environmental awareness training. h. Communicate such requirements to all existing and prospective operators.	Within 6 months for existing farms and at least 2 months before the first new farms establish	Relevant guidelines and communication
	(6) Confirm with key stakeholders (notably Port Captain, representatives of water users in the area and the South African National Defence Force / South African Navy) whether certain boundaries of the ADZ located away from night-time traffic require lighting at all.	At least 1 month before the first new farms establish	Relevant guidelines and communication
	(7) Develop maintenance and operational guidelines and standards in relation to	At least 1 month before the first	Relevant guidelines and

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	potential entanglement risks at farms, including loose ropes, lines, buoys or floats.	new farms establish	communication
	(8) Specify a period within in which existing operators must adhere to specifications applicable to all operators.	Within 6 months of establishment of the ADZ	Relevant guidelines and communication
Expansion of existing farms/establishment of new farms	(9) Develop a template for individual operators to provide farm establishment / expansion proposals to the DAFF for review and comment. Such proposals should contain information on the proposed: a. Location b. Stocking density, with reference to the maximum production volume authorised; c. Mooring plan, with reference to heritage resources on the seabed; d. Measures to ensure equipment is securely in place; e. Emergency procedures in the event of loose equipment, loss of stock, entanglement of animals etc; and f. Any other aspects deemed relevant.	At least 6 month before the first new farms establish	Relevant guidelines and communication
	(10) Review farm establishment / expansion proposals of individual operators and provide comment to proponents.	Within 1 month of submission of proposal to the DAFF	Clear advice to prospective operators on way forward
Emergency response	(11) Draw up emergency response protocol(s) to respond to a range of potential incidents in the ADZ, including: a. Loose / drifting equipment; b. Accidents (collisions) with other water users; c. Loss of stock; and d. Disease outbreak or algal bloom. e. Communicate the protocol to all ADZ aquaculture operators and registered stakeholders.	Before the construction of the first new farm and within 6 months of establishment of the ADZ	Relevant guidelines and communication
	(12) Develop disentanglement protocols in collaboration with DAFF, DEA and the SA Whale Disentanglement Network and establish a rapid response unit to deal with entanglements.	Within 6 months of establishment of the ADZ	Relevant guidelines and communication
Stakeholder communication	(13) Invite the general public to register as stakeholders on a stakeholder database maintained by the AMC.	Within 6 months of establishment of the ADZ	Advert / communication to public
	(14) Make available updates to all registered stakeholders / consultative forum on aspects relating to the ADZ, including: a. Location of existing and planned aquaculture farms; b. Results of environmental monitoring in the reporting period; c. Any other relevant aspects.	At least biannually	Relevant regular communication

Table 11 **Farm – level management and mitigation measures that must be implemented during the Design Phase of the Algoa Bay ADZ by individual operators.**

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
EMPr	(1) Compile an individual environmental management programme (EMPr) for each farm to allow for efficient management at the individual farm scale. The EMPr must be compatible, supportive and facilitative of the EMPr for the ADZ.	During design of farm / application for mariculture right. Within 6 months of EA for existing farms.	Review farm-level EMPr
Farm layout	(2) Consult the AMC specifications regarding the layout of aquaculture farms.	Before design of farm	Compliance of layout
	(3) Ensure a minimum width of 10 m between long-lines to allow for access.	During design of farm	Review layout
	(4) Fish farming: Ensure that finfish cages are suspended at least 15 m above the seabed to allow for adequate dispersion to prevent build-up of wastes (uneaten food and faeces) below the cages.	During design of farm	Propose layout
	(5) Ensure that finfish cages do not occupy more than 30% of the total area allocated for finfish farming at any one time, both within individual licence areas and overall within the portions of the ADZ identified for finfish culture.	During design of farm	Propose layout
	(6) Do not moor cages or longlines over long-lived biogenic habitats (e.g reefs). Ensure that no mariculture infrastructure is situated within the excised area at Algoa 1 Option 1 (Section 2.2).	During design of farm	Propose layout
	(7) Submit detailed proposals for expansions / new farms to the DAFF, reporting on the following aspects: a. Location (coordinates, size); b. Species; c. Equipment specifications; d. Layout (location and orientation of individual structures); e. Mooring plan; f. Surveys to be conducted prior to installation; g. Measures to ensure equipment is securely in place; h. Stocking density; i. Feeding protocols (if any); and j. Any other information deemed relevant or requested by the AMC.	At least 2 months before installation of farm	Relevant submission
	(8) The mariculture farm layout must be designed such that mooring structures to be anchored on the sea floor avoid underwater maritime heritage resources. An appointed archaeologist must identify exclusion zones, which must be clearly demarcated on the farm layout map. Exclusion zones must be determined in the following way: a. Any geophysical data generated to support the development of aquaculture in this area must be archaeologically reviewed for the	During design of farm	Record of diver surveys, placement of farms in layout with mooring and anchorage sites outside of exclusion areas identified by the qualified archaeologist.

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	presence of historical shipwrecks or related material and to ground truth proposed mooring locations. Datasets that are particularly useful in this regard are magnetometer, side scan sonar and multibeam bathymetric data. It is recommended that the archaeologist is consulted before data are collected to ensure that the survey specifications and data outputs are suitable for archaeological review; b. Any video footage collected support to development of aquaculture in the three areas should ideally also be reviewed by the archaeologist for evidence of shipwreck material on the seabed; c. If geophysical data are not collected, the proposed positions of all moorings must be ground truthed by suitably qualified divers; d. Should the reviews and ground truthing set out above identify wreck material at or near the location of any proposed mooring, micro-siting of the mooring and the possible implementation of an exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site. (9) Submit a detailed anchor / mooring distribution plan to the Maritime and Underwater Cultural Heritage Unit at the South African Heritage Resources Agency (SAHRA).		
Equipment	(10) Use aquaculture structures and equipment that are suitable for the environmental conditions in the farming area, e.g. that can withstand the maximum recorded wave / swell heights.	During design of farm	DAFF / AMC approval of layout and design Proven design in similar conditions Review order specifications
	(11) Ensure mooring systems will prevent / limit movement of anchors and chains over the sea floor.	During design of farm	DAFF / AMC approval of layout and design Proven design in similar conditions Review order specifications
	(12) Minimise entanglement by using mesh size less than 6 cm.	During design of farm	Review netting specifications Review order specifications
	(13) Use environmentally safe aquaculture infrastructure to prevent entanglement of faunal species such as fish, whales, dolphins and turtles.	During design of farm	Review netting specifications Review order specifications
	(14) All precincts: a. Use, as far as possible, grey based hues for all project components (rafts, cages, barrels, buoys/flotation devices)	During design of farm	Review order specifications

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	visible above the surface of the water. b. Ensure project components are of a similar style and scale to promote visual cohesiveness. c. Utilise the minimum number of safety / warning buoys as far as possible. Only demarcate the corner points of each precinct and the minimum interval distance along the precinct boundary to meet Ports Authority (Transnet) safety requirements. (15) Algoa 1 Option 1 specific: a. Use exclusively long-lines for bivalve culture (i.e. no rafts).		
Decommissioning	(16) Plan and make adequate financial provision for removal of all infrastructure upon cessation of farming operations.	Before installation of farm commences	Review financial provision documents

6 MEASURES APPLICABLE TO THE CONSTRUCTION PHASE

The construction phase measures will apply to (1) new farms that are installing infrastructure and equipment in the ADZ; and (2) Existing farms that are installing new infrastructure and equipment in the ADZ as part of an expansion.

6.1 Roles and Responsibilities

The key role players during the construction phase of the project are anticipated as follows:

- AMC (with DAFF primarily responsible);
- DAFF;
- Aquaculture operators; and
- Contractors responsible for construction / placement of infrastructure.

Individual operators retain the final responsibility with regards to compliance with the EMPr and EA. All instructions relating to the EMPr will be given to contractors via the respective aquaculture operators. Contractors will report issues of concern to the aquaculture operator, who in turn will report on progress to the AMC.

Key roles and responsibilities during the construction phase with respect to the implementation of the EMPr are outlined below.

Roles and responsibilities relating to environmental monitoring are laid out in Section 7.1.

AMC (with DAFF primarily responsible)

- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents;
- Provide updated information to the public (e.g. notification of proposed new aquaculture operations.
- Record and if necessary, respond to, environmental aquaculture-related incidents.

Aquaculture operators:

Individual aquaculture operators retain the overall responsibility for the management of construction activities and the implementation of the EMPr. Operators are required to:

- Ensure that contractors are aware of and comply with the conditions of the EMPr;
- Ensure that staff are aware of and comply with the conditions of the EMPr;
- Inform the DAFF/AMC should there be any notable changes to submimted plans; and
- Report any incidents and initiate the emergency protocol if required.

Contractors:

All contractors will be required to:

- Ensure that all employees are aware of and comply with the EMPr;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Immediately notify the aquaculture operator of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the AMC.

6.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the construction phase, as well as timelines for the implementation of these measures and monitoring thereof, are detailed below:

- Table 12species ADZ – level measures that must be implemented by the DAFF/AMC; and
- Table 13 specifies farm-level measures that must be implemented by individual operators.

Environmental monitoring requirements during the construction are addressed in Chapter 9.

Table 12 **Aquaculture Development Zone (ADZ) – level management and mitigation measures that must be implemented during the Construction Phase of the Algoa Bay ADZ by the Department of Agriculture, Forestry and Fisheries (DAFF)/ Aquaculture Development Zone Management Committee (AMC) (adopted from du Toit and Reuther 2017).**

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
Stakeholder communication	(1) Make available updates to all registered stakeholders on aspects relating to the ADZ, including: a. Location of existing and planned aquaculture farms; b. Results of environmental monitoring in the reporting period; c. Any other relevant aspects.	At least biannually	Relevant communication
Complaints register	(2) Maintain and disclose a complaints / comments register. The register must record: a. Name and contact details of person complaining / commenting; b. Date submission was lodged; c. Person who initially received the submission; d. Nature of the submission; e. Operator that is subject to the submission; f. Actions taken to investigate a complaint and outcome of the investigation; g. Action taken to remedy the situation; and h. Date on which feedback was provided to the complainant.	Duration of farm installation activities	Keep records of all complaints
Response to environmental incidents	(3) Contingency plans in the event of accidental spills must be prepared and immediately implemented in the event of a spill.	Prior to construction.	Contingency plans must be in place
	(4) Record all environmental incidents related to aquaculture farm construction / expansion, including: a. Loose / drifting equipment; b. Accidents (collisions) with other water users; c. Entanglement of marine animals; d. Spill of pollutants; and e. Waste in the marine environment. f. Underwater Maritime Heritage Resources are disturbed	In the event of an incident	Maintain register of incidents and response Following resumption of activities, frequently inspect area to ensure issue was properly addressed
	(5) Coordinate a response to environmental incidents related to aquaculture operations, if necessary.	In the event of an incident	Time taken to address the incident
	(6) Initiate the emergency response protocol to respond to an environmental incident if it cannot be dealt with at farm level.	In the event of an incident	Time taken to address the incident

Table 13 **Farm – level management and mitigation measures that must be implemented during the Construction Phase of the Algoa Bay ADZ by individual operators.**

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
Environmental Control Officer	(1)	Appoint an Environmental Control Officer (ECO) during the construction phase (installation of new farms) to ensure compliance with stipulations in the Environmental Authorisation and EMPr.	During installation of new (including extension of existing) farms	ECO reports submitted to the DAFF / AMC
Complaints register	(2)	Forward all public submissions received by operators to the DAFF/AMC	Within one week of receiving the submission	Keep record of all complaints
	(3)	Provide a response to the submission, where required.	Within one week of receiving the submission	Keep record of all complaints
Environmental awareness training	(4)	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: a. Potential impact of waste and construction activities on the environment; b. Suitable disposal of waste. Suitable handling and disposal protocols must be clearly explained and sign boarded on the vessels and the 'Reduce, reuse, recycle' hierarchy should be implemented. c. Key measures in the EMPr relevant to worker's activities; d. How incidences and suggestions for improvement can be reported. e. Sensitive marine habitats; f. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	Before workers start working on-site and before new activities are undertaken.	Training attendance register. Observe whether activities are executed in line with EMPr requirements
Waste management	(5) (6) (7) (8) (9)	Ensure that no litter and debris reaches the marine environment during construction activities. Train all staff in the effects of debris and litter in the marine environment. Minimise waste through reducing and re-using (packaging) material. Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations. Provide separate bins for hazardous / polluting materials and mark these clearly.	Throughout farm installation	Visual
Land-based activities: Hazardous substances	(10)	All hazardous materials should be stored in the appropriate manner to prevent contamination of the site.	Throughout farm installation	Visual inspection of hazardous materials handling and storage areas
	(11)	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.	Throughout farm installation	Visual inspection of hazardous materials handling and storage areas
	(12)	Avoid unnecessary use and transport of hazardous substances.	Throughout farm installation	Visual inspection

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
	(13)	Keep Material Safety Data Sheets (MSDS) for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.	Throughout farm installation	Visual inspection of MSDS
Response to environmental incidents	(14)	Report all environmental incidents related to aquaculture farm construction / expansion to the DAFF, including: a. Loose / drifting equipment; b. Accidents (collisions) with other water users; c. Entanglement of marine animals; d. Spill of pollutants; and e. Waste in the marine environment.	Throughout farm installation	Maintain register of pollution events and response Appropriate communication
	(15)	Initiate steps to contain the environmental incident at a farm level.	Throughout farm installation	Record of events
	(16)	Request and support assistance with environmental incidents from the DAFF / AMC if the incident cannot be dealt with at farm level.	Throughout farm installation	Appropriate communication
Response to environmental pollution	(17)	In the event of environmental pollution, e.g. through spillages, immediately stop the activity causing the problem.	Throughout farm installation	Maintain register of pollution events and response
	(18)	Only resume activity once the problem has been stopped, the equipment has been repaired and/or the pollutant can be captured without reaching the marine environment.		Following resumption of activities, frequently inspect area
	(19)	Repair faulty equipment as soon as possible.		Visual inspection Time to address issue
Equipment	(20)	Ensure that, upon installation of the aquaculture structures: a. Primary longline / raft / net is secured appropriately so that it is kept taut and rigid at all times. Nets of fish cages should be weighted; b. Ropes and anchor lines are taut, especially after rough seas; and c. There is adequate separation between rafts and longlines, even during strong currents and rough seas; or d. There is adequate separation between the primary and secondary nets of fish cages, even during strong currents and rough seas.	Following installation	Visual inspection (above and below water)
Vessel operation	(21)	Implement maritime safety protocols while working on vessels and at sea.	Throughout farm installation	Visual inspection
	(22)	Do not discard any waste overboard.		
	(23)	Take waste generated on vessels back to shore and dispose of properly.		
	(24)	In the event of litter and debris entering the sea, remove these as soon as possible.		

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
	(25)	Maintain vessels for safety of crew and to prevent environmental pollution		
Marine ecological impacts	(26)	Do not moor cages or longlines over long-lived biogenic habitats (e.g reefs). Ensure that no mariculture infrastructure is situated within the excised area at Algoa 1 Option 1 (Section 2.2).	Throughout the construction phase.	Visual inspection
	(27)	*Ensure mooring system is well designed to prevent/limit movement of anchors and chains over the sea floor.*	Throughout the construction phase.	Design concept, Visual inspection
	(28)	*Do not move mooring anchors or blocks when undertaking cage net maintenance or fallowing sites, as replacement of moorings when site is used again will increase impact footprint.*		
Employment/ procurement	(29)	Procure goods and services from local, provincial or South African suppliers as far as possible, giving preference to Black Economic Empowerment (BEE) suppliers.	Throughout the construction phase.	B-BBEE compliance, Procurement records, staff profiles
	(30)	Preferentially use local and regional labour		
	(31)	Preferentially employ previously disadvantaged individuals.		
Visual impacts	(32)	Use grey based hues for all project components (rafts, cages, barrels, buoys/flotation devices) visible above the surface of the water as far as possible. This mitigation measure has to be weight against bright infrastructure required to minimise entanglement.	During installation of farms Within specified timeframe for existing farms	Visual inspection
	(33)	Ensure project components are of a similar style and scale to promote visual cohesiveness.		
	(34)	Utilise the minimum number of safety / warning buoys as far as possible. Only demarcate the corner points of each precinct and the minimum interval distance along the precinct boundary to meet Ports Authority (Transnet) safety requirements.		
	(35)	Maintain all project infrastructure in good working order		
	(36)	Demarcate all equipment (buoys, raft and cage components) with the operators logo /name to enable tracing of lose equipment / debris.		
Protection of heritage resources	(37)	Should any archaeological material, be accidentally encountered during the course of developing aquaculture operations in any of the proposed areas, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.	During installation of farm	Record of diver surveys
	(38)	Provide the location and nature of any identified maritime and underwater cultural heritage resources to a maritime archaeologist and to SAHRA for inclusion on their shipwreck database.	During installation if required	Appropriate communication
	(39)	Obtain a permit from SAHRA prior to continuing with activities that have disturbed a wreck site or part thereof, including objects or artefacts.	During installation if required	Appropriate communication
	(40)	Submit a detailed anchor / mooring distribution plan to the Maritime and Underwater Cultural Heritage Unit at the South African Heritage Resources Agency (SAHRA).	Before installation commences	Record of diver surveys, placement of farms

7 MEASURES APPLICABLE TO THE OPERATION PHASE

Operation Phase measures will apply to aquaculture farms that are operating with the ambit of the Algoa Bay ADZ.

7.1 Roles and Responsibilities

The key role players during the operation phase of the project are the AMC (with DAFF primarily responsible) and aquaculture operators. Individual operators retain the final responsibility with regards to compliance with the EMPr and EA.

Key roles and responsibilities during the operation phase with respect to the implementation of the EMPr are outlined below.

Roles and responsibilities relating to environmental monitoring are laid out in Chapter 9.

AMC (with DAFF primarily responsible)
The AMC has oversight over environmental management at the ADZ. In terms of environmental management, the AMC will:

- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents or pollution related to aquaculture operations;
- Provide updated information to the public (e.g. updated maps/coordinates, water quality information, notification before new aquaculture operations start)
- Record and if necessary, respond to, environmental aquaculture-related incidents.

Aquaculture operators:
Individual aquaculture operators retain the overall responsibility for the management of operation activities and the implementation of the EMPr. Operators are required to:

- Comply with the conditions of the EMPr;
- Ensure that staff are aware of and comply with the conditions of the EMPr;
- Inform the DAFF/AMC should there be any notable changes to operations; and
- Report any incidents and initiate the emergency protocol if required.

7.2 Reporting

The AMC must make available biannual **ADZ Reports** to registered stakeholders including at a minimum the following information:

- Extent of current operations;
- Location and type of proposed new operations;
- Key environmental monitoring results;
- Feedback on stakeholder concerns; and
- Any other relevant aspects.

Note that environmental monitoring reports are addressed in Chapter 9.

7.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the operation phase, as well as timelines for the implementation of these measures and monitoring thereof, are laid out below:

- Table 14 specifies ADZ-level measures that must be implemented by the DAFF / AMC; and

- Table 15 specifies farm-level measures that must be implemented by individual operators.

Environmental monitoring requirements during the operation phase are addressed in Chapter 9.

Table 14 **Aquaculture Development Zone (ADZ) – level management and mitigation measures that must be implemented during the Operation Phase of the Algoa Bay ADZ by the Department of Agriculture, Forestry and Fisheries (DAFF)/ Aquaculture Development Zone Management Committee (AMC) (adopted from du Toit and Reuther 2017).**

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
Demarcation of ADZ precincts	(1) Ensure that all active aquaculture farms are accurately marked on navigational charts.	Throughout operations	Accurate charts Notification of stakeholders
	(2) Ensure that the outside boundaries of all active aquaculture areas are accurately marked day and night using markers compliant with South African Marine Safety Authority (SAMSA) regulations.	Throughout operations	Visual inspection
	(3) Monitor that markers are fully functional.	Throughout operations	Visual inspection
	(4) If the Ports Authority requires flashing lights, ensure the lights flash simultaneously.	Throughout operations	Visual inspection
	(5) Do not restrict access to fishing rights areas where practically possible.	Upon establishment of the ADZ	Map fishing areas and confirm access is maintained
Supervision of farming activities	(6) Enforce maintenance and operational guidelines and standards in relation to potential entanglement risks at farms, including loose ropes, lines, buoys or floats.	Throughout operations	Record of visual inspection and (non)compliances
	(7) Implement monitoring as per the environmental monitoring requirements stipulated in Chapter 9 of the EMPr.	Within 3 months of establishment of the ADZ	Monitoring records
	(8) Update the dispersion model with monitoring information as it becomes available to inform further monitoring and the phased implementation of the ADZ.	Throughout operations as advised by AMC	Record of model updates
Stakeholder communication	(9) Notify registered stakeholders before installation of new farms commences. Provide detail on the proposed farm type and location.	Throughout operations	Record of notification of stakeholders
	(10) Make available ADZ Report updates to all registered stakeholders on aspects relating to the ADZ, including: a. Location of existing and planned aquaculture farms; b. Results of environmental monitoring in the reporting period; c. Any other relevant aspects.	At least biannual	Record of stakeholder communication
Complaints register	(11) Maintain and disclose a complaints / comments register. The register must record: a. Name and contact details of person complaining / commenting; b. Date submission was lodged; c. Person who initially received the submission; d. Nature of the submission; e. Operator that is subject to the submission; f. Actions taken to investigate a complaint and outcome of the investigation; g. Action taken to remedy the situation; and	Duration of operations	Keep records of all complaints

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	h. Date on which feedback was provided to the complainant.		
Response to environmental incidents	(12) Contingency plans in the event of accidental spills must be prepared and immediately implemented in the event of a spill.	Prior to construction.	Contingency plans must be in place
	(13) Record all environmental incidents related to aquaculture farm construction / expansion, including: a. Loose / drifting equipment; b. Accidents (collisions) with other water users; c. Entanglement of marine animals; d. Spill of pollutants; and e. Waste in the marine environment. f. Underwater Maritime Heritage Resources are disturbed during maintenance	In the event of an incident	Maintain register of incidents and response Following resumption of activities, frequently inspect area to ensure issue was properly addressed
	(14) Coordinate a response to environmental incidents related to aquaculture operations, if necessary.	In the event of an incident	Time taken to address the incident
	(15) Initiate the emergency response protocol to respond to an environmental incident if it cannot be dealt with at farm level.	In the event of an incident	Time taken to address the incident
Sector development	*(16) Liaise with relevant authorities to encourage the development of South African spat and fingerling hatcheries to reduce the reliance on import, and associated risk of non-intentional introduction of associated alien species and diseases.*	As early as possible	
	(17) Encourage the municipality, in cooperation with aquaculture operators and the AMC, to initiate a study to identify industries or projects that could benefit from the direct and indirect opportunities generated by the ADZ, and mechanisms to promote or establish such industries or projects.	As early as possible	
	(18) Encourage the municipality, in cooperation with aquaculture operators and the AMC, to encourage and support projects and / or networks that provide training and support for small and medium enterprises in the Nelson Mandela Bay Municipality to benefit from the opportunities generated by the ADZ.	As early as possible	
	(19) Promote and facilitate certification of finfish farms by the Aquaculture Stewardship Council, which is an independent, international non-profit organisation that manages the world's leading certification and labelling programme for responsible aquaculture.	As early as possible	
	(20) Invest in production of finfish feed and infrastructure within South Africa (i.e. reduce reliance on imports)	As early as possible	Investment and sector development strategy available.

Table 15 Farm – level management and mitigation measures that must be implemented during the Operation Phase of the Algoa Bay ADZ by individual operators.

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
Environmental awareness training	(1)	Provide environmental awareness training to all personnel on the farm at the start of their employment. Training should include discussion of: a. Potential impact of waste and construction activities on the environment. b. Suitable disposal of waste. Suitable handling and disposal protocols must be clearly explained and sign boarded and the 'Reduce, reuse, recycle' hierarchy should be implemented. c. Key measures in the EMPr relevant to worker's activities. d. How incidences and suggestions for improvement can be reported. e. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	During first months of employment.	Training attendance register. Observe whether activities are executed in line with EMPr requirements
Complaints register	(2)	Forward all public submissions received by operators to the DAFF/AMC	Within one week of receiving the submission	Keep record of all complaints
	(3)	Provide a response to the submission, where required.	Within one week of receiving the submission	Keep record of all complaints
Management of domestic waste	(4)	Do not discard any waste overboard vessels.	Throughout operation	Visual inspection and waste management protocol in place.
	(5)	Minimise waste through reducing and re-using material (e.g. packaging).		
	(6)	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.		
	(7)	Collect all waste in bins and/or skips. Prevent littering by staff at work sites by providing bins or waste bags in sufficient locations.		
	(8)	Ensure no debris and waste material used at the operations enters the marine environment (particularly plastics), to minimise the risk of attraction, harming and entanglement by seabirds, marine mammals and large predators.		
	(9)	In the event of equipment, litter and debris entering the sea, remove these as soon as possible.		
	(10)	Investigate alternative uses for wastes prior to disposing to landfill.		
Storage of hazardous material	(11)	Provide separate bins for hazardous / polluting materials and mark these clearly.	Throughout operation.	Visual
	(12)	All hazardous materials should be stored in the appropriate manner to prevent contamination of the site.		
Day to Day Biological Waste Management	(13)	Do not discard fouling organisms removed from farming structures, oysters or mussels into the marine environment (molluscs may have alien fouling organisms growing on their shells). Dispose biological waste at a registered Waste Management Facility.	Throughout operation.	Waste monitoring programme and visual inspections.

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	(14) Do not discard fouling organisms removed from netting taken onshore for maintenance back into the marine environment.		
	(15) Do not discard sick or dead organisms into the marine environment.		
	(16) Provide fish mortality to fishmeal farms in the area, where possible (only if biosecurity measures are met).		
	(17) Where mortalities are sent for disposal to a fish meal processing facility, the farm shall receive documented proof that the facility is treating the material in an approved manner such that no transfer of pathogens may occur in the marine/aquaculture sector via the end use of the fishmeal or the disposal of any condemned material. This shall be ensured through either the treatment process method or the end product use (not being an aquaculture feed additive).		
	(18) Condemned material (waste/fish infected with confirmed OIE or controlled disease as opposed to normal mortalities, as confirmed and directed by the State Veterinarian), will be incinerated or disposed of at a licensed landfill site per the requirements of the Meat Safety Act (Act No 40 of 2000).		
Emergency Biological Waste Management	(19) In the case of mass mortality of farm organisms, dispose of dead organisms at a licensed waste management facility. *Alternatively where possible and if biosecurity measures are met provide mortalities to fish meal farms in the area.*	In emergency situations	Confirmation with the licenced Waste Management Facility that biological waste was received.
Response to environmental pollution and incidents	(20) Contingency plans in the event of accidental spills of hazardous materials must be prepared and immediately implemented in the event of a spill.	Prior to commencement of the operational phase.	Contingency plans must be in place
	(21) In the event of environmental pollution, e.g. through spillages, immediately stop the activity causing the problem.	In the event of an incident	Maintain register of incidents and responses following resumption of activities, frequently inspect area to ensure issue was properly addressed.
	(22) Initiate steps to contain the environmental incident at a farm level.		
	(23) Only resume activity once the problem has been stopped, the equipment has been repaired and/or the pollutant can be captured without reaching the marine environment.		
	(24) Report all environmental incidents related to aquaculture farm operation to the DAFF, including (but not limited to): a. Hydrocarbon spills; b. Accidents (e.g. collision with other water users); c. Collisions of fauna with vehicles; d. Entanglement of marine animals; e. Loss of stock; f. Disease outbreak or algal bloom;		

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	g. Spill of pollutants; and h. Waste in the marine environment;		
	(25) Repair faulty equipment as soon as possible.	In the event of an incident	Visual inspection, record the amount of time taken to address the issue.
	(26) Request assistance with environmental incidents from the DAFF / AMC if the incident cannot be dealt with at farm level.	In the event of an incident	Time taken to address an incident.
	(27) Rectify activities that elicit noise or odour complaints.	In the event of an incident	Record of rectification
Incident logging	(28) Maintain an incident register in which all events caused by farming activities or farm infrastructure, such as escape events or the dislodging of infrastructure, which may have environmental risks, are recorded.	Throughout operation	Incident register on file
	(29) Report all non-routine events that may have an environmental impact to the DAFF / AMC.	Throughout operation	Appropriate communication Farm Monitoring Report
Mussel Farm management	(30) Seed ropes with specimens present in the area and do not introduce mussels from other areas.	Throughout operation	Farm Monitoring Report
	(31) Do not dispose of mussels in the Bay during red tides (no biological material should be discarded into the marine environment).	Throughout operation	Visual inspection Reports of non-compliance
	(32) Avoid high density culture (overcrowding). The recommended density is: a. One raft of 800 droppers per ha; or b. 11 longlines of 832 droppers per ha.	Throughout operation	Visual inspection Farm Monitoring Report
Oyster farm management	(33) Use only spat sourced from biosecure certified hatcheries and/or quarantine facilities.	Throughout operation	Certificate
	(34) Inspect imported spat for other species before introduction into the Bay. Destroy any other species associated with oyster spat and report the incident to the DAFF.	Throughout operation	Visual inspection Farm Monitoring Report
	(35) Avoid high density culture (overcrowding). The recommended density is 11 longlines of 176 oyster stacks per ha.	Throughout operation	Visual inspection Farm Monitoring Report
	(36) Do not discard fouling organisms removed from cultured stock taken onshore for maintenance back into the marine environment.	Throughout operation	Records of non-compliance, disposal record
Finfish farm management	(37) Ensure that finfish cages do not occupy more than 30% of the total area allocated for finfish farming at any one time, both within individual licence areas and overall within the portions	Throughout operation	Visual inspection Farm Monitoring Report

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
Farm layout and density		of the ADZ identified for finfish culture.		Approved layout
	(38)	Rotate cages within a production area to allow recovery of benthos.	Throughout operation	Visual inspection
	(39)	Destock, or fallow, a site after a growing cycle to allow seabed recovery prior to restocking.		Farm Monitoring Report
Maintenance of aquaculture infrastructure	(40)	Keep cage netting clean, free of algal growth and free of any damage that could lead to the escape of farmed organisms or the penetration of predators.	Throughout operation	Visual inspection Maintenance records
	(41)	Keep nets well maintained (e.g. repair holes immediately)		
	(42)	Maintain all project infrastructure in good working order.	Throughout operation	Visual inspection Maintenance records Farm Monitoring Report
	(43)	Regularly clean cages, rafts etc and inspect for alien species.	Throughout operation	Visual inspection Maintenance records
	(44)	Regularly inspect aquaculture infrastructure for integrity of the structure, anchorage and general wear and tear.	Throughout operation	Visual inspection Maintenance records
	(45)	Keep all lines taught through regular inspections and maintenance.	Throughout operation	Visual inspection
	(46)	Leave mooring anchors or blocks in place when undertaking cage or raft maintenance or fallowing sites to avoid repetitive impacts on the seabed.	Throughout operation	Visual inspection
	(47)	Keep marine structures clean and free of unnecessary equipment.	Throughout operation	Visual inspection
	(48)	Maintain service barges and boats to withstand local weather conditions and fit them with the necessary safety equipment to provide a safe working environment.	Throughout operation	Visual inspection Maintenance records
	(49)	Undertake appropriate maintenance and implement operational guidelines and standards for minimising noise in noise -generating equipment	Throughout operation	Visual inspection Maintenance records
Vessel operation	(50)	Implement maritime safety protocols while working on vessels and at sea.	Throughout operation	Visual inspection
	(51)	Minimise noise and air emissions from vessels.	Throughout operation	Visual inspection
Safety	(52)	Clearly mark cages and other offshore infrastructure with clear warning markers, bells and radar reflectors to ensure visibility to marine traffic.	Throughout operation	Visual inspection
	(53)	Keep necessary safety equipment (e.g. life rings) on platforms in an accessible position.		
	(54)	Develop a safety protocol for the Bell Buoy Challenge open water swimming event to prevent accidents involving participants and aquaculture maintenance vessels.	Throughout operation	Safety protocol available, evidence of communication

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
				with organisers
Human consumption	(55)	Ensure that products intended for human consumption are of an acceptable quality and comply with health standards for seafood as prescribed by the relevant authorities such as the South African Bureau of Standards (SABS) and DAFF.	Throughout operation	Compliance with prescribed health standards
Feed	(56)	Purchase only registered aquaculture feeds from recognised feed companies that produce high quality feeds of which the ingredients, composition and manufacturing methods are known.	Throughout operation	Certificates, order records
	(57)	Use high digestibility, high energy and low phosphorus feeds, species and system-specific feeds and maximize food conversion ratios (and minimize waste).]		
	(58)	Use palatable feeds of the correct pellet or grain size to ensure low levels of feed loss.	Throughout operation	Farm monitoring report
	(59)	Use feeding regimes that minimise direct feed wastage and excessive faecal and metabolite releases from fish.		
	(60)	Record feed types and feeding rates daily so that conversion efficiency can be calculated and monitored.		
	(61)	Monitor and manage feeding regimes to minimise feed wastage and chemical usage.		
	(62)	Store and use feed on a "first-in-first-out" basis to prevent unnecessary aging and deterioration in quality.	Throughout operation	Visual inspection of feed quality
	(63)	Ensure that feed storage areas are well ventilated, cool, dry and free of vermin that can damage, contaminate and consume feeds.	Throughout operation	Visual inspection of feed storage areas
Environmental and farm monitoring	(64)	Comply with all management programmes required by DAFF (e.g. health management programme) including the reporting requirements of these programmes.	Throughout operation	
Bio-fouling	(65)	Undertake routine surveillance for indications of non-native fouling species on and around marine farm structures and associated vessels and infrastructure.	At least monthly throughout operations	Visual inspection
	(66)	Maintain effective antifouling coatings and monitor for fouling.	Throughout operation	Visual inspection
	(67)	Clean structures and hulls regularly to ensure eradication of pests before they become established.	Throughout operation	Visual inspection
	(68)	Avoid using chemicals for the cleaning of cage nets. It is recommended that high pressure water hoses and drying or sunning be used to clean cage nets of algae and debris.	Throughout operation	Record of materials used
	(69)	Minimise the impact of bio-fouling organisms by using smooth, plastic coated, knotless mesh on nets, or copper-alloy mesh.	Throughout operation	Visual inspection

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
	(70)	If antifouling products are used on infrastructure, ensure that they are not based on heavy metals and limit use of veterinary chemicals and antifoulants to the minimum necessary. .	Throughout operation	Records of materials used
	(71)	Use only prescribed veterinary chemicals and antifoulants.	Throughout operation	Records of materials used, prescription
	(72)	Establish and adhere to guidelines around the use of anti-fouling products in the mariculture industry.	Throughout operation	Records of materials used
	(73)	Do not apply antifoulants on site and use environmentally friendly alternatives where effective.	Throughout operation	Records of materials and methods used
	(74)	Ensure that veterinarian protocols to eliminate any pests, parasites and diseases are strictly adhered to.	Throughout operation	Record of implementation
	(75)	Obtain health certificates for any new batches of fry / finfish introduced into the bay (finfish and oysters).	Throughout operation	Health certificates
	(76)	Do not discard fouling organisms removed from structures back into the sea.	Throughout operation.	Reports of non-compliance Disposal record.
Biosecurity	(77)	Ensure that a high level of biosecurity management and planning is in place to limit the introduction of pests and diseases and to be able to respond quickly and effectively should biosecurity risks be identified. Comply with procedures prescribed by the DAFF Aquatic Animal Health Plans. Key components to biosecurity management include: a. Prevention of incursions, focussing on the management of: i. High-risk pathways (including international source regions); ii. New pathways; and iii. Regional sources known to be infected by recognised high-risk pests. b. Surveillance (detection), focussing on: i. Passive surveillance (screening at airports and ports); ii. Routine surveillance; iii. Targeted surveillance of high-risk areas. c. Control of populations and outbreaks through coordination with, and support from: i. All marine stakeholders whose activities can spread unwanted organisms; and ii. Agencies at local, regional and national scales.	Throughout operation.	Biosecurity plan is in place Record of implementation, Farm Monitoring Report

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	Eradication measures and/or application of therapeutants (pharmaceutical products, or 'medicines') are only advised if the risk of re-invasion can be managed and pests can be detected before they become widespread.		
Disease management	(78) Maintain strict bio-security measures within hatchery, holding tanks and sea cages.	Throughout operation.	Visual inspection
	(79) In the case of a suspected disease outbreak: a. The introduction of fingerlings onto the project site and the harvesting of fish and transport off the site must be temporarily suspended, in the case where a listed/notifiable disease is found (per RSA legislation/OIE guidelines) or an unexplained mass mortality occurs (>25% of farm population over a 14 day period), until the site has been declared suitable again by a veterinarian registered with the SAVC. Note that mass mortality events from environmental causes such as algal blooms (and associated toxins) and jelly fish swarm are precluded. b. Arrange immediately for a SAVC registered veterinarian to visit the site, sample, analyse and confirm diagnosis of the disease. c. Stop all inter-cage transfers of fish or equipment. d. Treat adjacent finfish cages simultaneously even if infections have not yet been detected.		
	(80) Upon detection of a disease outbreak: a. Implement the recommendations of the SAVC registered veterinarian including measures to minimise further spread of the disease, treat the diseased population or apply preventative measures to minimise the reoccurrence of the disease; b. Any suspected or identified disease listed as a controlled disease under the Animal Diseases Act (No 35 of 1984) must be reported to the State Veterinary Authority. c. If an OIE (World Organisation for Animal Health) listed disease is diagnosed, the State Vet Services shall be contacted immediately and their instructions followed. d. Humanely euthanize production animals to prevent suffering (in line with OIE Aquatic code (7.4) and detailed in farm Standard Operating Procedure).	Throughout operation.	Farm Monitoring Report
	(81) All organisms obtained from other hatcheries must be sourced only from certified disease, pathogen and parasite free sources.	Throughout operation.	Veterinary records
	(82) Ensure all fry undergoes a health examination prior to stocking		
	(83) All organisms introduced to the facility should be isolated in a quarantine system for a period		

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	of six weeks and subject to regular health inspections to monitor for disease.		
	(84) Fresh or frozen whole fish must not be used as feed prevent the potential introduction of pathogens and parasites via this route.		
	(85) Take necessary action to eliminate pathogens through the use of therapeutic chemicals or improved farm management as per veterinary identification and prescriptions.		Farm Monitoring Report
	(86) Regularly inspect stock for disease and/parasites as part of a formalised stock health monitoring programme approved by DAFF.		Veterinary records, Farm Monitoring Report
	(87) Maintain comprehensive records of all pathogens and parasites detected as well as logs detailing the efficacy of treatments applied. These records should be made publically available to facilitate rapid responses by other operators to future outbreaks.		Veterinary records Farm Monitoring Report
	(88) Implement good house-keeping practices at all times, i.e. keep nets clean and allow sufficient fallowing time on sites to ensure low environmental levels of intermediates hosts and or pathogens.		Visual inspection Farm Monitoring Report Sampling records
	(89) Quarantine new juveniles or new broodstock when introduced to identify and treat potential diseases and parasites under the supervision of a veterinary professional; OR Ensure all newly introduced organisms undergo a health exam by a suitably qualified veterinarian and are certified as disease free.		Veterinary records, Farm Monitoring Report
	(90) Humanely euthanize production animals that are injured or diseased to a point that causes excessive suffering.		Farm Monitoring Report
	(91) Remove and dispose of dead organisms daily (weather permitting) and dispose of in a responsible manner (refer to biological waste disposal requirements in this EMPr).		Disposal record, Farm Monitoring Report
	(92) Clean and sanitise equipment used for disposing of dead organisms.		
	(93) Appoint an aquaculture veterinarian to conduct a health assessment at least annually.		Veterinary records Farm Monitoring Report
	(94) Take the following actions in the event of a disease breakout: a. Notify the DAFF immediately; b. Isolate the affected individuals / cages; c. Identify the disease; d. Consult a veterinarian for treatment advice; e. Apply treatment recommended by veterinarian; and	As required	Appropriate communication and records.

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
		f. Monitor the efficacy of the treatment.		
	(95)	Locate cages stocked with different cohorts of the same species as far apart as possible (no less than 100 m), if possible stock different species in cages successively.		
	(96)	Treat adjacent finfish cages simultaneously even if infections have not yet been detected if prescribed by veterinarian.		
Chemical therapeutants	(97)	Seek assistance of an aquaculture veterinarian in the use of therapeutics and treatments, where required.	Throughout operation	Veterinary records Farm Monitoring Report Record of treatments
	(98)	Use only recognised and registered chemicals as treatments, medicines, herbicides, insecticides, pesticides and for other purposes.	Throughout operation	Veterinary records Record of treatments
	(99)	Avoid using excessive amounts of medication, antibiotics, hormones and pesticides.	Throughout operation	Veterinary records Record of treatments
	(100)	The use of chemicals in disease management is discouraged due to negative impacts on the aquatic environment, consumer reluctance, and because the frequent use of traditional therapeutics may trigger the emergence of disease-resistant strains of pathogens.	Throughout operation	Veterinary records Record of treatments
	(101)	Reduce levels of nutritional therapeutants and trace contaminants in feed, using only the lowest effective doses.	Throughout operation	N/A
	(102)	Use the most efficient drug delivery mechanisms that minimise the concentrations of biologically active ingredients entering the environment.	Throughout operation	Veterinary records Record of treatments
	(103)	Malachite Green as a bactericide or fungicide is prohibited.	Throughout operation	Veterinary records Record of treatments
	(104)	Reduce reliance on therapeutic chemicals through the use of sound husbandry practices aimed at disease and stress prevention.	Throughout operation	N/A
	(105)	Antibiotics use as a prophylactic or preventative measure is prohibited.	Throughout operation	N/A
	(106)	Record dosages, application methods and the resultant outcome of all treatments in a treatment register.	Throughout operation	Veterinary records Record of treatments
	(107)	Use bait type pesticides with care to prevent poisoning of non-target species.	Throughout operation	Veterinary records Record of treatments
	(108)	File Material Safety Data Sheets (MSDS) or medicine datasheets and reference during use,	Throughout operation	MSDS available for inspection

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
		storage and disposal.		
Genetic impacts (indigenous finfish species only)	(109)	Implement suitable management and planning measures to limit the possibility of genetic interactions.	Throughout operation	Farm Monitoring Report
	(110)	Adhere to DAFF genetic management guidelines.	Throughout operation	Certificate
	(111)	Maintain genetic compatibility (similar levels of variation) between wild and cultured stock by implementing the "Genetic Best Practice Management Guidelines for Marine Finfish Hatcheries" developed by DAFF and ensure adequate genetic monitoring of brood stock rotation	Throughout operation	Appropriate records
	(112)	Use appropriate spawning regimes in the hatchery to maintain genetic diversity in the offspring.	Throughout operation	Appropriate records
	(113)	Implement annual genetic monitoring between wild caught and farmed fish to monitor for any significant differences	Throughout operation	Monitoring results
	(114)	Reduce the number of escapees by maintaining cage integrity through regular maintenance and replacement and training of staff (see measures preventing escape of finfish).	Throughout operation	Maintenance records, visual inspection
	(115)	Develop and implement recovery procedures should escapes occur (see measures preventing escape of finfish).	Throughout operation	Recovery procedure in place, staff is trained to implement the procedure
	(116)	Develop the technology to create sterile fry for stocking (all female stocks can still interbreed with wild populations should escapes occur)	N/A	N/A
Escape of farmed finfish species	(117)	Ensure good physical and biological containment to limit the effects of escaped stocks.	Throughout operation	Visual inspection
	(118)	Use robust, well-maintained containment systems.	Throughout operation	Visual inspection
	(119)	Maintain cage integrity through regular maintenance and replacement.	Throughout operation	Visual inspection Maintenance records Farm Monitoring Report
	(120)	Develop a biosecurity management plan which provides mitigation measures to reduce the likelihood of escape occurring and recovery procedures should escapes occur.	Throughout operation	Biosecurity programme in place Farm Monitoring Report
	(121)	Staff should be comprehensively trained to reduce human error which could lead to escapes and unsuccessful recovery in the event of escapes.	Throughout operation	Staff training completed. Teaching material, record of attendance.
	(122)	Develop the technology to create sterile fry for stocking (all female stocks can still interbreed	Throughout operation.	Records of stock.

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
		with wild populations should escapes occur)		
Alien and invasive fouling organisms	(123)	Measures specific to *Crassostrea gigas* spat as a vector for the introduction of alien species: a. Produce oysters from own stock as far as possible and minimise importing of spat. b. Spat must undergo a visual inspection and pressure cleaning if necessary, to remove fouling organisms prior to transfer into quarantine tanks. c. Spat must be quarantined after import prior to release into the grow out baskets d. Spat must be accompanied by a health and veterinary certificates and guarantees from the supplier country's delegated authority. (this mitigation measure is primarily important for release of alien pathogens and parasites, not marine species) e. Any excess debris produced during the cleaning of oyster shells must be disposed of at a registered waste management facility. Any effluent that is produced as a result of cleaning of oyster shells must be disinfected with e-oxide to kill any remaining pathogens or biofilm. f. Environmental monitoring should include the screening for the presence of visible larger alien species such as *Tetrapygus niger* or *Ostrea edulis* (excluding authorised culture species). Any visible alien organism other than authorized culture species must be removed and disposed of regularly. Species identification should be confirmed by a qualified taxonomist or marine biologist.	Throughout operation.	Records of spat imports, visual inspection, records of alien species removed from grow out tanks.
Predators	(124)	Remove any injured or dead fish from cages promptly.	Throughout operation	Visual inspection. Farm monitoring report
	(125)	Do not release any blood and/or offal (organic waste) from finfish into the bay.	Throughout operation	Visual inspection.
	(126)	Use predator exclusion nets. Enclose nets at the bottom to minimise entanglement, keep nets taut, use mesh sizes of < 6 cm and keep nets well maintained (e.g. repairing holes).	Throughout operation	Visual inspection.
	(127)	Monitor whether predators are attracted to cages, e.g. through the presence of wildfish close to the cages.	Throughout operation	Visual inspection, farm monitoring report
	(128)	Investigate the possibility of implementing a shark spotter program	Throughout operation	Record of communication
Reduce seabird predation and at the aquaculture facility	(129)	Use exclusion devices to prevent killing of stock by predatory birds and prevent predatory bird entanglement.	Throughout operation	Visual inspection.

Aspect	Mitigation measure/procedure		Implementation Timeframe	Monitoring Methods
Entanglement	(130)	Ensure that exclusion nets are clearly visible under and above water.	Throughout operation	Visual inspection
	(131)	Keep all lines and nets tight through regular inspections and maintenance.	Throughout operation	Visual inspection
	(132)	*Ensure all mooring lines and rafts are highly visible (use thick lines and bright antifouling coatings). This mitigation measure has to be weight against bright infrastructure required to minimise entanglement.*	Throughout operation	Visual inspection
	(133)	Implement the relevant AMC protocol in case of entanglement.	Throughout operation	Farm Monitoring Report
	(134)	Request assistance with entanglement incidents from the DAFF/AMC if the incident cannot be dealt with at farm level.	Throughout operation	Appropriate communication, record of incidents
	(135)	Contact experts from the NSRI in the event of large marine mammals becoming entangled in cage systems.	Throughout operation	Record of contact with NSRI
	(136)	Keep record of all incidents of entanglement and the outcome of these incidents.	Throughout operation	Record of entanglements
Socio-economic impacts	(137)	Procure goods and services from local, provincial or South African suppliers as far as possible, giving preference to Black Economic Empowerment (BEE) suppliers and SMMEs.	Throughout operation	B-BBEE Programme records. Staff records.
	(138)	Procure ancillary services for goods purchased overseas, such as installation, customisation and maintenance, from South African companies as far as possible.	Throughout operation	Procurement records.
	(139)	Preferentially use local and regional labour	Throughout operation	Staff records, training programmes, farm monitoring report
	(140)	Preferentially employ previously disadvantaged individuals.	Throughout operation	Staff records
	(141)	Implement a local recruitment policy to discourage an uncoordinated influx of outside workers.	Throughout operation	N/A
	(142)	Collect data on staff numbers, composition and origin and report these to DAFF.	Throughout operation	Farm monitoring report
Visual impacts	(143)	Use grey based hues for all project components (rafts, cages, barrels, buoys/flotation devices) visible above the surface of the water as far as possible. This mitigation measure has to be weight against bright infrastructure required to minimise entanglement.	Throughout operation	Visual inspection
	(144)	Ensure project components are of a similar style and scale to promote visual cohesiveness.	Throughout operation	Visual inspection
	(145)	Utilise the minimum number of safety / warning buoys as far as possible. Only demarcate the corner points of each precinct and the minimum interval distance along the precinct boundary to meet Ports Authority (Transnet) safety requirements.	Throughout operation	Visual inspection

Aspect	Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
	(146) Maintain all project infrastructure in good working order	Throughout operation	Visual inspection, maintenance records
	(147) Lights at night should be safety dependent.	Throughout operation	Visual inspection
Product certification	*(148) Consider eco-labelling and certification schemes for fish safety and quality, to improve legality, transparency and sustainability.*	Operational phase	None required. Voluntary.
Protection of heritage resources	(149) Should any heritage resources material, be accidentally encountered during maintenance of the aquaculture operations in any of the proposed areas, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.	During installation of farm	Record of diver surveys
	(150) Provide the location and nature of any identified maritime and underwater cultural heritage resources to a maritime archaeologist and to SAHRA for inclusion on their shipwreck database.	During installation if required	Appropriate communication
	(151) Obtain a permit from SAHRA prior to continuing with activities that have disturbed a wreck site or part thereof, including objects or artefacts.	During installation if required	Appropriate communication
	(152) Submit a detailed anchor / mooring distribution plan to the Maritime and Underwater Cultural Heritage Unit at the South African Heritage Resources Agency (SAHRA).	Before installation commences	Record of diver surveys, placement of farms

8 MEASURES APPLICABLE TO THE DECOMMISSIONING PHASE

The DAFF facility does not have a specified life span. Partial or full decommissioning of individual farms may or may not occur. The decommissioning phase would also be applicable in case that the ADZ as a whole is decommissioned.

8.1 Roles and Responsibilities

The key role players during the decommissioning phase of the project are anticipated as follows:

- AMC (with DAFF primarily responsible);
- Aquaculture operators; and
- Contractors responsible for decommissioning / removal of infrastructure.

Individual operators retain the final responsibility with regards to the compliance of aquaculture operations with the EMPr and EA. All instructions relating to the EMPr will be given to contractors via the respective aquaculture operators. Contractors will report issues of concern to the aquaculture operator, who in turn will report on progress to the DAFF.

Key roles and responsibilities during the decommissioning phase with respect to the implementation of the EMPr are outlined below.

Roles and responsibilities relating to environmental monitoring are laid out in Section 9.1.

AMC (with DAFF primarily responsible)
The AMC has oversight over environmental management at the ADZ. In terms of environmental management, the AMC will:

- Ensure that environmental monitoring is undertaken in line with the monitoring plan until decommissioning is complete;
- Make decisions based on the outcomes of environmental monitoring, which could lead to the recommendations about the decommissioning process;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents related to aquaculture operations during decommissioning;
- Provide updated information to the public (e.g. notification when aquaculture operations cease); and
- Record and if necessary, respond to, environmental aquaculture-related incidents.

Aquaculture operators:
Individual aquaculture operators retain the overall responsibility for the management of decommissioning activities and the implementation of the EMPr. Operators are required to:

- Ensure that contractors are aware of and comply with the conditions of the EMPr;
- Ensure that staff are aware of and comply with the conditions of the EMPr;
- Ensure that aquaculture infrastructure is secure during decommissioning and removed completely;
- Report any incidents and initiate the emergency protocol if required.
- Report to the DAFF/AMC when decommissioning is complete.

Contractors:
All contractors will be required to:

- Ensure that all employees are aware of and comply with the EMPr;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Immediately notify the aquaculture operator of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the DAFF/AMC.

8.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the decommissioning phase, as well as timelines for the implementation of these measures and monitoring thereof, are detailed in Table 16 for farm-level measures to be implemented by individual operators.

Environmental monitoring requirements during the decommissioning phase are addressed in Chapter 9.

Table 16 Farm-level management and mitigation measures that must be implemented during decommissioning by individual operators (adopted from du Toit and Reuther 2017).

Aspect	Mitigation measure/procedure	Implementation timeframe	Monitoring methods
Determine requirements	(1) Initiate consultation with the AMC before decommissioning to discuss potential decommissioning options, methods and requirements.	While preparing decommissioning	Records of consultation with AMC
	(2) Determine other potential uses for equipment and infrastructure to be decommissioned (i.e. aim to reuse or recycle decommissioned items).		
	(3) Identify and assess any potential environmental and societal risks associated with the preferred method of decommissioning and implement mitigation to minimise risks.		
	(4) Notify the DAFF/AMC before decommissioning activities commence.	While preparing decommissioning	Record of notification of AMC
Environmental awareness training	(5) Provide environmental awareness training to all contractors. Training should include discussion of: a. Potential impact of waste and decommissioning activities on the environment. b. Suitable disposal of waste. Suitable handling and disposal protocols must be clearly explained and sign boarded and the 'Reduce, reuse, recycle' hierarchy should be implemented. c. Key measures in the EMPr relevant to worker's activities. d. How incidences and suggestions for improvement can be reported. e. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	Before employment.	Training attendance register. Observe whether activities are executed in line with EMPr requirements
Removal of infrastructure	(6) Remove all infrastructure and equipment and dispose of it appropriately.	Upon decommissioning	Visual inspection, Reports of non-compliance.
	(7) Do not dispose or leave behind infrastructure in the coastal and marine environment.		
	(8) Ensure that no litter and debris reaches the marine environment during the removal of infrastructure, cleaning of infrastructure and general decommissioning activities.		
	(9) In the event of equipment, litter and debris entering the sea, remove these as soon as possible.		
	(10) Collect recyclables separately and deliver these to suitable facilities or arrange for collection.		Disposal records.
	(11) Do not allow any burning or burying of waste on site.		Visual inspection
	(12) Aim to reuse or recycle decommissioned items.		Visual inspection

9 ENVIRONMENTAL MANAGEMENT AND MONITORING

Management plans and protocols will provide guidance in responding to environmental incidents and complaints, in providing environmental awareness, and to environmentally responsible decommissioning. Environmental monitoring is essential for the ADZ and will inform the phasing of aquaculture expansion in Algoa Bay, maximum production that can sustainably be achieved in the ADZ and an adaptive management strategy to environmental management of the ADZ.

It is important to note that the drafting and implementation of all required management and monitoring plans and protocols detailed in this chapter will contribute significantly to achieving compliance with the EMPr. However, some of the mitigation measures detailed in Chapters 5-8 will not be covered by these plans/protocols and compliance with individual environmental management measures must be ensured on ADZ and operator level.

Management and monitoring will be undertaken at two levels:

- ADZ-level monitoring, implemented / coordinated by the DAFF / AMC, includes monitoring for wider spatial and cumulative impacts of farms, including monitoring further afield and at control sites, to determine the ADZ footprint and inform expansion of aquaculture within the approved limits / boundaries. In addition, monitoring for the ADZ EMPr would include studies of disease and parasites and genetic variability within wild stocks, and status of ecosystem indicators further afield (e.g. bird nesting success on islands, cetacean use of important feeding and breeding habitats, habitat use by fish, cetaceans and sharks via telemetry studies).

  Many of these programmes will need to and should be undertaken in collaboration with existing studies and monitoring programmes in Algoa Bay. (Partial) funding for environmental monitoring may be sought from individual farm operators; and

- Farm-level monitoring must be implemented by individual operators and is specific to monitoring and record keeping of animal husbandry, stock health and feeding programmes, as well as water quality sampling within and adjacent to farms and, in the case of finfish farms, plans to deal with escapees and predators.

This monitoring programmes and management plans/protocols apply to:

- All phases of the ADZ (which are likely to overlap throughout lifetime of the ADZ); and
- All farms under design, construction, operation or decommissioning within the Algoa Bay ADZ.

Additional monitoring data may be collected outside of this EMPr framework:

- As part of other authorisations;
- In compliance with some form of code of practice;
- By regulatory authorities as part of enforcement; and
- By regulatory authorities as part of monitoring in the wider environment.

9.1 Roles and Responsibilities

The key role players involved in environmental management and monitoring are anticipated as follows:

- AMC (with DAFF primarily responsible);
- Aquaculture operators; and
- Specialists appointed to draft environmental monitoring plans and to undertake environmental sampling and monitoring.

The DAFF retains the final responsibility with regards to the compliance of aquaculture operations with the EMPr and EA. Some of the responsibility will be transferred to individual operators through permit and right conditions, where applicable. Individual operators also retain responsibility for undertaking any monitoring required at farm level and in terms of other authorisations.

All instructions relating to the service providers appointed to conduct sampling and monitoring on behalf of the AMC will only be given by the DAFF / AMC, and service providers will report directly to the DAFF / AMC.

Key roles and responsibilities relating to sampling and monitoring are outlined below.

AMC (with DAFF primarily responsible)
The AMC has oversight over environmental management at the ADZ. In terms of environmental management, the AMC will:

- Ensure that environmental monitoring is undertaken in line with the sampling/monitoring plans
- Monitor ADZ aquaculture operators' compliance with the EMPr and EA conditions; and
- Monitor production volumes in the ADZ.

Aquaculture operators:
Individual aquaculture operators retain the overall responsibility for the management of decommissioning activities and the implementation of the EMPr. Operators are required to:

- Undertake all necessary farm-level monitoring required in terms of authorisations and/or for the sustainable operation of the farm;
- Record and monitor farm-related aspects as per this EMPr;
- Provide service provider(s) appointed by the AMC with access to farm areas and requested information.

Specialists:
Specialists appointed by the DAFF and approved by the AMC to conduct environmental sampling and monitoring will be required to:

- Draft monitoring plans and protocols
- Conduct all sampling and monitoring in line with the requirements in the EMPr and specific plans;

9.2 List of environmental monitoring programmes and management plans/protocols/guidelines

DAFF and individual operators must appoint suitably qualified specialists to compile and/or approve environmental monitoring programmes and environmental management plans/protocols/guidelines appropriate for the type, size and impact significance of the proposed project for the following aspects within the time-frames specified in Table 17.

All management and monitoring instruments must be compiled in accordance with international and national best practice guidelines where available. The DAFF/AMC holds the responsibility to approve all monitoring and management instruments.

The time frames for approval and implementation differ for new farms and those already in operation at the time when the ADZ is established.

Table 17 **Aquaculture Development Zone – level management and monitoring plans/protocols. The DAFF/AMC holds the responsibility to approve all monitoring and management instruments.**

Type of programme/plan/protocol /guidelines	EMPr management measures to be included in the plan	Timeframe for approval	Timeframe for implementation	Responsibility: Drafting	Responsibility: Implementation
Design, maintenance and operational guidelines for the Algoa Bay ADZ	Consider all requirements listed in the EMPr to a level of detail appropriate for the plan.	Within 2 months of the ADZ establishment	Commencement of design phase for new farms Within 6 months for existing farms Throughout project cycle	DAFF	Individual operators
Farm establishment proposal template	Design phase in Chapter 5.	At least 6 months before the first new farms establish	With the establishment of the first new farms	DAFF	Individual operators
Emergency response protocol	Construction phase: • Table 12: #3-6 • Table 13: #14-19 Operation phase: • Table 14:#12-15 • • Table 15:#20-27	At least 6 months before the first new farms establish	Upon installation of new farm Within 2 months for existing farms Throughout project cycle	DAFF	Individual operators and AMC
Complaints register	Construction phase: • Table 12: #2 • Table 13: #2-3 Operation phase: • Table 14:#11 • • Table 15:#2-3	Upon declaration of the ADZ	Upon declaration of ADZ. Throughout project cycle	DAFF	AMC
Environmental monitoring programme (baseline and impact monitoring)	Operational phase • Table 14:#64	Prior to declaration of ADZ	Upon declaration of ADZ Throughout project cycle	Specialist appointed by DAFF	Specialist appointed by DAFF; and If required appointed by operator
Socio-economic monitoring	N/A	Prior to declaration of ADZ	Upon declaration of ADZ	Specialist appointed by	Specialist appointed

Type of programme/plan/protocol /guidelines	EMPr management measures to be included in the plan	Timeframe for approval	Timeframe for implementation	Responsibility: Drafting	Responsibility: Implementation
programme			Throughout project cycle	DAFF	by DAFF; and If required appointed by operator
Operator specific EMPr	Design phase: Table 11 Construction phase: Table 13 Operation phase: Table 15 Decommissioning phase: Table 16	During design of farm. Within 3 months for existing farms.	During design of farm. Within 6 months for existing farms. Throughout project cycle	Specialist appointed by operator	Operator
Decommissioning plan	Table 16	During design of farm. Within 3 months of EA for existing farms.	During design of farm. Within 6 months of EA for existing farms. Decommissioning phase	Operator	Operator
Environmental awareness training plan	Construction phase: Table 13 #4 Operation phase: Table 15 #1 Decommissioning phase: Table 16 #5	Three months prior to installation of the new farm Within 2 months for existing farms.	Prior to installation of new farm Within 3 months for existing farms. Throughout project cycle	ECO appointed by operator	ECO appointed by Operator
Farm-specific waste management plan	Construction phase Table 13: #5-9,22-24 Operation phase Table 15: #4-10,13-18,19,76,125 Decommissioning phase Table 16: #7-12	Three months prior to installation of the farm Within 2 months for existing farms	Upon installation of new farm Within 3 months for existing farms Throughout the project cycle.	ECO appointed by operator	Operator
Farm-specific hazardous substances handling and storage procedures	Construction phase Table 13: #10-12 Operation phase Table 15: #11-12	Three months prior to installation of the farm Within 2 months for existing farms	Upon installation of new farm Within 3 months for existing farms Throughout the project cycle.	ECO appointed by operator	Operator
Farm monitoring plan (based on design, maintenance and operational guidelines)	Construction phase: • Table 13:#20,21-25,26-28,29-31,32-36 Operation phase:	Three months prior to installation of the farm Within 2 months for existing farms	Upon installation of new farm Within 3 months for existing farms Throughout the project cycle.	Specialist appointed by operator	Operator

Type of programme/plan/protocol /guidelines	EMPr management measures to be included in the plan	Timeframe for approval	Timeframe for implementation	Responsibility: Drafting	Responsibility: Implementation
	• • Table 15:#30-32,33-36,37-39,40-49,50-51,52-54,55,56-63,66—72,77,78-96,97-108,109-116,117-122,123,126				

9.3 Monitoring measures

The monitoring measures that must be implemented for the ADZ, as well as timelines for the implementation of these measures, are laid out below:

- Table 18 - specifies ADZ-level measures that must be implemented by the DAFF / AMC; and
- Table 19 - specifies farm-level measures that must be implemented by individual operators.

A timeline for initial ADZ monitoring and sampling steps is provided in Figure 5 (du Toit and Reuther 2017).

Table 18 **ADZ-level monitoring requirements that must be implemented by the Department of Agriculture, Forestry and Fisheries (DAFF)/ Aquaculture Development Zone Management Committee (AMC) (adopted from du Toit and Reuther 2017).**

Mitigation measure/procedure	Implementation Timeframe	Monitoring Methods
(1) Ensure that the aquaculture industry association in Algoa Bay designates an individual to monitor the shoreline of the Bay weekly for any aquaculture equipment washed ashore. The frequency of monitoring can be reduced after 6 months with the approval of the AMC if incidents of equipment washing ashore are very limited.	Within 1 months of establishment of the ADZ	Appointment and Terms of Reference
(2) Ensure that the shoreline of the bay is monitored for any aquaculture equipment washed ashore.	Weekly monitoring Frequency can be amended by the AMC after 6 months.	Any debris is quickly removed, and owner is notified.
(3) Appoint / nominate a suitably qualified independent specialist to compile a comprehensive Sampling Plan for the ADZ and present the Sampling Plan to the AMC and consultative forum for review (Note that the sampling plan is not approved by the CF, however).	Within 6 months of establishment of the ADZ Sampling Plan to be compiled within 2 months of appointment of service provider.	Appointment and Terms of Reference Sampling Plan includes appropriate parameters and is (cost) effective and efficient
(4) Ensure that a suitably qualified specialist conducts sampling and sample analysis in line with the Sampling Plan.	Initiate sampling within 2 month of completion and approval of the Sampling Plan	Good understanding of aquaculture impact on bay, to inform phased implementation of aquaculture
(5) Appoint a suitably qualified specialist to monitor / audit compliance of aquaculture operators with specifications in the EMPr.	Appoint specialist within 6 months of establishment of the ADZ and conduct audit after first year (annually thereafter)	Appointment and Terms of Reference
(6) Support existing and ongoing monitoring in Algoa Bay and aim to include parameters that are also relevant to monitoring potential impacts of aquaculture and respective baselines.	Audits to confirm that appropriate monitoring is being undertaken at least quarterly initially. Frequency can be amended by the AMC after 1 year.	Compliance of aquaculture activities with EMPr
(7) Review and interpret results of environmental monitoring in Algoa Bay and make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits.	Throughout the lifespan of the ADZ	Complementary monitoring and reporting
(8) Review and interpret results of socio-economic monitoring in Algoa Bay and make decisions based on the outcomes of socio-economic monitoring, which could lead to the amendment of operations within the authorised limits.	At least quarterly Throughout the lifespan of the ADZ	Expansion / phasing in of activities does not compromise marine ecology of the bay
(9) Develop effective protocols to report on stocking densities, mortalities, graded and ungraded production, biofouling discards.	Throughout the lifespan of the ADZ	Data to be used in ADZ management

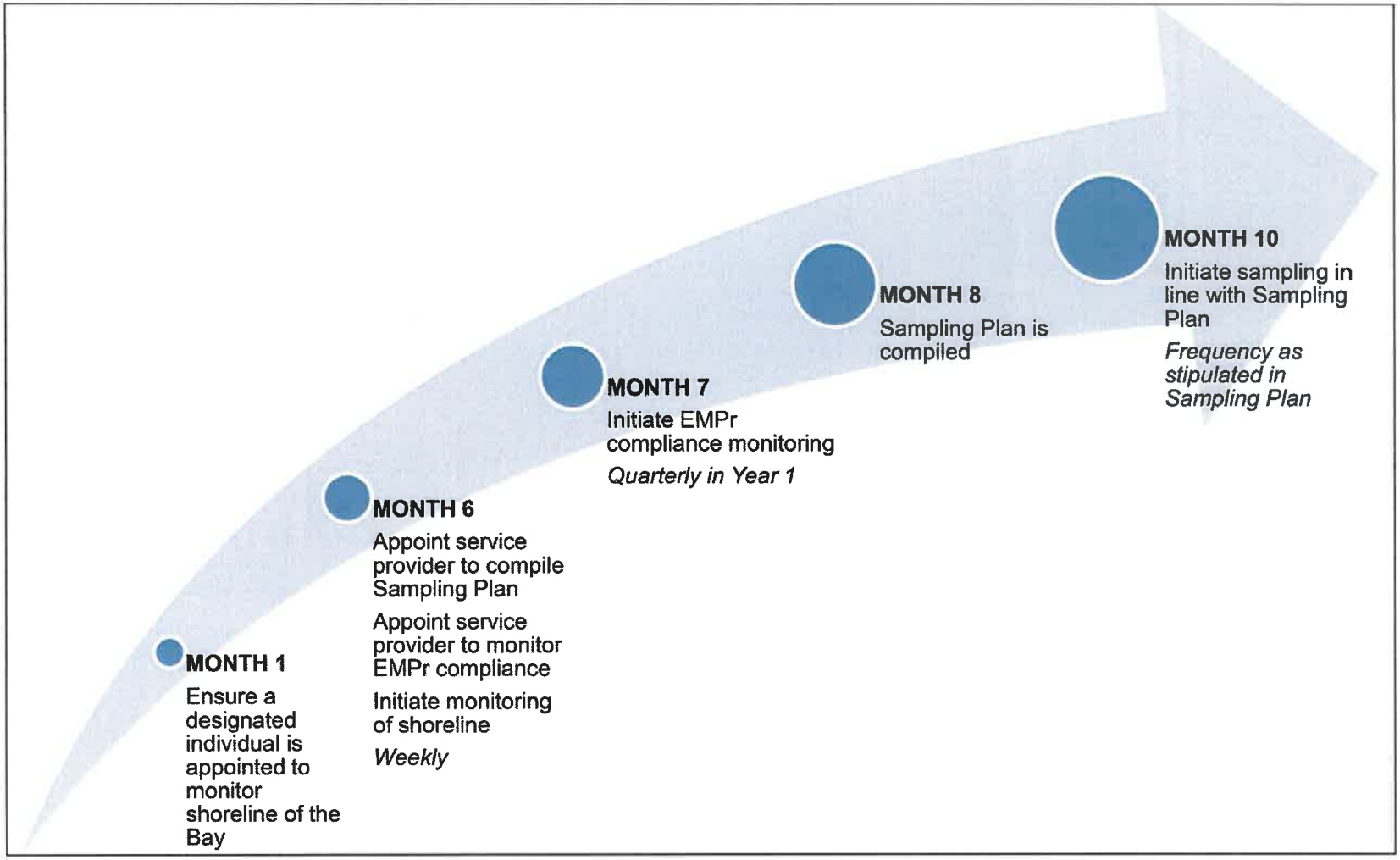


Figure 5 **Timeline for initial implementation of monitoring at the Algoa Bay sea-based Aquaculture Development Zone (adopted from du Toit and Reuther 2017).**

Table 19 Farm-level monitoring requirements that must be implemented by individual operators (adopted from du Toit and Reuther 2017).

Aspect	Mitigation measure/procedure		Frequency	Standard/target
Equipment	(1)	Establish an effective monitoring protocol to ensure that longline / raft / net integrity and supporting infrastructure are maintained. Ensure that: a. Primary longline / raft / net is secured appropriately so that it is kept taut and rigid at all times. Nets of fish cages should be weighted; b. Ropes and anchor lines are taut, especially after rough seas; c. Ropes are routinely inspected for wear, especially after rough conditions, and replaced as and when required; and d. There is adequate separation between rafts and longlines, even during strong currents and rough seas; or e. There is adequate separation between the primary and secondary nets of fish cages, even during strong currents and rough seas.	Surface infrastructure: Daily Subsurface infrastructure: Weekly and after storm events	Zero system failure resulting in loss of farm structure integrity. Fewer than 10 entanglements of any species per year and target of zero mortalities (AMC to set standard).
	(2)	Maintain a comprehensive and detailed register of the quantities of chemicals, antibiotics, antifoulants and hormones etc. that are utilised.	Throughout operations	All substances are accounted for and, all substances to be compliant with DAFF permit conditions.
Water quality	(3)	Monitor water quality and sediment quality as required for operations and/or by other authorisations.	Throughout operations	Produce is suitable for human consumption.
Biosecurity	(4)	Establish a traceability protocol of the cultured finfish / shellfish and its products.	Continuous as required by marine compliance officers, at processing, distribution and retail outlets.	100% traceability of cultured fish product.
	(5)	Develop and implement a stock health monitoring programme, including regularly inspecting stock for disease and parasites, in collaboration with DAFF.	Throughout operation	Stock is free of disease and parasites and, to be accompanied by a health certificate.
	(6)	Ensure that facilities are inspected by an aquaculture veterinarian to allow for monitoring of the health status of cultured stock.	Every two years	Overall health of stock should be of a suitable quality to promote and ensure efficient growth rates of particular species being cultured.
Fish farming	(7)	Monitor culture-fish mortalities to ensure dead fish are quickly removed, to minimise contamination and fluxes in waste production.	Daily	Zero mortalities left in cages for a period exceeding 24 hours.

Aspect	Mitigation measure/procedure		Frequency	Standard/target
	(8)	Monitoring feed input and uptake to ensure feed waste is limited (i.e. prevent overfeeding by maximising the feed conversion ratio of cultured fish).	Daily	Achieve acceptable Food Conversion Ratio for the fish species farmed.
	(9)	Develop and implement a protocol to monitor escapes from finfish farms.	Daily	Target = Zero escapees. AMC to decide on standard.
	(10)	Adopt the MOM management system (or similar) for monitoring finfish.	Throughout operation	Thresholds as set by MOM
	(11)	Ensure adequate genetic monitoring of brood stock rotation.	Throughout operation	No inbreeding / genetic interference
Marine animals	(12)	Keep a log of all cetaceans, seabirds and predators recorded in the vicinity of fish farms, including behavioural observations. These data should be periodically compiled and analysed by experts and included in annual monitoring reports that should recommend improvements and adjustments to mitigation measures if required.	Daily	Behaviour is not significantly altered to the detriment of the species.
	(13)	If predator deterrents are used, closely monitor cetacean, seal, shark and seabird behaviour.	Daily	Zero predation of cultured stock. Zero cases of physical harm to any predator caused by deterrents.
	(14)	Record all marine vertebrate mortalities resulting either directly or indirectly from aquaculture operations. Where appropriate modify equipment and/or implement other measures to reduce mortalities.	Daily	Target = zero mortalities. Acceptable level to be determined by AMC

10 REPORTING AND CORRECTIVE ACTION

Monitoring results must be compiled into various reports at specified frequency as detailed in Table 20. The minimum content of such reports is prescribed in Sections 10.1-10.5.

Table 20 Monitoring reports required throughout the lifespan of the Algoa Bay Aquaculture Development Zone.

Report	Frequency	From	To
Aquaculture Farm Monitoring Report	Monthly	Operator	ECO
Environmental Sampling Reports	Quarterly	Appointed service provider	DAFF/AMC/ECO
Socio-economic monitoring reports	Quarterly	Appointed social engagement co-ordinator	DAFF/AMC/ECO
EMPr Compliance Report	Quarterly	Appointed service provider	DAFF/AMC
EA and EMPr Compliance Audit	As indicated in the EA	Independent person	AMC/DEA

*Note that all reports should also be made available to the Consultative Forum.

10.1 Aquaculture Farm Monitoring Report

Individual aquaculture operators must prepare a monthly Farm Monitoring Report, which includes as a minimum the following information:

- Species farmed;
- Stocking densities and weight;
- Information related to the type and amount of feed used;
- Issues encountered (e.g. disease, pollution events, red tide events, damage to infrastructure, health and safety related issues);
- Maintenance activities required;
- Staff information (number, staff turnover, skill level, B-BBEE compliance);

10.2 Environmental Sampling Report

Suitably qualified specialists must submit quarterly Environmental Sampling Reports to DAFF/AMC/ECO. The frequency of report submissions can be amended after one year. Reports must include at a minimum the following information:

- Sampling/monitoring activities undertaken in the reporting period;
- Sampling/monitoring results;
- Key trends;
- Items of concern; and
- Recommendations for additional/change in management practices.

10.3 Socio-economic monitoring report

Suitably qualified social engagement co-ordinator must submit quarterly socio-economic monitoring reports to the AMC/ECO. The frequency of report submissions can be amended after one year. Each report shall provide the following information:

- A summary of outputs and activities undertaken;
- Specification of achievements compared to targets; variance reporting and assessment of deviations, and
- An assessment of the efficiency of the process and the underlying impact on the community.

10.4 EMPr Compliance Report

A suitably qualified specialist must submit quarterly EMPr Compliance Reports to DAFF. The frequency of report submission can be amended after one year. Reports must include at a minimum the following information:

- Monitoring/audit activities undertaken in reporting period;
- Overall compliance with the EMPr;
- Key aspects of non-compliance; and

10.5 EA and EMPr Compliance Audit Report

In accordance with Section 34 of the EIA Regulations, 2014 (as amended in 2017), compliance with the conditions of the EA and the EMPr must be audited by an independent person at intervals indicated in the EA. Audit reports must be submitted to the relevant competent authority. Environmental audit reports must comply with the specifications in Section 34 and Appendix 7 of the EIA Regulations, 2014 (as amended in 2017).

10.6 Corrective Action

Corrective action is a critical component of the implementation–review–corrective action–implementation cycle and it is through corrective action that continued improvement can be achieved.A compliance strategy will be developed by DAFF to outline the detailed compliance required by the operators. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid the need for repeated corrective action.

If environmental compliance monitoring indicates non-conformance with the EMPr, the DAFF will formally notify the operator through a Corrective Action Request. The Corrective Action Request documents:

- The nature of the non-conformance / environmental damage;
- The actions or outcomes required to correct the situation; and

- The date by which each corrective or preventive action must be completed.

Upon receipt of the Corrective Action Request, the aquaculture operator will be required to report in the Farm Monitoring Report how the required actions were implemented and success or failure of the corrective action.

Should proposed standards or targets be regularly exceeded, an independent committee or service provider should investigate and objectively assess the effectiveness of mitigation measures. If effective mitigation cannot be implemented, stocked biomass should be reduced until targets are consistently achieved.

11 REFERENCES

Mackay and van Zyl 2012. Algoa Bay Sea-based Marine Aquaculture Development Zones –Basic Assessment Report: Appendix G Environmental Management Programme. Supporting documentation for the Basic Assessment process conducted in terms of the National Environmental Management Act (No. 107 of 1998). Report prepared for the Department of Agriculture, Forestry and Fisheries by CapeEAPrac, Report Reference: NMM101/18 Version 30 July 2012.

du Toit J and Reuther S. 2017. Proposed Sea-Based Aquaculture Development Zone in Saldanha Bay. Environmental Management Programme. Report prepared by SRK Consulting for the Department of Agriculture, Forestry and Fisheries. Report Number 499020/6. August 2017.

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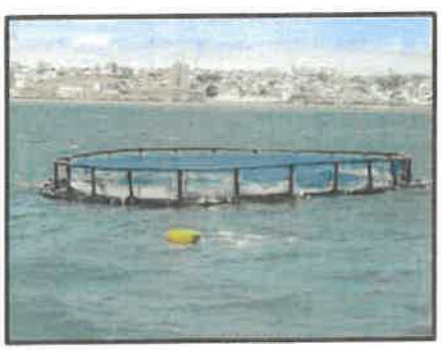
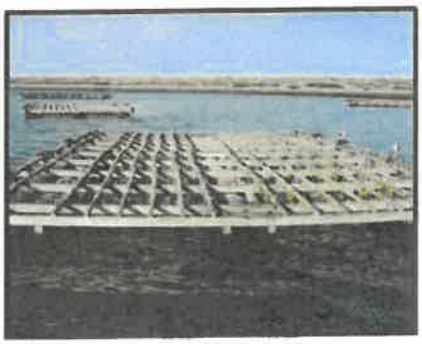
ANNEXURE C

Example of an Emergency response protocol.

C

EMERGENCY RESPONSE PROTOCOL FOR THE SALDANHA BAY AQUACULTURE DEVELOPMENT ZONE





June 2022

Version 3

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

	PREPARED BY: Department of Forestry, Fisheries and the Environment Private Bag X2 Roggebaai, 8001
REVIEWED BY:	Department of Forestry, Fisheries and the Environment (DFFE); The Western Cape Department of Environmental Affairs and Development Planning (DEA&DP); Transnet National Ports Authority (TNPA) of Saldanha Bay; Department of Agriculture (DoA); South African Whale Disentanglement Network (SAWDN); Saldanha Bay Municipality (SBM); National Sea Rescue Institute (NSRI); South African Navy: South African Hydrographic Office (SANHO); South African Maritime Safety Authority (SAMSA) World Wildlife Fund South Africa (WWF SA).
Report should be cited as:	Department of Forestry, Fisheries and Environment. 2022. Emergency Response Protocol for the Saldanha Bay Aquaculture Development Zone. Version 3. 37pgs.

Endorsed by:		
Name	Mr F Endemann	Ms M Naiker
Designation	AMC co-chair	AMC co-chair
Signature		MELLISA NAIKER Digitally signed by MELLISA NAIKER Date: 2022.06.15 11:04:12 +02'00'
Date	15/06/2022 13 00.	

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms

AAH – Aquatic Animal Health

ADZ - Aquaculture Development Zone

AMC - Aquaculture Management Committee

CF - Consultative Forum

DAFF - Department of Agriculture Forestry and Fisheries (Now DFFE: Branch Fisheries Management)

DEA – Department of Environmental Affairs (Now DFFE: Branch Environment)

DFFE – Department of Forestry, Fisheries and the Environment

DEO – Designated Environmental Officer

EA - Environmental Authorisation

ECO – Environmental Control Officer

ERP – Incident Response Protocol

EMPr - Environmental Management Programme

HAB - Harmful algal blooms

NEMA - National Environmental Management Act

NRCS- National Regulator for Compulsory Specifications

NSRI- National Sea Rescue Institute

SAMSA- South African Maritime Safety Authority

SANHO – South African Navy Hydrographic Office

SANParks - South African National Parks

SAPS - The South African Police Service

SAWDN – The South African Whale Disentanglement Network

SMB – Saldanha Bay Municipality

TNPA - Transnet National Ports Authority

Definitions

Aquaculture Development Zone is an area that has been earmarked specifically for aquaculture activities with the purpose of encouraging investor and consumer confidence; creating incentives for industry development, to provide marine aquaculture service; manage the risks associated with aquaculture; as well as to provide skills development and employment for coastal communities.

ADZ Incident Response Leader The person delegated by the AMC to perform a centralised coordinating function in the event of emergencies. This position is most likely to be filled by the Chairman of the Bivalve Association (BSASA) if resident in Saldanha Bay or surrounds or the current ECO depending on experience and expertise.

Custodian / Owner of the ERP is the person responsible for ensuring that the ERP is kept up to date and made available to all relevant parties.

Incident response includes the systematic response to an unexpected or dangerous occurrence with the objective of coordinating a procedure to mitigate the impact of the incident on people and the environment

Environment as defined by the National Environmental Management Act (107 of 1998) and its regulations (NEMA) means the surroundings within which humans exist and that are made up of-

(i) the land, water and atmosphere of the earth.

(ii) micro-organisms, plant and animal life.

(iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and

(iv) the physical, chemical, aesthetic, and cultural properties and conditions of the foregoing that influence human health and well-being.

Incident in terms of NEMA; is an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property. For example, a large oil spill into the bay.

Responsible person includes any person who is responsible for causing the incident, owns any hazardous substance involved in the incident; or was in control of any hazardous substance involved in the incident at the time of the incident

Section 30 incident As per the Section 30 of NEMA refers to an "incident" and defines this in subsection (1) as "an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that has caused or may cause significant harm to the environment, human life or property".

1. Purpose

The purpose of this document is to describe potential incidents or emergencies that could occur within the Saldanha Bay Aquaculture Development Zone (ADZ) and detail the Standard Operating Procedure to follow when such events occur. This is a "living document" and is intended to be expanded upon and adapted as unforeseen incidents or emergencies take place and as lessons are learnt. This document cannot predict every single possible incident or incident but aims, by dealing with already identified incidents or emergencies, to provide guidance for a response to a previous unidentified incident or incident.

2. What is an incident?

An incident in terms of NEMA, is an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property. For example, a large oil spill into the bay. However, for the purpose of this protocol this definition is expanded to include all incidents / events originating from an ADZ activity that could affect the environment / other Bay users AND all incidents / events occurring elsewhere in the Bay that could impact on the ADZ. Reference is made to some of these below:

- release of any alien invasive caged fish;
- loss of equipment;
- localised equipment washed up on the beach;
- mooring lines or other infrastructure becoming loose or drifting;
- widespread and large-scale equipment loss and debris formation (e.g. as a result of heavy seas of storms);
- major oil spill in the harbour- unrelated to ADZ operations;
- any other deviation or non-compliance with either the ADZ or farm-specific EMPrs which could pose a risk to the environment, people or other infrastructure and bay users; or.
- sewage or poorly treated effluent spill outside of the Aquaculture Development Zone (ADZ).

Thus, two broad **categories** of incidents can be defined based on the source of the incident and consequent risk of damage to the environment, people or property:

✓ an incident originating from within the ADZ farms and,
✓ an incident originating outside of the ADZ, but which could affect the farms.

Two levels of incident can be defined:

1. A localised, farm specific loss of equipment, discharge of pollutant that does not need outside assistance, and which is likely to have localised impact and not affect other bay users (this type of event will be termed an INCIDENT in the remainder of this plan) and,
2. A larger, more significant incident in which multiple farms are involved and the effects of which are potentially felt by other bay users and the environment such as loss of fish.

3. What should be done if such an incident occurs?

The two **categories** of event (i.e. originating inside the ADZ or outside the ADZ) are approached differently. The flow diagram below summarises the approaches which are then detailed in subsequent paragraphs.

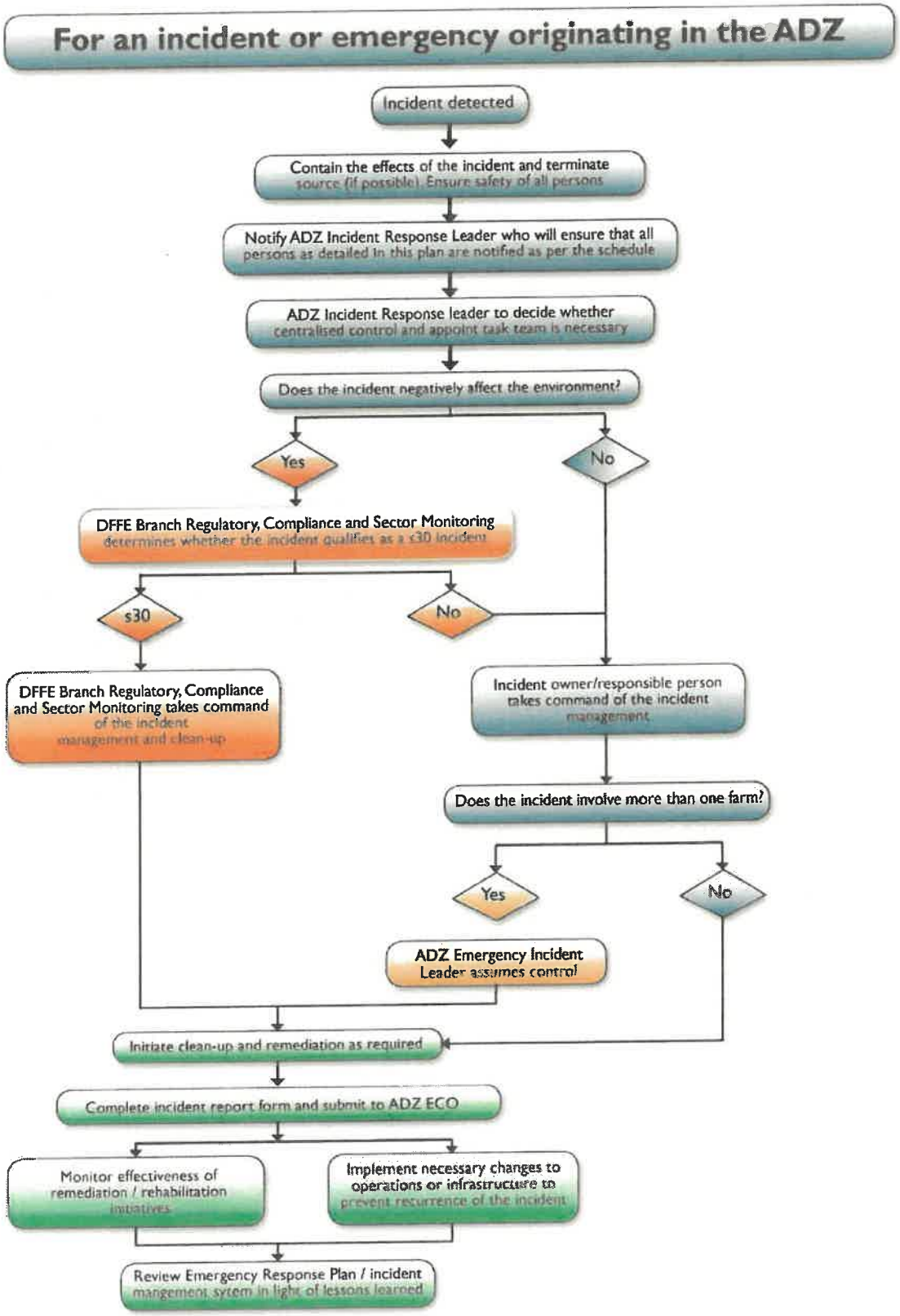


Figure 3-1: Flow chart for an Incident originating inside the ADZ

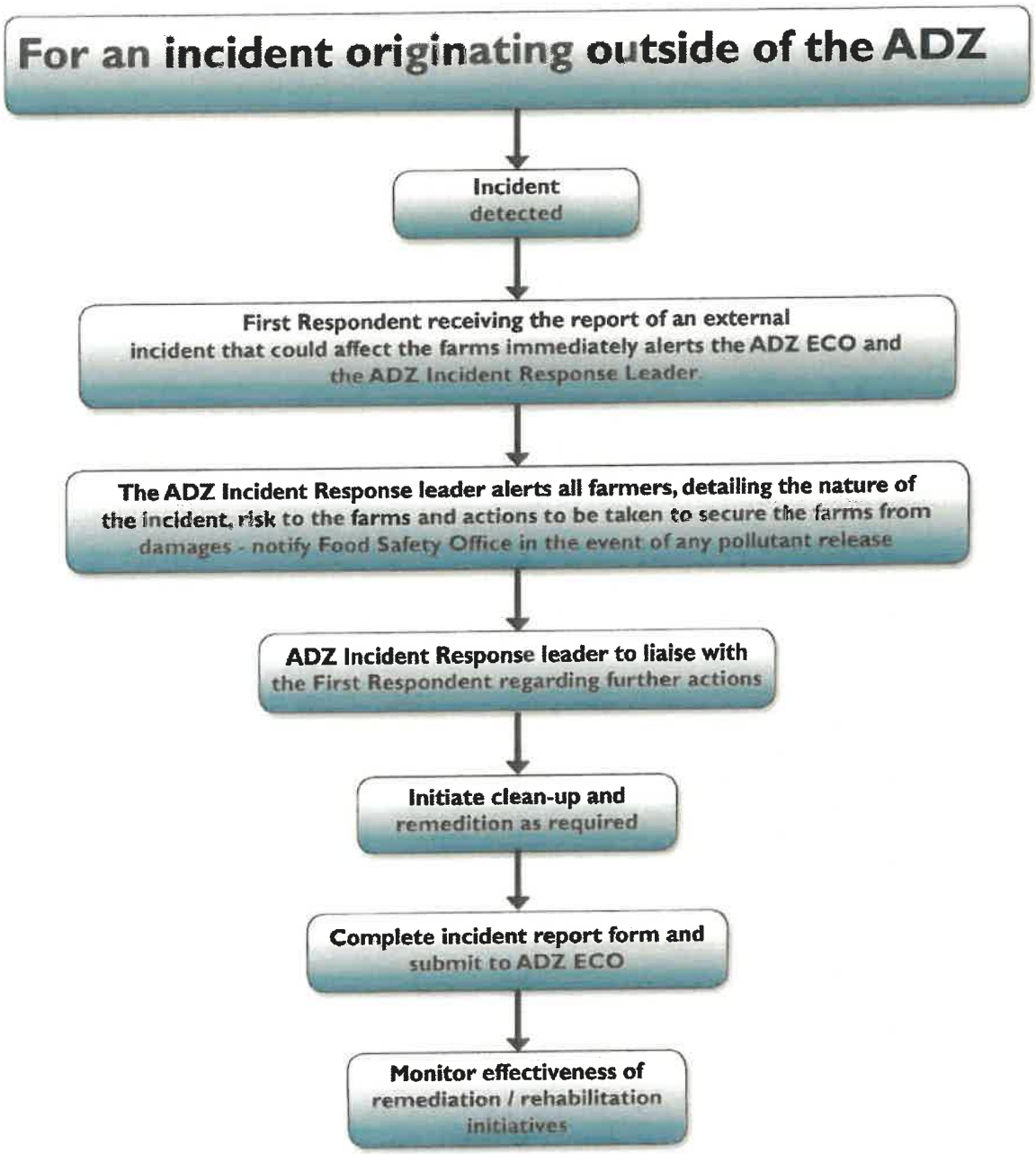


Figure 3-1: Flow chart for an Incident originating outside the ADZ

The following paragraphs provide a summary of actions to be taken in the event of an INCIDENT. More details are provided in Table 4-1.

3.1 First Response: Contain and minimise the effects of the ADZ originated incident

The responsible person must, as soon as reasonably practicable after knowledge of the incident take the following actions:

a) Take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons (this may include isolating the source of the incident i.e. in the event of a spill or the hole through which fish have escaped);
b) Notify the ADZ Incident Response Leader who will notify the persons detailed in the sections below dealing with specific incidents or emergencies and make a decision whether centralised control is necessary;
c) Initiate containment and control measures;
d) Initiate clean-up operations; and,
e) Complete incident report (Appendix 1) for submission to ADZ ECO.

Where an incident involve hazardous substances and fall within the ambit of NEMA S30 the responsible person must follow provisions of Section 30. Guideline can be found at:
https://www.dffe.gov.za/sites/default/files/legislations/incidentsadministration_nemasection30guideline.pdf.

In the event the response is required to deal with an incident of external origin, the ADZ Incident Response Leader will direct activities to protect the ADZ farms in liaison with the ADZ ECO and First Respondent of the external incident.

3.2 Immediate reporting

The First Respondent must report the incident to the ADZ Incident Response Leader who will then initiate the incident contact notification, under the immediate list and notify the appropriate individuals depending on the nature of the incident and risks posed to other users as detailed in section 6 of this document (Incident Response Protocols per incident type).

The notification must be via telephonic/ VHF (channel 16) and followed up by email and must include–

a) The nature of the incident; (including date, time and location) and causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure;
b) Any risks posed by the incident to people, property and the environment (i.e. floating rafts or ropes endangering other vessels);
c) The toxicity of any substances or by-products released by the incident;
d) The nature and estimated number of alien fish escapees
e) Any steps that have already been taken to avoid or minimise the effects of the incident on people, property and the environment; and,

Once the transmission is received the Port Captain/ NSRI EOC and MRCC and depending on the nature of the incident Stn4 Mykonos will be contacted to respond accordingly.

3.3 Subsequent reporting – within 7 calendar days

The ADZ Incident Response Leader, must, within 7 calendar days of the incident, ensure the submission of a completed incident report form to the to the ADZ ECO.

4. Incident Response Roles and Responsibilities

The following tables define the various roles and responsibilities in the two categories of incidents (i.e. originating inside or outside the ADZ).

Table 4-1: Roles and Responsibilities for incidents

Role	Incidents that originate INSIDE the ADZ	Incidents that originate OUTSIDE the ADZ
First Respondent	This may be a member of the public, the farm staff member on a barge, or a member of a ship's crew or Departmental official and is referred to as the person that first detects the incident or incident. The First Respondent should notify the ADZ Incident Response Leader or any other person listed on the contact list who can then get in contact with the ADZ Incident Response Leader. If the person is a farm member of staff, they must endeavour must try to minimise the magnitude of the incident by shutting off the source (i.e. a hole in the cage netting) and limit the extent of the damage by containing the effects of the event (i.e. containing the escaped fish), where possible. The intention is to prevent the situation from becoming worse while reaction activities are being initiated. While the incident or incident is being contained/ stabilised, the staff member must notify the farm manager who must then assume control of the incident or event and notify the ADZ ECO and ADZ Incident Response Leader. An alert report in terms of NEMA S30(3) must be sent to DFFE: RCSM in case of S30 incidents	The first respondent in this instance will be the organisation taking control of the INCIDENT and is likely to be organisations such as Port Control, TNPA or DFFE Oil Spill Response Unit. The First Respondent will make contract with the ADZ ECO and or the ADZ Incident Response Leader who will issue instructions as appropriate.
Farm Manager	The Farm Manager is the person who must take control of any incident or incident originating inside the ADZ where the incident arose since the incident or incident and the response will have resource implications and only the farm manager can authorise those responses. If the event qualifies as an INCIDENT, the ADZ Incident Response Leader must notify all persons/ organisations included in the list detailed for each incident type below (see Table 6-1 and Table 6-2) and perform the activities detailed. The Farm Manager must adhere to any instructions issued by the ADZ Incident Response Leader in actions to contain or remediate the INCIDENT. If the INCIDENT falls with the ambit of NEMA S30, the Farm Manager must follow the requirements of NEMA S30. In the event of an INCIDENT, the Farm Manager must ensure that a completed incident response report is submitted to the ADZ ECO within 7 calendar days of the incident. The Farm Manager may make media statements IF the INCIDENT is confined to a single farm ONLY. If this is not confined to a single farm, all media queries must be referred to the DFFE.	For an INCIDENT originating outside of the ADZ this requires notification of the ADZ farmers and operators, it can be assumed to be a large-scale INCIDENT or INCIDENT. As such there is unlikely to be direct communication with individual farm managers. The ADZ Incident Response Leader will assume control for the ADZ response, so if the Farm Manager is notified by an outside agency, the Farm Manager must immediately notify the ADZ Incident Response Leader. The Farm Manager must then implement any instructions provided by the ADZ Incident Response Leader. The Farm Manager may not make media statements. Any media queries are to be routed to the DFFE.
Farm Designated	The farm DEO (if applicable) is a farm staff member with assigned environmental management and control functions. That individual will assist the farm manager to	For an INCIDENT originating outside of the ADZ this requires notification of the ADZ farmers and operators, it can be assumed to be a large-scale INCIDENT. As such

Role	Incidents that originate INSIDE the ADZ	Incidents that originate OUTSIDE the ADZ
Environmental Officer (DEO)	ensure that the environmental damage caused by the INCIDENT is limited and that clean-up activities are effective and comprehensive. This person may NOT make any media statements, all media queries must be referred to the DFFE.	there is unlikely to be direct communication with individual farm DEO. The ADZ Incident Response Leader will assume control for the ADZ response, so if the farm DEO is notified by the outside agency, the Farm Manager must immediately be notified and the farm DEO must then implement any instructions provided by the Farm Manager. The farm DEO may not make media statements. Any media queries must be referred to the DFFE.
Farm ECO (applicable to finfish farms)	The farm ECO (if applicable) is not a staff member but an external consultant appointed by the farm management to oversee environmental protection measures and ensure compliance with the ADZ Environmental Authorisation (EA) and Environmental Management Programme (EMPr) and any other instructions or protocols issued by the Saldanha Bay Management Committee (AMC) including this Incident Response Protocol. He/ She will monitor activities to contain and remediate the INCIDENT or INCIDENT to ensure the outcome conforms with the objectives of the approved EMPr and/ or authorities requirements (as appropriate). This person may NOT make any media statements, all media queries must be referred to the DFFE.	The farm ECO (if applicable) will monitor activities to contain and remediate the INCIDENT to ensure the outcome is acceptable to the ADZ ECO and/ or authorities (as appropriate). This person may NOT make any media statements, all media queries must be referred to the DFFE.
ADZ ECO	The ADZ ECO is appointed by the DFFE to oversee compliance with environmental management actions detailed in the ADZ EA and EMPr. He/ she will provide monitoring to ensure legal requirements are met, coordination between parties is effective, that stakeholders are notified and that clean-up is completed. The ADZ ECO will receive, register and process all incident response forms for INCIDENTS. The ADZ ECO can request additional or alternative actions to those taken by the farm managers if required. The ADZ ECO is responsible for verifying that clean-up is completed and that any long-term monitoring required is implemented and maintained. This person MAY NOT make media statements - any media queries must be referred to the DFFE.	The ADZ ECO will not be actively involved in such INCIDENTS but may act as a conduit for instructions and information to channelled from the First Respondent to the ADZ Incident Response Leader and the DFFE if appropriate. The ADZ ECO is responsible for updating the ADZ AMC and DFFE on the progress of the INCIDENT activities and compiling an Incident Report. This person may NOT make any media statements, All media queries must be referred to the DFFE.
ADZ Incident Response Leader	At present, the ADZ Incident Response Leader is the current Chair of the Bivalve and Shellfish Association of South Africa (BSASA). As chair, this individual's response is to ensure that activities and notifications are coordinated in the event of an INCIDENT- i.e. when more than one farm is involved. This individual will be the one of the main role players notifying the persons/ organisations detailed in the list in section 6 below.	The ADZ Incident Response Leader – BSASA Chair is to be the primary link between the First Respondent and the farmers and operators. The ADZ Incident Response Leader – BSASA Chair will channel and coordinate responses to all instructions from the First Respondent to affected farmers and operators. The ADZ Incident Response Leader – BSASA Chair must also initiate any actions that may be required to protect the ADZ operations from the INCIDENT but only after these

Role	Incidents that originate INSIDE the ADZ	Incidents that originate OUTSIDE the ADZ
	The ADZ Incident Response Leader MUST designate an alternate contact who can assume his/her roles if the primary contact is unavailable. The ADZ Incident Response Leader is also responsible for receiving instructions and coordinating activities in the event that the incident falls within the ambit of S30 of NEMA and the DFFE Branch Regulatory, Compliance and Sector Monitoring assume control. This individual will be the link between the DFFE Branch Regulatory, Compliance and Sector Monitoring and the farmers. The ADZ Incident Response Leader must, in order to effectively discharge the responsibilities as coordinator, establish a working forum with DFFE to ensure effective and rapid transfer of information. Other key organisations will be invited to participate in this forum as required. This person may NOT make any media statements, and all media queries must be referred to DFFE.	actions have been endorsed by the ADZ ECO and/ or the DFFE to ensure there is no conflict. This person may NOT make any media statements, All media queries must be referred to the the DFFE.
DFFE Branch Regulatory, Compliance and Sector Monitoring	DFFE Branch Regulatory, Compliance and Sector Monitoring has two roles in this context: • The first role is to ensure complete compliance with the conditions detailed in the ADZ EA and other relevant legislation; and, • The second role is to process any INCIDENT notification and make a declaration whether it constitutes a S30 Emergency. The DFFE will then decide to either assume direct control of response activities or merely provide oversight. If DFFE elects to merely provide oversight, the farm manager or ADZ Incident Response Leader must implement any directives issued by the DFFE and provide report-back as required. If DFFE assumed complete control of the incident, the ADZ Incident Response Leader must establish a forum to ensure effective transfer of communication from DFFE Branch Regulatory, Compliance and Sector Monitoring to the farmers. DFFE will receive and process all Incident Reports submitted by the ADZ ECO and issue any further instructions to the ADZ ECO, as required.	DFFE Branch Regulatory, Compliance and Sector Monitoring will be notified by the First Respondent. It is not the role of the ADZ ECO or ADZ Incident Response Leader to notify DFFE Branch Regulatory, Compliance and Sector Monitoring in this instance. If the INCIDENT is classified as a S30 Emergency they will engage directly with the other relevant parties.
DFFE Branch Fisheries Management (EA holder)	DFFE Branch Fisheries Management is the "holder" of the EA and as such is ultimately responsible for compliance of all activities in the ADZ. DFFE appoints the ADZ ECO and can issue specific instructions to farmers to ensure compliance with regards to incidents. DFFE must be notified in all cases. Only DFFE is permitted to engage with the press / media in the event of an INCIDENT	DFFE Branch Fisheries Management is the "applicant" and thus will receive regular updates from the ADZ ECO but will not be actively involved in the management of the INCIDENT.

Role	Incidents that originate INSIDE the ADZ	Incidents that originate OUTSIDE the ADZ
DFFE Branch Fisheries Management: Aquaculture Authorisations	DFFE : Aquaculture Authorisations is responsible for ensuring compliance with Aquaculture Rights and Aquaculture Permit conditions. DFFE will investigate when a contravention of Right or Permit conditions is evident in the incident.	DFFE Branch Fisheries Management Compliance Monitoring will only be notified if there is a breach of the Marine Aquaculture Right and or permit conditions but will play no role in the management of the INCIDENT.
DFFE Branch Fisheries Management: State Veterinarian	The State Veterinarian is responsible for ensuring adequate measures are in place to promote animal health and prevent or contain a disease outbreak in the ADZ farms. The State Veterinarian MUST be notified if any fish escape or in the event of any disease outbreaks and may then issue specific instructions to the farmers or to the ADZ Incident Response Leader as required. The State Veterinarian is the only agency that may instruct euthanasia of a trapped animal. If no State Veterinarian is available, a registered veterinarian in consultation with NSPCA must make the decision to euthanise and indicate the method of doing so and records for such consultation shall be kept appended to the incident report.	The State Veterinarian will only be notified if there is an issue of animal health. While it should be the responsibility of the First Respondent, in the event that the First Respondent does not do so and the ADZ Incident Response Leader deems it necessary, The First Respondent can be requested to do so, or the ADZ Incident Response Leader may notify the State Veterinarian, but the First Respondent must be copied in all communication.
DFFE Branch Fisheries: Aquaculture Research and Development	DFFE ARD is primarily responsible for marine (aquaculture) research. As such DFFE ARD must be notified if specialist marine biology information is required or in the event of fish escapees, disease outbreaks which are believed to be zoonotic and entanglements, they may issue specific instructions to the farmers or ADZ Incident Response Leader as required.	DFFE: ARD will only be notified if specialist marine biological knowledge or advice is required. While it should be the responsibility of the First Respondent the ADZ Incident Response Leader may be requested to notify the DFFE ARD but the First Respondent must be copied in all communication.
DFFE Branch Fisheries Management: Food Safety	DFFE: Food Safety Office is primarily responsible for ensuring that the ADZ products are fit for human consumption. The Food Safety Office monitors environmental residues and pathogenic microbiological organisms amongst other parameters. Examples include polycyclic aromatic hydrocarbons from hydrocarbon spills and E. coli from sewerage spills and heavy metals from ore spillage. They may issue specific instructions to the farmers or ADZ Emergency Response Leader as required.	DFFE: Food Safety Office will only be notified if there is an issue of food safety. While it should be the responsibility of the First Respondent the ADZ Incident Response Leader may be requested to notify the DFFE: Food Safety Office but the First Respondent must be copied in all communication.
South African Navy Hydrographic Office (SANHO)	SANHO is responsible for compiling charts showing obstructions to shipping and boat users. In the event that the INCIDENT involves an obstruction such as a loose raft, or loose ropes or cages that may cause a hazard to shipping, they must be notified immediately by the ADZ Incident Response Leader and may decide to issue a warning/ notice. ONCE THE HAZARD IS REMOVED, they may withdraw the warning.	SANHO will only be notified if there is an issue of obstructions to bay users. While it should be the responsibility of the First Respondent the ADZ Incident Response Leader may be requested to notify SANHO but the First Respondent must be copied in all communication.
Saldanha Bay Port Control/ Port Captain	Saldanha Bay Port Control/ Port Captain is responsible for all activities in the Port of Saldanha they will only be directly involved if there is a hazard to shipping, or pollution.	Saldanha Bay Port Control/ Port Captain will only be notified if there is an issue of obstructions to bay users. While it should be the responsibility of the First Respondent the ADZ Incident Response Leader may be requested to notify the Saldanha Bay Port Control/ Port

Role	Incidents that originate INSIDE the ADZ	Incidents that originate OUTSIDE the ADZ
	Any such event requires immediate notification of the Saldanha Bay Port Control/ Port Captain they may be involved in coordinated clean-up such as after a major storm where the debris results from numerous operations within the Port. They may issue specific instructions to the farmers or ADZ Incident Response Leader as required.	Captain but the First Respondent must be copied in all communication.
Transnet National Port Authority (TNPA)	TNPA leases the water space to the operators of the ADZ farms and the lease contains provision for environmental protection. In the event of an INCIDENT such as widespread damage from storms, TNPA may participate in retrieving debris resulting from numerous Port-based operations they may issue specific instructions to the farmers or ADZ Incident Response Leader as required.	Notification of the TNPA rests with the First Respondent.
South African National Parks (SANParks)	SANParks manages the West Coast National Park and if the INCIDENT negatively impacts on the Langebaan Lagoon or its surrounds must be notified. Section 6 details the events in which South African National Parks (SANParks) must be notified and they may issue specific instructions to the farmers or the ADZ Incident Response Leader as required.	Notification of SANParks rests with the First Respondent
South African Maritime Safety Authority (SAMSA)	SAMSA is responsible for maritime safety and MUST be notified immediately in the event of any collisions with vessels, vessels running aground or onto ADZ infrastructure as per section 6. SAMSA can issue incident authorisations to allow vessels to exceed their permitted maximum seaward passage to permit disposal of animal carcases.	Notification of SAMSA rests with the First Respondent
South African Police Service (SAPS)	SAPS is responsible or law enforcement and must be notified in the event of tampering or damage to ADZ infrastructure and a case can be opened regarding the matter and they may offer assistance if people are in danger from shipping accidents and may issue specific instructions to farmers or the ADZ Incident Response Leader as required. SAPS may also be required to assist with control of the public in the event of debris or animals being washed ashore.	Notification of SAPS rests with the First Respondent
National Sea Rescue Institute (NSRI)	NSRI is responsible for rescuing people and vessels at sea. They have a base in Langebaan and must be notified if human safety is involved or if a marine mammal is entangled. Section 6 details when NSRI must be notified. The NSRI, in conjunction with SAWDN will take control of any incident in which sea animals are entrapped.	Notification of NSRI rests with the First Respondent. While it should be the responsibility of the First Respondent the ADZ Incident Response Leader may be requested to notify the NSRI but the First Respondent must be copied in all communication.
South African Whale Disentanglement	SAWDN are permitted to assist with any marine mammal entanglements in the area and must be notified immediately.	SAWDN are responsible for any marine mammal entanglements in the area and must be notified

Role	Incidents that originate INSIDE the ADZ	Incidents that originate OUTSIDE the ADZ
Network (SAWDN)	The SAWDN, in conjunction with NSRI will take control of any incident in which sea animals are entrapped.	immediately by the First Respondent or if this is not done, by the ADZ Incident Response Leader.
Southern African Foundation for the Conservation of Coastal Birds (SANCCOB)	SANCCOB is responsible for any turtle or avian entanglements in the area and must be notified immediately. SANCCOB, in conjunction with NSRI will take control of any incident in which sea animals are entrapped.	SANCCOB is responsible for any chelonian or avian entanglements in the area and must be notified immediately by the First Respondent or if this is not done, by the ADZ Incident Response Leader.
National Council of Societies for the Prevention of Cruelty to Animals – Wildlife Protection Unit (NSPCA)	NSPCA are permitted to ensure that all animals are handled in a humane manner without unnecessary stress. They need to be notified in the event of any entanglements and they will send a representative to site as appropriate.	NSPCA is responsible for ensuring that all animals are handled in a humane manner without unnecessary stress. They need to be notified in the event of any entanglements and they will send a representative to site as appropriate.
Saldanha Bay Municipality (SBM)	SBM has responsibility for incident response and environmental management landwards from the high-water mark and must be notified if there is a risk of debris washing up onto the beaches or safety concerns at the SBM beaches. Section 6 details when SBM must be notified.	Notification of SBM rests with the First Respondent
DFFE: Branch Oceans & Coasts - Oil Spill Unit	DFFE: Branch Oceans & Coasts - Oil Spill Unit is a national unit designed to develop and coordinate effective responses to marine oil (and hydrocarbon) spills. This unit is ONLY notified in the event of an oil spill they may issue specific instructions to farmers and the ADZ Incident Response Leader.	Notification of Branch Oceans & Coasts - Oil Spill Unit rests with the First Respondent
Saldanha Bay Consultative Forum (CF)	The Saldanha Bay Consultative Forum (CF) is a forum established to exchange information between the ADZ operators and farmers and the general or affected public. The CF will not be directly involved in INCIDENTS or EMERGENCIES but MUST be notified in the event of any INCIDENT or INCIDENT which could affect their safety (such as loose infrastructure) or their health and welfare (pollution events). All communication with the CF MUST be via the ADZ ECO ONLY. All incident reports are summarised monthly for the CF by the ADZ ECO – full transcripts are available on request.	Responsibility for keeping the CF informed rests solely with the ADZ ECO who must issue updates, IRRESPECTIVE of whether the First Respondents is independently issuing updates.
Aquaculture Development Zone Management Committee (AMC)	The AMC is a management committee comprising all government departments responsible for the management and control of the Saldanha Bay ADZ. This Committee makes decisions and issues instructions to farmers and operators. The AMC will receive notification of INCIDENTS via the ADZ ECO and must be notified as per the details in section 6.	Responsibility for keeping the AMC informed rests solely with the ADZ ECO who must issue regular updates, IRRESPECTIVE of whether the First Respondents is independently issuing updates.

Role	Incidents that originate INSIDE the ADZ	Incidents that originate OUTSIDE the ADZ
	All incident reports are summarised monthly for the ADZ by the ADZ ECO – full transcripts are available on request. The AMC may issue media statements if appropriate.	

5. Review of the Incident Response Protocol

This Incident and Response Protocol must be reviewed every year by the ADZ ECO as a minimum or after each significant incident. The review will consist of:

1. Reviewing the effectiveness and appropriateness of all instructions in dealing with the incident
2. Reviewing the reporting procedures and structures
3. Reviewing the contact details
4. Determining what changes are required and effecting the changes within 7 calendar days of the last event.

6. Incident and Incident Response Protocols

The following paragraphs provide details of responses required in the identified INCIDENTS or EMERGENCIES. Note: all of the below listed incidents need to follow the process outlined in section 3.

In the tables below,

- Each incident type is listed providing the identity of the individual or organisation who could have a role to play in the management of the listed INCIDENT;

It depicts the individuals or organisations that must be contacted immediately- without delay;

INFRASTUCTURE RELATED INCIDENTS

6.1 Loose/ drifting equipment (single or small items only)

Minimum requirements for infrastructure used in the ADZ have been issued to all farmers. This includes specifications for mooring blocks, ropes and shackles etc. In addition, all the major infrastructure elements must be marked with unique markings so that their owners can be traced. These measures notwithstanding, buoys, ropes and other **small** pieces of infrastructure do break loose on occasion. **Note:** entire rafts breaking loose do not fall within this category, nor do complete longlines drifting off station. In the event of INCIDENTS involving small items of infrastructure, the following actions must be taken.

Immediate Response	**Within 7 calendar days**
• If the loss is detected by farm staff- Farm Manager must be notified immediately. • Farm Manager o must notify all relevant parties in Table 6-1. o initiate retrieval where possible. o initiate repairs or replacements of infrastructure which may have washed onto the beach. • If the items are found on the beach by a stakeholder or member of the public, the notification can come through either the ADZ ECO or the ADZ Incident Response Leader – the farm manager is then required to collect the item as identified by its unique marking without delay.	• Farm Manager o complete Incident Report and submit to ADZ ECO. • ADZ ECO o to register the Incident Report in the Incident Register, o review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF. Complete transcripts must be available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.2 Large-scale loss of equipment or infrastructure as a result of severe storms

Minimum requirements for infrastructure used in the ADZ have been issued to all farmers. This includes specifications for mooring blocks, ropes and shackles etc. In addition, all the major infrastructure elements must be marked with unique markings so that their owners can be traced.

These measures, it has been found, do not provide total security in the event of severe storms and/ or high seas. Such weather events can result in large pieces of equipment tearing loose, posing a risk to other users and cetaceans. In the event of such EMERGENCIES involving large items of infrastructure, the following actions must be taken.

Immediate Response	**Within 7 calendar days**
• If the loss is detected by farm staff- Farm Manager must be notified immediately. • Farm Manager o must notify the ADZ Incident Response Leader who will take overall charge for coordination and reporting. o initiate repairs or replacements. • The ADZ Incident Response Leader o must notify all relevant parties in Table 6-1. o SANHO office to be contacted via the Port Control to notify all vessels in the area of the potential navigational hazard. o initiate securing any loose articles until such time the weather permits retrieval where possible to prevent further damage. o coordinate beach patrols including Hoetiesbaai, Dial Rock, Blue Water Bay, Spreeuvalle. Langebaan Lagoon and Paradise Beach and any other beaches in the areas where	• The ADZ Incident Response Leader o to complete Incident Report and submit to ADZ ECO. • The ADZ ECO o to physically verify that the beaches have been cleaned within 7 calendar days of the incident. o register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF, complete transcripts are available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring. • SANHO to be requested to remove the warning notice if such a notice is issued, post clean up.

debris is likely to wash ashore, to detect any debris on the shore. o coordinate clean-up and return of loose items to their owners as per the unique identifiers. • As soon as the weather permits, large loose articles must be returned to their original position and repaired or moved to another area for repairs that will not pose a threat to other bay users. • If the items are found on the beach by a stakeholder or member of the public, the notification can come through either the ADZ ECO or the ADZ Incident Response Leader – the farm manager is then required to collect the item as identified by its unique marking.	

6.3 Accidents (collisions) with other water users

The ADZ operations make use of service vessels to install and service infrastructure. While every attempt is made to avoid collisions with other water users, such INCIDENTS do occur. In this instance, the following actions must be taken.

Immediate Response	Within 7 calendar days
• If the collision is detected by farm staff- Farm Manager, ADZ Incident Response Leader, NSRI and Port Control must be notified immediately. • Farm Manager o must notify all relevant parties in Table 6-1 immediately. o administer any incident first aid required to stabilise any injuries while waiting for the arrival of NSRI. o ensure that the other party's vessels is removed from the ADZ. • In the event that the other party is within the ADZ exclusion zone, the Farm Manager may lay a criminal charge with SAPS. • In the event that any farm infrastructure is damaged, the Farm Manager shall initiate repairs. • ADZ ECO to notify the AMC and the CF.	• Farm Manager o complete Incident Report and submit to ADZ ECO. • ADZ ECO o to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.4 Infrastructure theft, vandalism, tampering or other intrusions

The ADZ farm infrastructure is not staffed after hours or over weekends, theft, vandalism, tampering or other intrusions are therefore a possibility. In the event that these events do take placethe following actions must be taken.

Immediate Response	Within 7 calendar days
• If theft, vandalism, tampering or other intrusions are detected by farm staff- Farm Manager must be notified immediately. • Farm Manager o must report the incident to SAPS and obtain a case number. o notify all relevant parties in Table 6-1. • ADZ ECO to notify the AMC.	• Farm Manager o must follow up on investigations by SAPS. o complete Incident Report and submit to ADZ ECO. • ADZ ECO o to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report.

	○ submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. ○ send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.5 Sewage spills

The Saldanha Bay Municipality operates a sewage treatment facility. Break-downs in controls can lead to un-or semi-treated sewage being discharged into the Saldanha Bay. Such discharge has the potential to contaminate the shellfish and render them unsaleable. In this event, the following actions must be taken:

Immediate Response	**Within 7 calendar days**
• If the sewage discharge is detected by farm staff- the Farm Manager must be notified immediately to report the incident to the DFEE Compliance and Sector Monitoring. • The Farm Manager ○ immediately notify the ADZ Incident Response Leader who in turn will notify SBM. ○ take appropriate action to prevent the harvesting of potentially contaminated products ○ send shellfish samples to Mérieux NutriSciences for food safety analysis. • The ADZ Incident Response Leader ○ notify all relevant parties in **Error! Reference source not found.** ○ If more than one farm is at risk, the ADZ Emergency Response Leader shall take responsibility for coordination and monitoring. • If the discharge is detected by SBM staff, they must notify the ADZ Incident Response Leader and the Food Safety Office who in turn will inform all Farm Managers and all relevant parties in Table 6-1. • Food Safety Office through the Shellfish monitoring programme to monitor farm stock to determine the level of contamination (if any) and has the mandate to close the farm until the levels of contamination are within regulatory limits. • ADZ ECO to notify the AMC and the CF.	• The Municipality to identify cause of untreated sewage spill and take appropriate action and report back to ADZ ECO and ADZ Incident Response Leader. • The ADZ Incident Response Leader ○ complete Incident Report and submit to ADZ ECO. • ADZ ECO ○ to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. ○ sign-off Incident Report. ○ submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. ○ send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.6 Metal Ore spills

The Saldanha Bay Port Authority operates a bulk ore terminal. Break-down of controls can lead to large quantities of metal ore being deposited into Saldanha Bay. Such deposits have the potential to contaminate the shellfish and render them unsaleable. In this event, the following actions must be taken:

Immediate Response	**Within 7 calendar days**
• If the ore spill is detected by farm staff- Farm Manager must be notified immediately. • The Farm Manager ○ must the immediately notify Port Control and TNPA.	• The TNPA/ Port Control to identify cause of metal oil spill and take appropriate action and report back to ADZ ECO and ADZ Incident Response Leader. • The ADZ Incident Response Leader. ○ complete Incident Report and submit to ADZ ECO.

○ then immediately notify ADZ Incident Response Leader who will in turn notify all Farm Managers and SBM. • The ADZ Incident Response Leader ○ must notify all relevant parties in **Error! Reference source not found.** • If the discharge is detected by SBM staff, they must notify the ADZ Incident Response Leader who in turn will inform all Farm Managers all relevant parties in Table 6-1. • If the deposit is detected by Port Control or TNPA staff, they must notify the ADZ Incident Response Leader who in turn will inform all Farm Managers. • If more than one farm is at risk, the ADZ Incident Response Leader shall take responsibility for coordination and monitoring. • Farm Managers to take appropriate action to prevent the harvesting of potentially contaminated products. • Shellfish monitoring programme Food Safety Office to monitor farm stock to determine the level of contamination (if any) and has the mandate to close the farm until the levels of contamination are within regulatory limits. • Farm Managers in association with the Food Safety Office must send shellfish samples to a suitably accredited laboratory for food safety analysis for relevant heavy metals; • ADZ ECO to notify the AMC and CF.	• ADZ ECO ○ to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. ○ sign-off Incident Report. ○ submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. ○ send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.7 Oils spills from ADZ operations

The ADZ farmers use petrol, oils and greases for their service vessels. Usually only small volumes are carried into the Bay thereby limiting the potential damage from a spill.

Even though very small volumes are carried, in view of the potential harm this could do to the harvest, the following actions must be taken in the event of a spill of oil, petrol or grease during ADZ operations:

Immediate Response	**Within 7 calendar days**
• If the spill is detected by farm staff- Farm Manager must be notified immediately who must then notify the ADZ Incident Response Leader. • If more than one farm is involved or at risk, the ADZ Incident Response Leader shall take responsibility for coordination and monitoring. • Even if not assuming a centralised command role, the ADZ Incident Response Leader. ○ must notify all relevant parties in Table 6-1. • The Farm Manager or ADZ Incident Response Leader shall notify all farmers. • Farm Managers ○ repairs must be undertaken immediately, and preventative measures installed if appropriate. ○ to take appropriate action to prevent further spillage. ○ take appropriate action to contain the spillage and shield the farm infrastructure (booms etc). ○ in association with the Food Safety Office send shellfish samples to a suitably accredited laboratory for food safety analysis for polycyclic aromatic hydrocarbons.;	• The ADZ Incident Response Leader/ Farm Manager ○ to determine cause of the spill. ○ complete Incident Report and submit to ADZ ECO. • DFFE Food Safety Office /Farm Veterinarian to monitor farm stock after the oil spill for contamination • ADZ ECO ○ to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. ○ sign-off Incident Report. ○ submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. ○ send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

• DFFE Food Safety Office through the Shellfish monitoring programme to monitor farm stock to determine the level of contamination (if any) and has the mandate to close the farm until the levels of contamination are within regulatory limits. • ADZ ECO to notify the AMC.	

6.8 Major Oils spills from Port operations

The Port of Saldanha has an Oil Transfer Depot where fuels and oils are transferred to or from large oil tankers. The Port has its own Oil Spill Response Plan (TNPA Oils Spill Response Plan for Port of Saldanha TNPA-IMS-SLD-PLN 016.05) which details actions it must take.

In the event of a large oil spill the farmers must take the following actions:

Immediate Response	**Within 7 calendar days**
• If the spill is detected by farm staff- Farm Manager must be notified immediately. • The Farm Manager must immediately inform Port Control and the ADZ Incident Response Leader. • The ADZ Incident Response Leader o must notify all relevant parties in Table 6-1.**Error! Reference source not found.** o shall take responsibility for coordination and monitoring of ADZ related activities. o notify all farmers. o shall implement all instructions issued by the TNPA Responsible Person and relay these to the Farm Managers. • If the report comes from TNPA, if must be routed via the ADZ Incident Response Leader or ADZ ECO who in turn will notify the ADZ Incident Response Leader. • Farm Managers o to take appropriate action to contain the spillage and shield the farm infrastructure (booms etc). o in association with the Food Safety Office send shellfish samples to a suitably accredited laboratory for food safety analysis for polycyclic aromatic hydrocarbons; • DFFE Food Safety Office to monitor farm stock to determine the level of contamination (if any) and has the mandate to close the farm until the levels of contamination are within regulatory limits. • ADZ ECO to notify the AMC and CF.	• The TNPA to determine cause of the spill and relay the information to the ADZ Incident Response Leader. • DFFE Food Safety Office /Farm Veterinarian to monitor farm stock after the oil spill for contamination. • The ADZ Incident Response Leader o complete Incident Report and submit to ADZ ECO. • ADZ ECO o to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

BIOLOGICAL INCIDENTS

6.9 Escape of Alien Invasive Fish Species

Alien invasive fish species are authorised to be farmed in the Saldanha ADZ. While best practice procedures are implemented to ensure that any escapees cannot form viable populations, measures to prevent escape are implemented and monitored. In the event that escapes do take place, the following actions must be taken.

Immediate Response	Within 7 calendar days
• If the escape is detected by farm staff- Farm Manager must be notified immediately. • Farm Manager o notify all relevant relevant parties in Table 6-2. o initiate incident net repair o attempt recapture o initiate Escape Plan **(See section 8)** o notify all local fishermen and issue spreadsheet detailing the manner of treatment in the event of any alien fish species being caught (use may be made of the CF if required). • ADZ ECO to notify the AMC and CF.	• Farm Manager o complete Incident Report and submit to ADZ ECO. • ADZ ECO o register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.10 Accidents (collisions) with marine animals

The ADZ operations make use of service vessels to install and service infrastructure. While every attempt is made to avoid collisions with marine animals, such INCIDENTS do occur. In this instance, the following actions must be taken. SAWDN maintain a ship collision database and should thus receive an urgent notification to keep this database up to date and assist where needed.

Immediate Response	Within 7 calendar days
• If the collision is detected by farm staff- Farm Manager, the ADZ Incident Response leader, State Vet, NSPCA, SANCCOB, SAWDN, NSRI and Port Control and the DFFE must be notified immediately and asked to stand by in case they are needed. • The ADZ Incident Response Leader o must notify all relevant parties in Table 6-2. o In the event that any farm infrastructure is damaged, the Farm Manager shall initiate repairs. o ensure that the injured animal is safely removed from the ADZ. • ADZ ECO to notify the AMC and CF.	• ADZ Incident Response Leader o complete Incident Report and submit to ADZ ECO. • ADZ ECO o to register the Incident Report I the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.11 Entanglement of marine animals

The ADZ operations have been designed to limit the potential for marine animals (including birds, turtles, seals, whales and dolphins) to be entangled. In the event of such entanglements occurring, the following actions must be taken.

It is important to remember that speed is paramount. These animals are air-breathing and delayed response can result in them drowning. They are simultaneously at risk of permanent injury from ropes and nets, especially if they start to struggle to free themselves. Do not attempt to free the animals yourself, remain on the scene and maintain visual contact with the animal. If the animal appears to be distressed by your proximity, move away slightly but maintain visual contact wherever possible.

The following information should be provided to the SAWDN and NSPCA if marine mammals are involved:

a. Type of animal(s) involved such as whales (Humpbacks and Southern Right Whales), seals, turtle, dolphins (Dusky and Heavisides) etc.
b. Number of animals involved and their condition
c. Nature of entanglement and if possible, nature of rescue equipment required provide photographs/ video's (on WhatApp if possible) what parts of the body is wrapped with mainline, buoy's and nets etc.
d. Exact location of the entanglement (Lat and Long if possible)
e. Current state of the animal (stressed/ inert etc.) - any visible injuries.

The following information should be provided to the SANCCOB and NSPCA if marine birds are involved:

a. Type of bird(s) involved such as penguins, gannets etc;
b. Number of birds involved
c. Nature of entanglement and if possible, nature of rescue equipment required provide photographs/ video's (on What's app if possible)
d. Exact location of the entanglement (Lat and Long if possible)
e. Current state of the birds (stressed/ inert etc.) - any visible injuries.

Immediate Response	**Within 7 calendar days**
• The ADZ Incident Response Leader DFFE must be contact who in term will contact SAWDN/ SANCCOB/ NSPCA (as appropriate), they will then initiate the NSRI protocols. • NSRI Incident Operation Centre (EOC) to place SAWDN operations manager (M.A. Meyer) on the activated NSRI operations WhatApp. • SANCCOB will act in collaboration with NSRI as above • SANParks must be contacted. • Port Control and SANHO must be notified to ensure that the incident does not pose a navigational hazard to shipping traffic within the port. • The ADZ Incident Response Leader must notify the Farm Manager of the farm/s involved in the incident location. • The GPS position of the incident must be reported so that the rescue team can be requested to proceed immediately to the position. • Farm vessel/ Operator to ensure they are on standby to assist with the disentanglement as instructed by the NSRI/ SAWDN if required such as lifting the lines to allow for disentanglement. • Farm Manager o must notify all relevant parties in Table 6-2. o should remove parallel lines and floats in close proximity to the whale where appropriate so that it cannot be	• ADZ Incident Response Leader o complete Incident Report and submit to ADZ ECO. • ADZ ECO o to register the Incident Report I the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring and SAWDN.

captured further within the gear. The longer the time period between sighting and responding, the more entangled the whale will become over time. ○ remove floating buoys and ropes if appropriate where close to the whale to prevent overwraps. ○ be prepared to assist SAWDN/ SANCCOB/ NSRI response vessels during disentanglement. ○ remain on site to guide the rescue teams to the animal through submerged infrastructure. ○ prevent unauthorised vessels from approaching ○ assist SAWDN/ NSRI/ SANParks and/or TNPA with the release of the animal under their instruction. ○ In the event that any farm infrastructure is damaged, the Farm Manager shall initiate critical repairs to prevent any further entanglements within 24hrs of the event. • ADZ ECO to notify the AMC and CF.	

6.12 Disease outbreak

Extreme care is taken to ensure the health of all ADZ animals. Disease outbreaks and resulting mass mortalities are rare. In the event that a disease outbreak is detected, the following actions must be taken:

Immediate Response	**Within 7 calendar days**
• If the disease outbreak is detected by farm staff- Farm Manager must be notified immediately. • Farm Manager ○ must notify all relevant parties in Table 6-2. ○ notify the Farm-appointed vet if the INCIDENT occurs in relation to finfish. ○ implement recommendations of veterinarian /scientists report. ○ monitor stock. • All visible mortalities removed and disposed of on land according to animal health and safety protocols (disposal receipts must be retained for audit purposes). • Obtain proof of diagnosis and mitigation from Farm-appointed veterinarian for Branch Fisheries Management/ State veterinarian. • ADZ ECO to notify the AMC and CF.	• Farm Manager ○ complete Incident Report and submit to ADZ ECO. • Farm vet to report diagnosis and actions to branch Fisheries scientist and state vet within 7 calendar days. • Depending on the case, Branch Fisheries Management/ Sate vet may conduct independent investigation with a diagnosis and mitigation. • State veterinarian and DFFE Branch Fisheries: Food Safety specialist to do a follow-up visit to see if the mitigation is in place and advise accordingly. • ADZ ECO ○ to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. ○ sign-off Incident Report. ○ submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. ○ send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.13 Mass stock mortalities

Extreme care is taken to ensure the health of all ADZ animals. Disease outbreaks and resulting mass mortalities are rare. In the event that mass mortalities are detected, the following actions must be taken:

Immediate Response	Within 7 calendar days

• If the mass mortality is detected by farm staff- Farm Manager must be notified immediately.
• Farm Manager
  o must notify all relevant parties in Table 6-2.
  o notify the Farm-appointed vet if the INCIDENT occurs in relation to finfish.
• All visible mortalities removed and disposed of or treated on land according to animal health and safety protocols and in consideration with the Saldanha Bay Municpality Organic Waste Management Diversion Plan (disposal or treatment receipts must be retained for audit purposes for a minimum of five years).
• Samples must be preserved and submitted to branch Fisheries.
• Farm to investigate check the physical and chemical characteristics of the water (e.g. temperature, pH, oxygen content, etc.) and implement the necessary corrective measures.
• ADZ ECO to notify the AMC and CF.
	• Farm Manager
	  o complete Incident Report and submit to ADZ ECO.
	• Farm vet to report diagnosis and actions to branch Fisheries scientist and state vet within 7 calendar days.
	• Branch Fisheries Management scientist and vets to investigate causes of mortalities.
	• ADZ ECO
	  o to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required.
	  o sign-off Incident Report.
	  o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request.
	  o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.14 Stock Theft

The ADZ farm infrastructure is not staffed after hours or over weekends, stock theft is therefore a possibility. In the event that escapes do take place, the following actions must be taken.

Immediate Response	Within 7 calendar days

• If the theft is detected by farm staff- Farm Manager must be notified immediately.
• Farm Manager
  o must notify all relevant parties in Table 6-2.
  o report the incident to SAPS and lay a charge of theft – obtain a case number.
• ADZ ECO to notify the AMC and CF.
	• Farm Manager
	  o must follow up on investigations by SAPS.
	  o complete Incident Report and submit to ADZ ECO.
	• ADZ ECO
	  o to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required.
	  o sign-off Incident Report.
	  o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request.
	  o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

6.15 Harmful Algal Bloom

The presence of algal blooms (red tides) can severely affect the harvesting of bivalves. Other algal blooms may indicate a problem with water quality- both situations must be addressed as follows:

Immediate Response	Within 7 calendar days
• If the algal bloom is detected by farm staff- Farm Manager must be notified immediately. • Farm Manager o must notify the ADZ Incident Response Leader, the DFFE and the ADZ ECO. o monitor fish mortalities if any; and notify the Branch Fisheries Management. • The ADZ Incident Response Leader o must notify all relevant parties in Table 6-2 including the DFFE Food Safety Office immediately. • Branch Fisheries Management to determine whether the bloom is dangerous or unhealthy for the ADZ and report to the Farm Manager and ADZ Incident Response Leader. • If a Harmful Algal Bloom (HAB) is detected, DFFE Food Safety Office to initiate contingency measures as outlined in the South African Live Molluscan Shellfish Monitoring and Control Programme. • ADZ ECO to notify the AMC and CF.	• Farm Manager o complete Incident Report and submit to ADZ ECO. • ADZ ECO o to register the Incident Report in the Incident Register, review the Incident Report and request additional information or actions before sign-off if required. o sign-off Incident Report. o submit a summary of the Incident report to the AMC and CF, complete transcripts must be available on request. o send complete transcripts and summaries to DFFE Branch Regulatory, Compliance and Sector Monitoring.

Table 6-1 Identifying the different role players per incident which are related to infrastructure and which role player needs to be contacted (shaded blocks indicate that the Role player needs to be notified regarding the type of incident refer to Section 11 for specific contact details).

Type of incident	Loose/ drifting equipment (single or small items only)	Large scale loss of equipment or infrastructure as a result of severe storms	Accidents (collisions) with other water users	Infrastructure theft, vandalism, tampering or other intrusions	Sewage spills	Major Oils spills	Oils spills from ADZ operations	Major Oils spills from Port operations
Farm DEO								
Farm ECO								
ADZ ECO								
ADZ Incident Response Leader – BSASA Chair								
Compliance Monitoring								
Fisheries Management								
Fisheries State Veterinarian								
Fisheries: Food Safety								
SANHO								
DEA&DP								
Saldanha Bay Port Control								
TNPA								
SANParks								
SAMSA								
SAPS								
NSRI								
SAWDN								
NSPCA								
SANCCOB								
SMB								
Oceans & Coasts - Oil Spill Unit								
MRCC Maritime Rescue Coordination Centre								
CF								
AMC								

Table 6-2 Identifying the different role players per incident which are related to biological related incident and which role player needs to be contacted (shaded blocks indicate that the Role player needs to be notified regarding the type of incident refer to Section 11 for specific contact details).

Type of incident	Escape of Alien Fish Species	Accidents (collisions) with marine animals	Entanglement of marine animals	Disease outbreak	Mass stock mortalities	Stock Theft	Harmful Algal Blooms
Farm DEO							
Farm ECO							
ADZ ECO							
ADZ Incident Response Leader – BSASA Chair							
Compliance Monitoring							
Fisheries Management							
Fisheries State Veterinarian							
Fisheries: Food Safety							
SANHO							
Saldanha Bay Port Control							
TNPA							
SANParks							
SAMSA							
SAPS							
NSRI							
SAWDN							
SANCCOB							
NSPCA							
SMB							
Oceans & Coasts - Oil Spill Unit							
CF							
AMC							

7. Entanglement Prevention

The approved EMPr for the Saldanha Bay ADZ requires the development of a guideline for the prevention and management of marine mammals in the aquaculture infrastructure (which includes ropes, cages and rafts). This section provides a synthesis of inputs from the aquaculture industry, academic research institutes and is based on a specialist opinion on the most appropriate measures to prevent entanglement submitted by Dr Simon Elwen of Sea Search (Elwen 2020). It represents a practical guide for the implementation of preventative measures without compromising compliance with regulatory requirements of the Transnet National Ports Authority (TNPA). This is to be implemented by all holders of aquaculture marine rights in the Saldanha Bay ADZ. Compliance will be monitored (as necessary) by the appointed Environmental Control Officer (ECO) and will be reported on in the monthly ECO reports.

Fisheries bycatch is acknowledged as one of the largest threats to cetacean populations globally (IWC 2010, FAO 2018). "Entanglements" may occur in a broader range of anthropogenic materials including "ghost" gear, shark nets, free floating plastic or ropes, mooring lines and increasingly aquaculture farms – the latter being applicable to this Guideline.

Three main mammalian taxa that are vulnerable to entanglement in aquaculture infrastructure in the Saldanha ADZ are:

- Whales and dolphins; and,
- Seals.

There are few records of interactions between whales and aquaculture as a consequence of low numbers of individuals inshore and small spatial overlap of the mostly pelagic baleen whales with aquaculture farms which are mostly placed within protected coastal waters. The risk of whales becoming entangled in ADZ aquaculture infrastructure is therefore low when the farms is managed appropriately.

Oceanic dolphins (*Delphinidae*) are the only members of the toothed cetaceans with a coastal and shelf habitat in Southern Africa. Dolphins include the Heaviside's dolphin (the smallest) (*Cephalorhynchus heavisidii*) to the largest species the killer whale (*Orcinus orca*). Although there may be seasonal movements along the coast and changes in local numbers, these dolphins are all resident. All dolphins are predatory, eating fish or squid (only the killer whale is known to predate on other mammals in our waters). Dolphins rarely become entangled in well maintained single ropes.

The only resident seal in South Africa is the Cape fur seal *Arctocephalus pusillus pusillus*. They are similar in overall body size to most of the oceanic dolphins. They are more susceptible to bycatch in nets, rather than ropes. However, they are prone to becoming entangled around the neck in much smaller ropes and twines including fishing line.

In summary, the most likely animals to become entangled are seals and whales (especially during the high upwelling period when large numbers of whales forage on the West Coast.). The precautions detailed in the table below attempt to minimise the risk of such entanglements. It is clear that the ropes (mooring and production) of the bivalve farms and the nets of the finfish farms pose the biggest risk to marine mammals. The focus of this guideline is therefore on those components of the aquaculture infrastructure.

Also of concern is the entanglement of birds in the nets covering the finfish cages.

The following table defines the requirements of this guideline in the Saldanha ADZ to prevent entanglement of marine mammals.

Table 7-1: Entanglement mitigation measures and monitoring.

ALL FARMS	MONITORING FREQUENCY
Farm placement	
➢ Farms should be placed as close together (10-20m between lines in Small Bay and approximately 30m in Outer Bay North and Big Bay) as possible without compromising the productivity of the installations.	Record **presence and number** of whale and dolphin species observed within ~1 km of the farms and reported in the monthly visual precinct level monitoring reports submitted to the ADZ ECO
➢ Support and service vessels should drive with caution and avoid mammals	As above. Any vessel strikes or entanglements **must** be recorded and reported to the ADZ ECO.
Farm structure and design	
➢ Anchor lines used should kept taut to minimise entanglement risk.	Ongoing daily visual inspection and maintenance of ropes, moorings etc. reported in the monthly visual precinct level monitoring reports submitted to the ADZ ECO
➢ Any groundlines used must be made completely of sinking line.	Ongoing inspection and maintenance of surface ropes (10-20m between lines in Small Bay and 30m in Outer Bay North and Big Bay), moorings etc. to ensure loose lines
➢ Number of non-mooring ropes such as for marker buoys should be minimised and lines should be kept taut to minimise entanglement risk.	Ongoing weekly inspection and maintenance of ropes, moorings etc at the farm level and audited by the ADZ ECO on monthly site inspections.
FINFISH FARMS	**MONITORING FREQUENCY**
➢ **Above water anti-predator** barriers to prevent seals entering farms: 1. Electric fencing (the frequency of the fencing which is permitted by the DFFE) If netting is used it should be: 2. Highly visible (i.e. not mono-filament) 3. Sufficiently high as to prevent seals climbing over it 4. Culture net to use a mesh size of no more than 25mmto minimize entanglement. Predator and bird netting to be a mesh size of 50mm and 75mm respectively acting as a barrier for predator exclusion. Other: 5. Reduce resting places for seals on the cages	Ongoing inspection and maintenance of nets, ropes, moorings etc. at the farm level and audited by the ADZ ECO on monthly site inspections.
➢ **Below water anti-predator nets** should be 1. Constructed of as small a mesh as possible, maximum 60 mm 2. Closed at the bottom and sides and kept clear of the sea floor 3. Weighted or moored to keep sides taut 4. Well separated from main fish farm net (ideally with rigid poles) 5. Repaired immediately if damage is observed	Ongoing weekly visual and diver inspections conducted and maintenance of nets, ropes, moorings etc. at the farm level and audited by the ADZ ECO on monthly site inspections.
MUSSEL LONGLINES	**MONITORING FREQUENCY**
➢ The black support buoys should be attached close to the mainline i.e. rope connection to have as minimal as possible length attachment but enough to allow space to be cut them free. Diameter of rope should not be excessive (reference is made to the minimum infrastructure guideline).	
➢ The longline should be as taut as possible to reduce entanglement in the mainline.	
➢ Where possible a weak link along the continuous mussel line depending on what the distance is between each line.	

8 Alien Fish Escapes

Finfish Farms should comply with best practice guidelines some of which are outlined below:

a. Design and construction of the net-pen system

The floating cage system and various nets should conform to industry standards and regulations set out by the Department, if there are no standards international standards should be applied. Culture net mesh size of appropriate diameter should be utilised and predator and bird netting should be a respective mesh size of 50mm and 75mm. These should be inspected daily weather permitting. Regular maintenance of the nets for biofouling should be scheduled and maintenance records kept. The net structure should be properly fit, to minimise unnecessary strain on the nets to prevent excess netting from bunching up, as this can pose an entanglement risk. Biofouling cleaning schedule should be implemented as this if not managed can lead to weighing down of the net pens and allows for predators to enter the cages and increases the risk of escapes.

b. Mooring systems

The mooring system design and infrastructure should conform to industry standards and regulations set by the Department, if there are no standards international standards should be applied. The minimum infrastructure guidelines are to be implemented for the ADZ. Infrastructure set up should withstand the ocean conditions prevalent in the area and should be inspected daily weather permitting. Regular maintenance according to a maintenance schedule and records should be kept.

c. Boat operations

A competent skipper and trained staff to be on board when operating near the net pens, since there is great risk from the propellers which can cut, pinch the infrastructure during manoeuvres around the cages.

d. Fish handling and movement

When there is fish handling there is a higher risk of escapes, due to human error of lack of knowledge or equipment failure and ocean conditions. Mitigations to avoid escapes during handling

- Barrier netting is to be placed from the work boat deck to the net pen, operators is to stand on the netting. This will allow fallen fish to be captured in the net
- Pipe must be properly fixed to the receiving net-pen and operations will be ceased if the ocean conditions worsen, i.e. swell over 3 m with rough winds of over 18 knots.
- Ensure that fish contact surfaces are kept wet and cool.
- All low points on the work boat through which a fish can fall overboard is closed off with netting to ensure that the fish will be captured

e. Staff training

Staff should be adequately trained to ensure that they have adequate knowledge and competency to undertake their function.

All staff must be trained for the following:

- Net-pen assembly techniques
- Opening and closure of nets
- Proper fish handling
- The structure and function of the whole net-pen system, including the mooring system
- What to look out for during inspections
- Deployment of incident netting
- Detection of possible missed escape points during a fish handling or movement event
- The importance of preventing escapes
- The initiation and execution of the recovery plan

9 Training and Awareness

All farm and support staff must receive training in this Incident Response Protocol at least annually. Attendance at the training programs must be recorded in attendance registers. Immediately after any substantive changes to the Incident Response Protocol, all staff must receive up-date training, irrespective of how recently they received any other training in this Protocol.

In addition, staff from SBM, Port Control, NSRI and TNPA need orientation so that their ERPs can align with the ADZ ERP and so that they know who to contact.

10 Distribution and version control

The ADZ ECO is responsible for issuing the Incident Response Protocol to all operators and farmers. The ADZ ECO is also responsible for circulating any updates and/or revisions. The ADZ ECO will keep a documented record of when each version was issued and to the recipients. The operators or farmers must destroy outdated versions. Possession of the latest version will be the subject of regular auditing by the ADZ ECO.

11 Contact details

To be read in conjunction with the latest version of the SAMSA Marine Notice. Current version MN No. 55 of 2020

Designation	Name	Email	Telephone No
ADZ Environmental Control Officer (ADZ ECO)	Jen Keleightley	SaldanhaADZECO@DFFE.gov.za	084 447 1100
ADZ Incident Response Leader	Vossie Pinaar Tim Damons	bbmussel@mweb.co.za tdamons@blp-sa.com	083 418 9748 073 385 3761
Port Captain Port Control Incident	Port Captain Willem Roux Acting Harbour Master Silindele Mdlalose	Willem.Roux@transnet.net Silindile.Mdlalose@transnet.net	083 4133902 022 703 5310 022 714 1726 Channel 16 VHF 022 703 5472 084 291 2743
DFFE: Oceans & Coasts - Oil Spill Unit	Feroza Albertus Ulrich van Bloemestein Yazeed Petersen	FBalbertus@DFFE.gov.za UVBloem@DFFE.gov.za YPetersen@DFFE.gov.za	072 173 6234 084 421 6606 083 530 3127
DFFE: Regulatory, Compliance and Sector Monitoring (Pta)	Sonnyboy Bapela	SBapela@DFFE.gov.za	012 399 9422
DFFE: Regulatory, Compliance and Sector Monitoring (CT)	Bongumenzi Gumbi	BGumbi@DFFE.gov.za	071 6090 792
DFFE: Fisheries Management Compliance Monitoring	Wade Theron	WTheron@DFFE.gov.za	028 771 8910
Fisheries Small Harbour Master	Mr K Ndivhuwo	NKwinda@DFFE.gov.za	072 6788619
DFFE: State Veterinarian	Vacant		
DFFE: Aquatic Animal Health	Dr Kevin William Christison	KChristison@DFFE.gov.za	021 430 7010
DFFE: Aquatic Animal Health	Primrose Bontle Lehubye	PLehubye@DFFE.gov.za , AquaHealth@DFFE.gov.za	021 430 7038
DFFE: Food Safety Office	John Foord Mayizole Majangaza	JFoord@DFFE.gov.za MMajangaza@DFFE.gov.za SAMSanitation@DFFE.gov.za	021 430 7003 021 430 7065
DFFE Aquaculture Research Development	Dr Grant Pitcher	GPitcher@DFFE.gov.za	021 430 7015
Department of Environmental Affairs and Development Planning	Amina Sulaiman Control Environmental Officer: Remediation &	Amina.Sulaiman@westerncape.gov.za leptieshaam.Bekko@westerncape.gov.za	021-483 2571 021-483 3370

Designation	Name	Email	Telephone No
	Emergency Incident Management Leptieshaam Bekko Deputy Director: Coastal Management		
South African National Parks (SANParks)			Office hours 022 772 2144 16h00 to 07h00 071 008 6472
South African Maritime Safety Authority (SAMSA)	Principal Officer Capt. N. Noble Deputy Principal Officer Mr. H. Esterhuizen SAMSA Duty Surveyor – Capt Neville Noble	saldanhabayoffice@samsa.org.za nnoble@samsa.org.za	022 714 1612 (Office hrs) **076 077 7467 (After hrs emergency/ duty surveyor)** 073 608 1377 (Principle Officer Capt Neville Noble) 083 294 8617 (Mr H Esterhuizen)
MRCC Maritime Rescue Coordination Centre	National Oil Spill Contingency Plan a central number for oil spills		24/7 – 021 938 3300
South African Navy Hydrographic Office (SANHO)	NAVCOMCEN	ncc@sanavy.co.za	
National Sea Rescue Institute (NSRI)	Incident Operations Centre (EOC) available 24/7, 365 Bruce Sandmann Rhine Barnes	**In all cases the NSRI incident contact number (National) is 112 from cell phone.** operations@searescue.org.za bruce@searescue.org.za Rhine@searescue.org.za	112 or, 021 434 4011 (for the EOC), or 082 994 7555 (Stn04 Mykonos directly)
South African Whale Disentanglement Network (SAWDN)	Mike Meyer	michaelmeyer0@gmail.com	082 578 7617
Southern African Foundation for the Conservation of Coastal Birds (SANCCOB)			+27 78 638 3731
NSPCA	Jason Page	Wild4@nspca.co.za	011 907 3590
Saldanha Bay Municipality (SBM)	Mr B January Ms Nazeema Duarte	mun@sbm.gov.za Basil.January@sbm.gov.za Nazeema.Duarte@sbm.gov.za	022 713 1815
Saldanha Bay South African Police Services		saldanhasaps@saps.gov.za	022 714 8333, 022 714 8308
ADZ Consultative Forum	VIA ADZ ECO		
ADZ AMC	VIA ADZ ECO		

12 Reference List

Elwen, Dr S. 2020. Guidelines and Standards to mitigate marine mammal entanglement for the Saldanha Bay Aquaculture Development Zone. Sea Search Research & Conservation. March 2020

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Kemper CM, Pemberton D, Cawthorn M, Heinrich S, Mann J, Wursig B, Shaughnessy P, Gales R. 2003 Aquaculture and marine mammals: Co-existence or conflict? In: Gales N, Hindell M, Kirkwood R (eds) Marine Mammals: Fisheries, Tourism and Management Issues. CSIRO Publishing, Melbourne, p 208–225

13 Incident Report Form

The form in **Appendix *1*** below must be completed for incidents, whether they arise inside the ADZ or outside. The form must be submitted to the ADZ ECO for review within 24 hours of the incident, even if not all actions have been completed so that that it can be registered on the Incident Register for tracking

Appendix 1: Incident Reporting Form

Saldanha Bay Aquaculture Management Committee

Incident Report Form V2 – ADZ ECO/ AMC/ CF

Section One: To be completed by the person reporting the incident					
Name		**Designation**			
Contact number		**Physical location of incident**			
Date of incident		**Time of incident**			
Designation of Responsible Person					
Name		**Contact details**			
Describe the incident – e.g.- provide as much detail as possible 1. What happened? 2. Where? 3. What environmental damage is already visible? 4. What was the probable cause?					
Was there damage/ contamination of any of the following? (Tick the appropriate box)					
Sea water		**Beach**		**Infrastructure**	
Other					
What remediation has been undertaken? (Describe)					
Section Two: After the incident has been contained					
Has the damage/ contamination been completely remediated?					
Has the damage/ contamination produced general or hazardous waste? If yes, kindly attached the disposal or treatment receipts.					
If not, what residual damage remains (detail the residual damage).					

If residual damage remains- what is the reason and what is planned to remediate the damage. The ECO must counter sign this form in this event before it can be closed. (see below)
Upon investigation, what was found to be the cause of the incident? (Detail)
Is this a repeat of a similar incident?
What is the reason that planned changes did not prevent a recurrence of the incident?
What is to be changed to ensure that the incident will not be repeated? (Detail)
Section Three: To be completed by the ECO
Does the incident comprise a contravention of legislation?
If so, what action has been taken?
Have all the required and appropriate actions been taken to the satisfaction of the ECO?
Have all parties signed the incident form?

Date	Signature	`Date	Signature
Responsible Person		ECO	

ANNEXURE D

Example of Sampling Plan

D

agriculture,
forestry & fisheries
Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

Protocols for Environmental Monitoring of the Aquaculture Development Zone in Saldanha Bay, South Africa

4 December 2018

DRAFT	TYPE	DATE	EXECUTED	CLIENT	DESCRIPTION / COMMENTS
01	Draft	29/10/2018	TP	DAFF	Draft for comment
02	Final	30 /11/2018	TP	DAFF	Final draft

	PREPARED FOR:
agriculture, forestry & fisheries Department: Agriculture, Forestry and Fisheries REPUBLIC OF SOUTH AFRICA	**Department of Agriculture, Forestry and Fisheries** Private Bag X2 Roggebaai, 8001 Tel: +27 (0)21 402 3911 Contact persons: Ms Fatima Daya
	PREPARED BY:
	Dr Trevor Probyn trevorprobyn@gmail.com
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	Peer reviewed by:
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Contents

1. Background to the Aquaculture Development Zone

The Department of Agriculture Forestry and Fisheries (DAFF) has established an Aquaculture Development Zone (ADZ) in Saldanha Bay with the aim of streamlining the expansion of farming operations and promoting investor confidence in the sector. The ADZ expands on existing aquaculture areas in Small Bay and Big Bay, and extends operations into Outer Bay (entrance channel). The authorized species for cultivation include both alien and indigenous species of finfish and shellfish, and seaweeds. The proposal has been subject to a Basic Assessment (BA) process and a final Basic Assessment Report has been produced (SRK 2017a). Through stakeholder engagement and in mitigation of the proposed scale of operations, the original area being considered for new development in the ADZ was reduced considerably from 1 404 ha to 420 ha giving a total area of 884 ha including existing areas allocated for aquaculture. Most of the total area considered for allocation to aquaculture is for shellfish farming as only 29% of the ADZ is regarded as suitable for finfish (SRK 2017a).

Mitigation and monitoring actions during the design, construction, operational and decommissioning phases are clearly specified in the EMPr and will largely be implemented by the developer/farmer and overseen by the Aquaculture Development Zone Management Committee (AMC) constituted according to Section 13 of the Environmental Authorization (EA). A Consultative Forum shall also be established to provide a platform for the public to engage on activities within the ADZ. As the holder of the EA, DAFF is responsible for implementation of recommendations in the Environmental Management Programme (EMPr) and the present monitoring plan. An Environmental Control Officer (ECO) has been appointed during the construction and operational phases to ensure compliance with stipulations given in the Environmental Authorization and the EMPr (SRK 2017b).

As specified in section 7.1 of the EMPr (SRK 2017b), monitoring required during the operational phase must be undertaken by:

- an specialist appointed by the DAFF and approved by AMC, and
- individual operators.

The AMC/DAFF has oversight of environmental monitoring and through an Environmental Representative (condition 19 of the EA) will:

- liaise with the appointed specialist(s) to ensure environmental monitoring actions/methods are performed according to the EMPr and additional sampling plans;

- receive and review environmental monitoring results to ascertain compliance of aquaculture operators with conditions of the EMPr and EA;
- receive and review monthly Farm Monitoring Reports from individual operators;
- notify the AMC Chairperson of issues that require immediate attention of the committee;
- notify the AMC Secretariat of issues that require immediate attention of other aquaculture operators within the ADZ, and;
- report on environmental aspects at AMC meetings.

The Marine Ecology Specialist Study (Pisces 2017) discusses many of the generic impacts associated with finfish and shellfish aquaculture as well as those specific to the Saldanha Bay/Langebaan Lagoon ecosystem which provide the focus for the required monitoring actions. The significance of these potential impacts both with and without mitigation measures are provided in the final Basic Assessment Report (SRK 2017a). Discussion regarding the different impacts with reference to the scientific literature is provided in the specialist study. Very briefly, the significant impacts can be categorized as:

- modification of seabed by biodeposition;
- modification of water column dissolved oxygen and inorganic nitrogen;
- removal of seston by shellfish;
- creation of habitat by farm structures;
- alteration of behaviour and entanglement of seabirds and marine fauna at finfish sites;
- introduction of aliens and spread of pests;
- transmission of diseases to wild population;
- genetic interaction with wild populations by shellfish and finfish; and
- pollution by therapeutants and trace metals.

Management and mitigation measures that address the above concerns for the different phases of the proposed ADZ development are provided in the final Basic Assessment Report (SRK 2017a) and EMPr (SRK 2017b). A number of environmental mitigation measures proposed for the operation phase in the Basic Assessment Report (BAR) are realistically addressed in the design and planning phase and will not be considered in detail in the

present recommendations for monitoring. These are concerned mainly with appropriate siting, buffer zones, production limits through phasing and farm footprints, use of predator nets etc.

The scope of this document encompasses a sampling/monitoring plan to address the concerns related to impacts on the marine ecology of the Saldanha Bay/Langebaan Lagoon system during the operational phase of the ADZ, as specified in section 7.2 of the Environmental Management Plan (SRK 2017b). Mitigation measures related to Ecological concerns raised by potential genetic and biosecurity impacts are outlined in the Environmental Management Plan (EMPr) and referred to briefly in Section 11-13. . Monitoring actions are intended to address both farm-scale and far-field impacts (ADZ scale) and will be guided by the recommendations in the EMPr and the findings of the hydrodynamic model (PRDW 2017).

2. Introduction to the marine ecology monitoring plan

The primary aim of ecologically focused monitoring is to assess whether an activity or activities are having an unacceptable impact on the environment (Fernandes et al. 2001). Ultimately an area designated for aquaculture may be able to be used indefinitely i.e. in a sustainable manner. Potential use of the environment as a means of disposing waste is included under sustainable use of the environment. However, such use must be localized, short-term and reversible (Fernandes et al. 2001). Important in this context is the assimilative capacity or ability of the environment to absorb and process wastes without damage to the ecosystem. GESAMP (1996) suggest a working definition of monitoring as `the regular collection, generally under regulatory mandate, of biological, chemical or physical data from predetermined locations such that ecological changes attributable to aquaculture wastes can be quantified and evaluated'. Monitoring should be informed by valid research such that adequate methodologies and appropriate variables are employed. However, situations may arise where the scientific requirements for monitoring are often tempered by practical limitations such as time scale and finances. Ideally the monitoring programme design should be able to distinguish between natural background variability and real change in the indicator variable. Central to the majority of monitoring programmes is the assessment of environmental status against a control or reference condition as an indication of environmental change.

The objectives (purpose) of any monitoring exercise are (Fernandes et al. 2001): '(i) to provide information on the area where the operation will take place (pre-operational); (ii) to provide information on which management guidelines/recommendations can be based (pre-operational); and (iii) to act as a `temporal and spatial control (operational and

post-operational) upon which remedial action might be based'. A key issue is that monitoring actions are not intended solely to document changes as/if they occur but should aim to promote avoidance and mitigation of significant negative impacts on the environment through timely management responses by industry and the regulator (Cranford et al. 2006). A common approach in achieving these goals is the determination of environmental quality objectives so that the environment can be managed in a sustainable manner (Day et al. 2015). Environmental quality standards are then set for specific variables such that the objectives can be attained (GESAMP 1996). Inherent with this approach is the concept of a mixing zone or allowable zone of effect (AZE) where standards may not be met (SEPA 1998, Day et al. 2015).

A monitoring plan should consider the appropriate variables to be sampled for the particular farming operation and receiving environment. The indicator variables and measurement approach should be able to detect changes over the appropriate temporal and spatial scales. Relevant spatial scales encompass, local (directly at culture structure, lease area, bay (coastal embayment or management area), and regional (broader coastal areas of similar environmental conditions (Cranford et al. 2006). Temporal conditions should address relevant scales of natural variability and generation times of critical organisms. There are multiple variables that can be sampled, generally falling under three categories: physical (e.g. sediment grain size, wind, currents), chemical (e.g. redox potential, pH, dissolved oxygen), and biological (e.g. species abundance and diversity, productivity). These variables, singly or in combination, form the basis of ecological indicators that aim to provide information on ecosystem status and the impact that aquaculture activities have on ecosystems to regulatory authorities, industry and the public (ICES 2009). indicators need to be quantifiable and able to detect change over the appropriate temporal and spatial scales, i.e. representative of the system in question. Generally a suite of environmental impact indicators are considered in industry operational monitoring programmes and the performance of the industry is based on the accumulated evidence ('weight-of-evidence'). Such an approach will require specific thresholds to be predetermined that initiate prompt action on the part of the regulators and operators. Where such thresholds have yet to be determined, an alternative approach (surveillance) attempts to determine if there are detectable differences between aquaculture and control sites, or significant changes over time that cannot be attributed to natural variations (Cranford et al. 2006). Inherent in a recommended monitoring framework is the basic principle that such programmes are reviewed frequently and allow flexibility to add or remove indicators based on the evolution of our state of knowledge.

Certain target areas may require special considerations that could impose specific requirements for variables to be sampled. Sampling design considerations include the

number of samples, location and replication. Measurement variation can become a consideration particularly in situations where sampling is difficult to undertake, such as in deep benthic environments. Costly use of time and resources should not be expended on perfecting each measurement, especially where this would lead to a sacrifice in the number of samples taken (Foster et al. 2018). The number and location of sampling sites will depend largely on the hydrography, specific objectives and, as a practical limitation, finances. However, it is essential that important habitats and species are adequately addressed. The number of replicates taken within a site should be sufficient to address natural spatial variability and patchiness such that a degree of reliability can be placed on the results. This is of particular relevance where comparison with a reference or baseline condition is intended. Reference stations need to be defined for each location. Stations of similar depth and substratum type to the sites within the proposed aquaculture operation should be chosen. Reference stations should be positioned away from the probable zone of influence of the operation (e.g. upstream of dominant current direction) but within the same broad vicinity (Noble-James et al. 2017). Under no circumstances should reference stations be located close the aquaculture site, even if they are believed to be 'upstream' (Fernandes et al. 2001).

Where regular monitoring is intended it is essential that information from each survey is comparable. Methodology and assessment criteria need to be established and, where possible, sampling points/area and in some cases, season, should be fixed. The methodologies to be used including data analyses must be specific for the monitoring design and objectives, and allow comparisons to be made. Relatively simple statistics (e.g. regression, analysis of variance) may be employed in combination with specific numerical methods that are standard in environmental data analysis. These encompass univariate summary statistics (e.g. species diversity indices) and multivariate techniques such as cluster analysis and ordination (Fernandes et al. 2001). Power analysis can be used to define how many replicates should be taken in order to assess reliably any potential deviations from the baseline. However, when deciding on the number of replicates practical aspects regarding time and labour demands, as well as the nature of the environment, should also be taken into account. For instance, for benthic subtidal communities it is generally regarded that 3 - 5 replicates is sufficient to provide the necessary information (Fernandes et al. 2001). However, other variables such as water column properties (nutrients, phytoplankton) and physio-chemical parameters could require greater replication to address the inherent short-term spatial and temporal variability that characterizes them.

It should be emphasized that ongoing monitoring programmes need to be responsive to new information concerning environmental impacts and indicators thereof, as well developments in methodological approaches (Cranford et al. 2006). Some monitoring actions and indicators

may prove insensitive to the specific aquaculture impacts they are proposed to target, and as such, a waste of resources. Relatively low-risk practices such as shellfish cultivation in exposed environments may require less frequent monitoring than originally proposed in a monitoring plan. Besides issues of compliance, it is important that regular review of monitoring results is undertaken to facilitate an inclusion or removal of indicators, or amendment of monitoring effort, based on an expanding knowledge base.

3. Sites to be monitored

The ADZ identifies 4 sites within the bay system. The areas allocated for either finfish or shellfish farming in each are shown in Table 1.

Table 1: Areas allocated for the finfish and shellfish farming in the ADZ.

Area	Finfish area (ha)	Bivalve area (ha)
Outer Bay North (OB-N)		217
Outer Bay South (OB-S)	96	
Big Bay (BB)	40	394
Small Bay (SB)		163

The OB and BB sites are largely undeveloped and are earmarked for both finfish and shellfish farming (within OB-N and BB). However, there is little interest by industry in farming finfish in OB-N (A. Bernatzeder, pers. comm.) and as such the area is treated as being allocated for bivalves only (Table 1). Aquaculture in SB is restricted to shellfish and has been in progress for decades. Monitoring actions in SB will be addressed separately from the other sites.

4. Indicators

Although both benthic and water column effects have been highlighted in the marine ecology specialist study (Pisces 2017), the effect on the benthos will provide the major focus of the monitoring campaign as many studies have shown these to be the more severe. International experience has shown that for both shellfish (review by Keeley et al. 2009) and finfish (review by Forrest et al. 2007) the main environmental impact has been a result of sedimentation of biodeposits. Globally, sea-based aquaculture monitoring has generally focused on organic loading to the benthic habitat in the vicinity of the farm. Sediments generally provide a more

stable integrator of near-field past and present activities as well as natural processes that assimilate or disperse particulate wastes than do water column measurements (Cranford et al. 2006, ICES 2009). Understanding of seabed organic enrichment effects are relatively advanced which has resulted in the development of effective environmental indicators and scientifically defensible thresholds. Seabed effects can be particularly pronounced for finfish farming as a result of artificial feed additions. However, a simulation model of finfish farms in Saldanha Bay has shown that none of the sites in OB and BB at showed any evidence of organic matter accumulation at the farm site for the specified production tonnages of 1000 - 1500 metric tons (PRDW 2017). The model did identify depositional areas in harbours and along the iron ore and oil jetty, as well near Riet Bay at the entrance to Langebaan Lagoon. Sediment build-up, however, was regarded as negligible in terms of anticipated effects on the benthos (PRDW 2017). Although shellfish feed on naturally occurring plankton populations, the concentration of stock within farm infrastructure results in an 'unnatural' localization of effects on the benthos. However, benthic effects of shellfish are typically of minor influence beyond the boundaries of the farm (NZMPI 2013).

Monitoring of benthic impacts is mandatory in all salmon growing countries (Black et al. 2008) and should be undertaken in Saldanha Bay despite the model predictions of minimal impact. Although there is a wide range of benthic indicators in use by different countries, they all have the primary Environmental Quality Objective of preventing hypoxic or anoxic sediment conditions by maintaining a functional, not necessarily pristine, benthos beneath the culture structures (Black et al. 2008, PNS 2018a). Maintaining functionality is crucial considering the importance of the benthos in promoting organic matter degradation by microbial communities.

Copper (Cu) and zinc (Zn) are two metals that are commonly monitored in finfish growing areas. Copper is the primary active agent in most antifouling products applied to submerged farm structures and Zn is a fish health additive included in feed. Some paint formulations also contain Zn as an antifouling agent (Macleod and Eriksen 2009). Both are ubiquitous in the environment and essential trace nutrients for nearly all organisms. However, toxic effects can occur when they accumulate in high concentrations of bioavailable forms. Copper leaching from antifoulants will primarily be present in the dissolved phase but, as a result of its low solubility, is rapidly partitioned to suspended particulate matter and ultimately incorporated in the sediments. In addition, the actual bioavailable fraction of Cu in the dissolved phase can be orders of magnitude lower than total Cu concentration as a result of binding to naturally occurring organic material (Clement et al. 2010). Zinc in uneaten feed and fish faeces will rapidly settle to the seabed. Thus sediments are the primary concern in the accumulation of

Cu and Zn and both are consistently associated with finfish farming operations at environmentally significant levels beneath and adjacent to fish cages (Clement et al. 2010).

The accumulation of both metals is mediated by settlement processes and as a result may be expected to follow the pattern predicted for organic matter (Keeley et al. 2014). Unlike organic matter, however, metals in sediments are neither broken down over time, nor utilized by biota at appreciable rates. Consequently they may persist for long periods in environments where physical dispersion is limited. Although model simulations for Saldanha Bay suggest very little accumulation of sediments (and their attendant contaminants) at finfish growing sites (PRDW 2017), Cu and Zn should be monitored until sufficient data are collected to indicate contamination by these two metals within the lease areas is minimal. Generally studies of metal contamination apply normalization techniques as an aid to interpreting measured concentrations (Ho et al. 2012). Normalization to Aluminium (Al) is common practice and is currently employed in current monitoring efforts in Saldanha Bay (Clark et al. 2017).

Both finfish and shellfish culture release nutrients to the water column which have putative effects on phytoplankton productivity and community structure. However, numerous studies demonstrate very localized to indiscernible effects of suspended finfish culture on the water column through nutrient enrichment or oxygen depletion (see review by Price et al. 2015). Model simulations of dissolved inorganic N release from the proposed finfish farms in Saldanha Bay, support these findings (PRDW 2017). Similarly for shellfish, a meta-analysis of the effects of different aquaculture practices on dissolved nutrient levels has shown no significant effect for bivalve culture (Sarà 2007a). Effects on dissolved oxygen and turbidity have largely been eliminated through better management practices, and near-field nutrient enrichment to the water column is usually not detectable beyond 100 m of the farm. A meta-analysis of different aquaculture systems concluded that dissolved oxygen was generally not affected by aquaculture (Sarà 2007b). Nutrients as indicators of aquaculture impacts is particularly challenging owing to a high natural variability. A compelling explanation for why increased nutrients are often undetectable around fish farms is that they are being rapidly assimilated by phytoplankton. In fact measures of chlorophyll or other metrics of phytoplankton production provide useful proxies for hypernutrification (Cranford et al. 2006). Evidence for stimulation of phytoplankton growth around fish cages is variable though most often a direct causal relationship has not been demonstrated (Price et al. 2015). One possible explanation for the lack of a systematic effect on the water column variables around fish farms, is the presence of strong currents in these areas that promote dilution (Huntington et al. 2006). Alternatively, rapid grazing by microzooplankton could keep stimulation of phytoplankton growth in check (Tett et al. 2003).

Shellfish culture has the added effect of stripping plankton from the water column. Both models (Grant et al. 2008) and field studies (Heasman et al. 1998, Petersen et al. 2008) have shown feeding by intense bivalve culture results in a marked depletion of phytoplankton (and other components of the seston) as water moves through the farmed areas. Larger phytoplankton groups are targeted by mussels and oysters resulting in relative enrichment of smaller size classes with possible ecological costs to other components of the ecosystem 'downstream' of the farm (Cranford et al. 2008). Bivalve filtration could out-compete zooplankton for food potentially redirecting energy flow from pelagic to benthic foodwebs (Cloern 2005). Besides such effects on natural foodwebs, intense shellfish culture may have density-dependent, negative feedback effects within the lease areas (Heasman et al. 1998). Given the potential ecosystem shifts that may arise in areas of intense bivalve culture, indicators of size spectrum changes are perceived as being of high value in monitoring shellfish aquaculture growing areas (Cranford et al. 2006, ICES 2009). Of particular ecological concern is the potential reduction in carrying capacity for other filter feeding organisms in Langebaan Lagoon. The shallow lagoon, exchanges water with the relatively nutrient-poor, upper water column of Big Bay (Monteiro & Largier 1999); a depth range where filtration by cultivated shellfish would be most noticeable. As adequately defined operational, quantitative thresholds are not established for phytoplankton measurements, they fall into the surveillance category of indicators. However, this does not preclude their potential usefulness. Cranford et al. (2006) identifies the possible effects of intensive shellfish feeding on pelagic plankton and foodwebs as of particular concern, particularly at the bay scale.

Based on the above, the ecological indicators chosen for monitoring impacts of aquaculture are:

- benthic macofaunal community species richness and biomass;
- sediment geochemical variables (total sulfides and/or redox) ;
- visual and odour characteristics;
- surficial sediment geochemical characteristics (total organic carbon and nitrogen (TOC/N), Al, Cu and Zn);
- sediment geotechnical characteristics (size structure, porosity);
- near-bottom oxygen concentration; and
- upper water column chlorophyll concentration (fluorometer and discrete samples).

Other ecosystem indicators that are presently monitored as part of the State of the Bay

programme must also be considered in the context of expansion of aquaculture in the bay. These include:

- fish abundance;
- bird breeding success;
- alien species occurrence.

Together with the ongoing State of the Bay benthic fauna studies in Langebaan Lagoon, these provide useful indicators of the state of the far-field ecosystem relative to aquaculture.

5. Indicators and thresholds

5.1 Benthic oxic-anoxic classification

The primary source of impact on the seabed from finfish and shellfish aquaculture is organic matter input from faeces, pseudofaeces, uneaten artificial feed, and fall-off-off of culture organisms and fouling organisms (Cranford et al. 2012). Sediment organic enrichment effects are generally less dramatic with bivalve culture than with finfish culture where artificial feed is used. Nevertheless, if organic deposition is sufficiently high, decomposition by sediment bacteria can increase the oxygen demand which, if not balanced by diffusive or advective supply, can lead to anaerobic conditions in the porewaters of the seabed of both finfish and shellfish farms. In severe cases this can lead to oxygen depletion in the water above the sediments that may then have a direct impact on farm operations. Ammonification and sulfate reduction to sulfides follow as typical responses to a lowering of the oxygen reduction (redox) potential. The shift to sulfate reduction is critical because the end-product, sulfide, is toxic (Black et al. 2008). It is important to note that highly organic enriched sediments can occur naturally where inputs from terrestrial or marine sources are large. Periodic oxygen depletion in sediments and overlying water may develop in these areas.

Hargrave (1994) has shown that sediment organic C, redox potential (Eh) and total sulfides (S^{2-}) were effective in describing adverse impacts on the benthos from salmon culture. The two inversely related chemical indicators, Eh and S^{2-}, have been used to classify sediments associated with a salmon farm into 4 organic enrichment groups; normal, oxic, hypoxic and anoxic (Wildish et al. 2001). Subsequently this classification has been expanded into 5 groups, with slight adjustment of the geochemical threshold levels, incorporating two oxic and two hypoxic categories (Cranfield et al. 2006, Hargrave et al. 2008a, Hargrave et al. 2008b). The separation of the two hypoxic categories is based on the relative proportion of opportunistic species. Each category has defined Eh and S^{2-} thresholds (Table 2). The

maximum S^{2-} threshold level for Oxic B conditions (1500 µM) is slightly higher than previously identified as a maximum S^{2-} concentration for oxic deposits (1300 µM) and the range of Eh potentials characteristic of this enrichment group is slightly broader (+100 to -50 mV) than previously proposed (+100 to 0 mV) in Wildish et al. (2001). This inverse correlation between Eh and S^{2-} has been shown to be similar at both finfish and shellfish aquaculture sites (Cranford et al. 2006). Consequently these chemical indicators provide an effective means of determining organic matter enrichment and oxic status of seabed deposits at both finfish and shellfish farm sites. In New Brunswick, eastern Canada, an extra category is included by separation into three hypoxic regimes, though the oxic to anoxic transition thresholds remain the same as the 5 category scheme (NBDENV 2012).

Table 2: Ranges of redox potential (Eh) and total sulfides (S^{2-}) in 5 sediment organic enrichment categories Cranford et al. 2006, Hargrave et al. 2008b. The Biotic index indicators (Borja et al. 2000, 2003) have been included for comparison.

	Oxic A	Oxic B	Hypoxic A	Hypoxic B	Anoxic
Geochemical:					
Redox (Eh) mV	>100	100 to - 50	-50 to - 100	-100 to – 150	<-150
Sulfides (S^{2-}) µM	<750	750 to 1500	1500 to 3000	3000 to 6000	>6000
Biological:					
Shannon-Wiener (H')	>4	4 - 3	3 - 2	2 - 1	<1
Infaunal Trophic Index (ITI)	>50	50 - 25	<25	<25	<5
AZTI Biotic Index	<1.2	1.2 - 3.3	3.3 - 5	5 - 6	>6
Effect on sediment	Low effects	Low effects	May be causing adverse effects	Likely causing adverse effects	Causing severe damage

Many countries have chemical thresholds for monitoring aquaculture areas, finfish in particular, that are aligned with a classification of sediment state into categories similar to those given in Table 2. For example, in Maine S^{2-} levels of 2500 - 6000 µM (Eh 100 to -100 mV) at any sampling station within a salmon AZE (30 m) is treated as a warning level and levels > 6000 µM as unacceptable impact that will require a mitigation plan and schedule for modification of operations (State of Maine 2008). A similar mitigation plan will be required if subsequent monitoring indicates a deterioration in warning level S^{2-} concentrations within the

AZE or S^{2-} concentrations >3000 µM at any station beyond the AZE.

Salmon farms on the Pacific coast in British Columbia employ similar regulatory threshold values of 1300 µM and 4500 µM at 125 m and 30 m from the cages (Fisheries and Oceans Canada 2015). If a single sample exceeds the threshold then an additional survey will be required before re-stocking for the subsequent production cycle (Seafood Watch 2017).

The Irish finfish monitoring thresholds require Eh values to be < -125mV within the AZE and equivalent to reference station values outside the AZE (Irish DAFF 2008). A breach of the required parameters for either chemical or biological indicators will require the operator to provide a benthic amelioration plan that aims to improve the ecology of the benthos in as short a time as possible. Subsequent surveys of the impacted area serve to assess if the amelioration plan has been successful. In Marlborough Sound, New Zealand, proposed S^{2-} thresholds within the zone of maximum effect, i.e. close to fish cages, is < 1700 µM, and for the outer limit of effect (150 - 600 m) concentrations should remain a conservative <290 µM (Keeley et al. 2014). Scotland also applies different thresholds relative to a mixing zone as given in Annex A, SEPA Fish Farm Procedures Manual but, instead of a fixed AZE (25 m), a less arbitrary approach is allowed whereby a site-specific AZE's are determined according to the dispersing nature of the site (Black et al. 2008). This allows larger benthic footprints in areas of high dispersion with the aim of encouraging development in more physically dynamic environments.

Benthic monitoring of finfish culture in the maritime provinces of Canada, Nova Scotia (PNS, 2018a, 2018b) and New Brunswick (NBDENV 2012), does not implement an AZE but is concentrated in the vicinity of cages - along the outside perimeter of cage arrays. If average S^{2-} is < 1500 µM then no further action is required. If S^{2-} falls between 1500 and 3000 µM (hypoxic A) then a mitigation plan will be required by the operator. In the event that S^{2-} exceeds 3000 µM (hypoxic B/anoxic), extra sampling (their Tier II) will be required for an improved spatial delineation of the impacted area and more effectively define the degree of influence. In their scheme, sulfide concentrations indicative of hypoxic (4500 to 6000 µM) or anoxic conditions (>6000 µM) would likely require special authorization (Gomes Consulting Inc. 2010).

5.2 Benthic geochemical indicators

The Aquaculture Stewardship Council specifies a S^{2-} concentration of <1500 µM (or Eh > 0 mV) as the threshold beyond the AZE for salmon farming (ASC 2017). The benthic AZE is defined as 30 m from a cage array unless a site-specific zone of impact has been established. It is proposed that this threshold is adopted for Saldanha Bay fish farm sites as

the threshold outside the AZE. It is suggested that an additional S^{2-} threshold concentration of >3000 µM be applied at the position of the finfish cages as is implemented in the Canadian maritime provinces monitoring programmes. Although Eh is still commonly used as an indicator of sediment organic enrichment there are procedural problems with its measurement that lead to high variability in certain sediments (Wildish et al. 2004, ACS 2010). Based on these limitations total sulfide should be the variable used to define oxic status. Redox should strictly only be used as a check on S^{2-} measurements - they should be inversely related (Wildish et al. 2004). In the Aquaculture Stewardship Council's monitoring plan for shellfish, an AZE is not specified; sites for measurement of chemical indicators are limited to beneath the farm (ASC 2012). It is recommended that their threshold S^{2-} concentration of >3000 µM is adopted for annual monitoring of site condition in shellfish growing areas (beneath culture areas).

Failure to meet S^{2-} thresholds of 1500 µM at the AZE limit for finfish farms or 3000 µM at finfish cages or directly below shellfish longlines, will require management intervention and/or additional sampling. Non-compliance is dependent on the farm or AZE station being significantly greater than levels measured at the reference stations.

While many countries have established sediment quality guidelines for trace metals very few have aquaculture-specific guidelines and sediment monitoring protocols. The Scottish Environmental Protection Agency (SEPA) has derived sediment standards within the AZE that could potentially cause adverse effects (108 mg/kg for Cu and 270 mg/kg for Zn) and probably will have adverse effects (270 mg/kg for Cu and 410 mg/kg for Zn). Outside the AZE the standards are more stringent: 34 mg/kg for Cu and 150 mg/kg for Zn. This approach acknowledges that impacts will be greatest in the vicinity of the farm and is designed to control both the intensity and spatial extent of the impact (Clement et al. 2010). The Australian and New Zealand Environment and Conservation Council (ANZECC 2000) have derived Interim Sediment Quality Guidelines (ISQGs) that are considered appropriate to apply monitoring of benthic conditions at finfish farms (Keeley et al. 2014). The guidelines specify a ISQG-low of 65 mg/kg for Cu and 200 mg/kg for Zn which represents a 10% probability of adverse effects, and a ISQG-high of 270 mg/kg for Cu and 410 for Zn which is regarded as a 50% probability of significant toxicity. These guidelines are applicable to the worst affected areas in the vicinity of a farm (Keeley et al. 2014)

The critical issue regarding the toxicity of metals in the environment is the fraction that is actually bioavailable to organisms. It is likely that the majority of total Cu and Zn in the sediment under fish farms will be bound to sulfides and organic matter rendering them unavailable for uptake by organisms effectively reducing their subsequent toxicity (MPI

2013). Given the likely reduced bioavailabilty of Cu and Zn in the organic rich sediments it is recommended that the SEPA aquaculture-specific probable effects levels (equal to the ANZECC ISQG-high guidelines) are used as guideline limits within the finfish AZE for the total recoverable metal fraction. This is similar to the criteria recommended by Keeley et al. (2014) for finfish in New Zealand and the US National Oceanic and Atmospheric Administration (NOAA) Effects Range Medium for sediments (Macleod & Eriksen 2007). Metals concentrations outside the AZE should conform to the SEPA limits, i.e. 34 mg/kg for Cu and 150 mg/kg for Zn.

Non-conformance of measured values with the above thresholds will trigger additional sampling to facilitate comparison with between baseline data for reference and farm sites with subsequent data. Failure will require management intervention.

5.3 Benthic community impact indicators

A primary objective with farm sediments is that they should contain a high abundance and biomass of bioturbating macrofaunal animals to enhance aeration and carbon degradation (Black et al. 2008). However, the development of oxygen stress within the benthic environment results in well documented responses by the benthic community that acts to reduce the processing of organic matter. These responses by the benthic community to changes in environmental variables such as oxygen supply are often reflected before they are detectable in some chemical properties (Cranford et al. 2006). They form the basis of indicators of benthic environment status and include (Black et al. 2008, Cranford et al. 2012):

- a decrease in species richness and an increase in the total number of individuals,
- a general reduction in most species biomass,
- a decrease in average body size of species,
- a constriction of that portion of the sediment occupied by infauna, and
- a shift in the relative dominance of trophic groups.

Away from the farm, organic input and oxygen demand decrease, benthic faunal assemblages are typified by increased diversity and functionality (Black et al. 2008, Keeley et al. 2014).

Some of the benthic community indicators that are commonly used are given in Table 3. Biodiversity indices are in common usage to describe the diversity of macrofaunal assemblages. However, they should be interpreted with caution and require a good understanding of what these indicator results actually reveal about community changes (Cranford et al. 2012). They should not be employed in isolation but as part of a suite of

indices to interpret changes in benthic fauna and the probable causes. Indicator species or trophic indices have been shown to be extremely useful in situations of high organic loading which result in shifts in community structure from filter feeders to deposit feeders and scavengers or from sensitive to more tolerant opportunistic feeders (McKindsey et al. 2011). Studies conducted by Stenton-Dozey et al. (1999) and Stenton-Dozey et al. (2001) showed that mussel rafts in Small Bay, Saldanha Bay, attracted opportunistic deposit feeders and carnivores while stations away from the aquaculture sites had an increased presence of suspension feeders.

Table 3: Indicators of the intensity of benthic community impacts from organic matter deposition from suspended aquaculture (after Cranford et al. 2012).

Indicator category	Indicators
Biodiversity metrics	Index of the number and abundance of species. Includes the Shannon-Wiener diversity index (*H´)* Pielou's evenness index (*j*), Simpson's dominance index (*c*), and Margalef's species richness (*d*).
Indicator species	Highly enriched marine sediments are generally dominated by a few opportunistic macrofaunal species that are tolerant of high organic enrichment and low oxygen conditions. The AZTI Marine Biotic Index (AMBI) is calculated based on the relative proportion of 5 species groups (previously classed as being sensitive to opportunistic).
Trophic indices	In highly organically enriched areas, benthic communities are dominated by deposit feeders and scavengers, at the expense of filter feeders. For example, the Infaunal Trophic Index provides a categorization of overall species abundance within different trophic groups in soft bottom communities.
Benthic similarity	Comparison of community structure using multivariate statistics such as ordination and cluster analyses.
Size structure	Most species that are tolerant to organic enrichment belong to families such as the Spionidae, and have a small size. Differential sieving allows separation of fauna into size categories.

It is proposed that the biodiversity indices such as Shannon-Wiener diversity index (*H´*), Pielou's eveness index (*j*) and Margalef's species richness index (*d*) form part of the suite of biological indicators because of their common usage in assessing benthic community status. All three have shown significant differences between salmon farm sites and reference sites (Wildish et al. 2001). The Infaunal Trophic Index (ITI), which is based on a functional feeding type for benthic fauna, is 'highly recommended' for monitoring benthic community impacts (Cranford et al. 2012) and should be included as a key indicator. The relationship of these indicators with the chemical thresholds discussed previously is shown in Table 1. Application

of the AZTI Biotic Index (originally Biotic Coefficient) will require allocation of the different benthic species found in Saldanha Bay sediments to different categories of sensitivity to organic loading and hypoxia/anoxia. The index has been shown to be broadly applicable to a range of impact sources, including aquaculture and hypoxia, in European coastal waters and estuaries (Muxika et al. 2005).

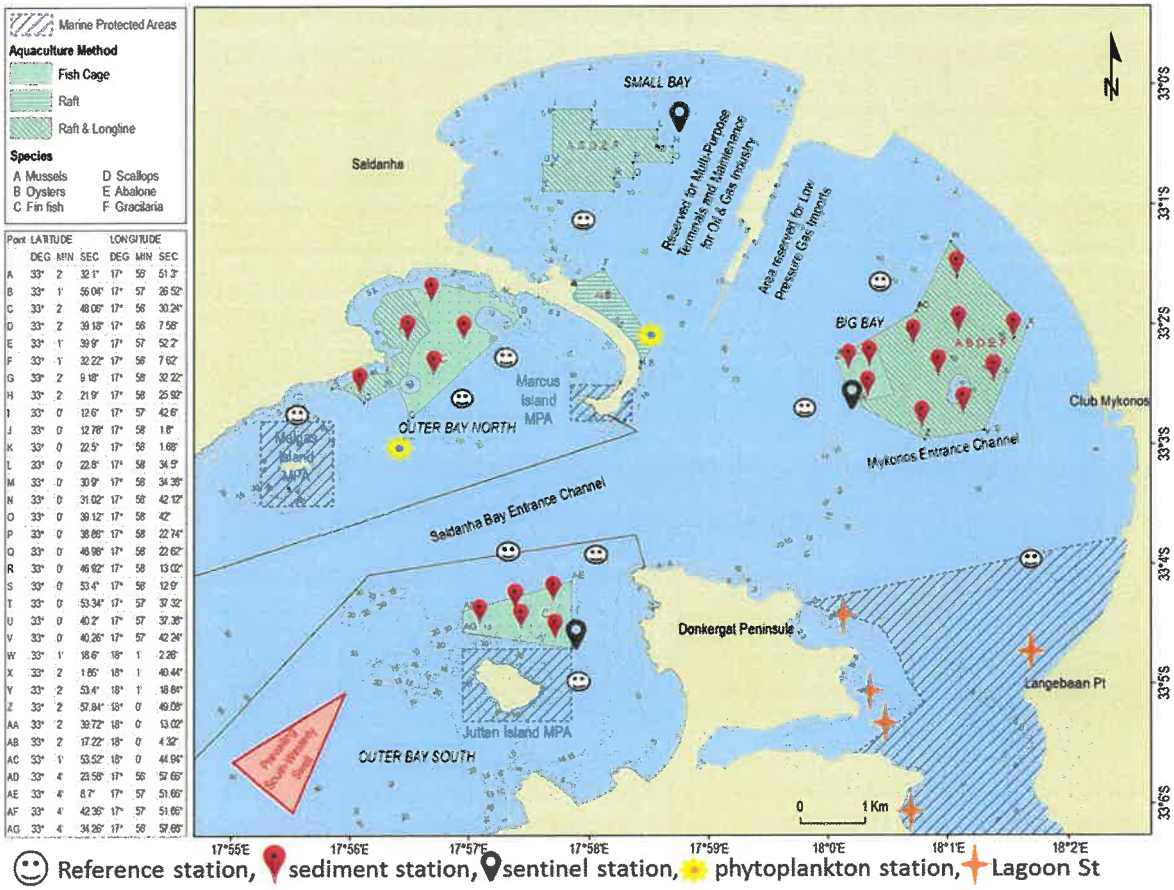
Multivariate methods provide additional tools to the univariate indices mentioned above to describe community composition data. The two most common multivariate techniques for analysis of community data are cluster analysis and ordination. Cluster analysis, usually in the form of a dendrogram, simply groups entities in terms of species composition. Ordination groups similar samples or species or both are grouped close together and dissimilar entities far apart in a low-dimensional space. Relationships between community and environmental data may be investigated using these techniques to provide further insight to the ecology and environmental degradation of an area. Although a very powerful interpretative tool for environmental managers, multivariate analysis should be applied with caution as interpretation is at least partially subjective. It should always be used in conjunction with other methods such as univariate analysis (Telfer and Beveridge 2001).

Whereas the annual geochemical sampling targets near-field effects from organic loading at the culture structures, the benthic survey gives an indication of the overall health of the broader lease area. Should monitoring actions show that the benthic fauna composition in a lease area does not meet the oxic thresholds of Shannon-Wiener ≥3 and Infaunal Trophic Index ≥25, or other similar metrics, then mitigatory actions will be required to return the area to an oxic classification.

5.4 Water column indicators

Extensive shellfish and finfish cultivation has two potentially countervailing effects on chlorophyll concentrations. Nutrient enrichment from both finfish and shellfish farming could promote phytoplankton production and biomass, whereas filter feeding by bivalves will reduce phytoplankton biomass. Thus measures of chlorophyll concentration alone may be ambiguous. An increase in the proportion of small-sized picoplankton in the phytoplankton community, however, is a good indicator of excessive feeding by bivalves. The fluorometer time series of chlorophyll concentration and proportion of picoplankton in size-fractionated discrete samples should be analyzed for obvious trends that could be correlated with the expansion of aquaculture in Saldanha Bay. Although operational thresholds for these indicators are difficult to fully define, they remain highly relevant indicators of habitat and ecosystem status (Cranford et al. 2006).

6. Baseline survey



Point	LATITUDE DEG	MIN	SEC	LONGITUDE DEG	MIN	SEC
A	33°	2'	32.1"	17°	55'	51.3"
B	33°	1'	55.06"	17°	57'	26.52"
C	33°	2'	48.06"	17°	56'	30.24"
D	33°	2'	39.18"	17°	56'	7.56"
E	33°	1'	39.9"	17°	57'	52.2"
F	33°	1'	32.22"	17°	56'	7.62"
G	33°	2'	9.18"	17°	58'	32.22"
H	33°	2'	21.9"	17°	58'	25.92"
I	33°	0'	12.6"	17°	57'	42.6"
J	33°	0'	12.78"	17°	58'	1.8"
K	33°	0'	22.5"	17°	58'	1.68"
L	33°	0'	22.8"	17°	58'	34.9"
M	33°	0'	30.9"	17°	58'	34.38"
N	33°	0'	31.02"	17°	58'	42.12"
O	33°	0'	39.12"	17°	58'	42"
P	33°	0'	38.88"	17°	58'	22.74"
Q	33°	0'	46.98"	17°	58'	22.62"
R	33°	0'	46.92"	17°	58'	13.02"
S	33°	0'	53.4"	17°	58'	12.9"
T	33°	0'	53.34"	17°	57'	37.32"
U	33°	0'	40.2"	17°	57'	37.38"
V	33°	0'	40.26"	17°	57'	42.24"
W	33°	1'	18.6"	18°	1'	2.28"
X	33°	2'	1.86"	18°	1'	40.44"
Y	33°	2'	53.4"	18°	1'	18.84"
Z	33°	2'	57.84"	18°	0'	49.08"
AA	33°	2'	39.72"	18°	0'	13.02"
AB	33°	2'	17.22"	18°	0'	4.32"
AC	33°	1'	53.52"	18°	0'	44.94"
AD	33°	4'	23.58"	17°	56'	57.66"
AE	33°	4'	8.7"	17°	57'	51.66"
AF	33°	4'	42.36"	17°	57'	51.66"
AG	33°	4'	34.26"	17°	56'	57.66"

Figure 1: Map of sampling station for the Saldanaha Bay Aquaculture Development Zones. Stations are for illustrative purposes only and lease area positions will be finalized prior to sampling. Lagoon stations are part of the ongoing State of the Bay monitoring programme. Detailed map to be added as an addendum and updated when required.

6.1 Seabed

Although the three-dimensional model simulations for finfish farming in the new areas in BB and OB indicate undetectable accumulation of organic matter at the farm sites (PRDW 2017), these predictions require validation through sampling over the operational phase. An 'ideal' sampling design includes comparison of data from before to after a disturbance that might cause impacts (Underwood & Chapman 2013). A benthic survey should be conducted prior to expansion of aquaculture in OB and BB as a 'before' reference of the area for comparison with the operational or post-operational ('after') phases. Baseline data, if sufficiently detailed and relevant, may be used in place of, or in combination with, reference station data in evaluating results from operational monitoring (State of Maine 2008). Thus the baseline survey should include replicated, undisturbed control/reference stations that can be used to demonstrate that an impact, if it occurs, is associated with the disturbed area and is not a

general phenomenon within the habitat unrelated to the disturbance (Underwood & Chapman 2013). Undisturbed in this instance means isolated from the disturbance being investigated, in the present case organic loading to the seabed from aquaculture, but still exposed to other influences characteristic of the hydrodynamic regime.

Spacing of sampling stations for the baseline study should be stratified random. It is proposed that the number of sample stations should be based on lease area with stratification, i.e. proportional stratification, with a larger sample size (sample unit number) for finfish areas (one per 20 ha) than shellfish areas (one per 50 ha). In this way finfish and shellfish leases are treated as different strata. Currently farmed areas should also be treated as different strata in that at least one station position is located there. If a pre-identified station position is shown to be hard bottomed, the station position should be relocated to the closest point with soft sediment, providing it is within the near vicinity. If large area of rock is found this should be recorded as such. Although confounding the randomness in station positioning, it is deemed necessary as experience has shown that bottom water is often very turbid in the bay precluding reliable photographic/video records - a common means of recording seabed condition in subtidal, hard substratum environments. The rationale for more intensive sampling of finfish sites is based on the reasonable expectation of a potentially greater impact on the benthos from aquaculture in these areas compared to shellfish growing areas. If portions of the lease areas are deemed unsuitable for farming by industry, then sample numbers may be adjusted accordingly. Exclusion of portions of lease areas is most likely for OB where exposure to excessive swell is a practical reality.

The requirement for full macrofauna analyses (both infauna and epifauna), TOC/N, granularity and porosity (Figure 1):

- 8 stations in BB area designated for shellfish including at least one in the existing oyster farms (35 ha);
- 3 stations in BB finfish area;
- 5 stations in OB-N (based on assumption of only shellfish farming), and
- 5 stations in OB-S.

Three samples taken from the finfish sites shall also be taken for analysis of the metals Al, Cu and Zn.

Control (reference) stations should be identified; three for each of BB, OB-N and OB-S in areas where environmental characteristics, such as depth and sediment structure, are as similar as possible to the respective lease areas. They should be located in the same broad vicinity of the farm sites, though at least 500 m from the lease area to minimize potential

impact from the farm and at least 500 m apart. Control sites within and/or on the boundary of the marine protected areas around Malgas Island, Jutten Island and Langebaan Lagoon should be considered if they meet the above criteria. Samples must be taken for macrofauna, geochemical (TOC/N, metals) and geotechnical (porosity, granularity) analyses, as above.

Protocols for collecting sediment samples for macrofauna analyses should be maintained within already established monitoring programmes to facilitate comparison with established data-sets (Noble-James et al. 2017). To this end protocols should be aligned with The State of the Bay Programme where 3 replicate samples of 0.08 m^2 and 30 cm deep, where possible, are taken by divers at each station and pooled for subsequent taxonomic analysis of macrofauna in the >1 mm size fraction (Clark et al. 2017). The total sample size is more than double than the minimum generally recommended for benthic fauna analysis thereby greatly increasing the likelihood of including rare or sparsely distributed species. Although pooling of replicates for later processing reduces quantification of fine-scale variation, the need to maximize the spatial extent of sampling area in a compliance orientated monitoring programme is prioritized over within station patchiness. This is an acceptable approach (Noble-James et al. 2017) and where resources are adequate should be accompanied by replication at a sub-set of stations (Prezlawski et al. 2018). It is recommended that macrofaunal sampling is replicated at a single station within the three growing areas, BB, OB-N and OB-S. These samples provide information on variability in both small-scale distribution as well as sampling gear performance. While this is not a requirement and depends on practicality, this would equate to three composite samples of approximately 0.2 m^2 at each of the three stations chosen for replication

Sediment geochemical and geotechnical samples should be taken from separate core samples, i.e. they should not be sub-sampled from macrofauna samples. Only the surficial sediment (2 cm) from grabs or diver-collected cores shall be retained for analyses. If multiple samples (replicates) are collected at each station they should be combined and homogenised prior to storing for later analysis (see methods).

This suite of samples is intended to serve as an indication of ecological status at the lease scale prior to major expansion of aquaculture. Significant deterioration at a future date considering both the reference condition and the initial baseline data will initiate a management decision.

In addition to the above, two sentinel stations shall be established on the boundary of the finfish lease areas along the main axis of bottom currents (One sentinel station for Big Bay and one for Outer Bay South). Residual bottom currents flow predominantly in a southerly direction in OB-N, south-easterly in OB-S, and south-westerly in BB (PRDW 2017). Bottom

water oxygen and temperature shall be monitored at sentinel stations and one reference station from each site. Sensors should be moored close to the seabed (<0.5 m off bottom) and programmed for hourly or more frequent readings. Ideally, these stations should be operational prior to development, or as soon thereafter as possible. Significant deterioration in bottom oxygen conditions at either of these sites relative to the reference stations, will initiate further investigation of the extent and magnitude of the effect.

6.2 Water column

As a check on the flow of plankton into Langebaan Lagoon and how it may be affected by aquaculture development (especially shellfish) in the bay, it is proposed that a fluorometer be deployed in the entrance channel. As this is a surveillance approach to monitoring with no specified thresholds, it is important that measures are established prior to major expansion in the bay to assist in interpretation of time series data. These measurements will provide a continuous indicator of phytoplankton abundance (fluorescence) as aquaculture develops within the bay. A long term commitment to ongoing regular monitoring is critical for establishing time series data which are far superior in identifying directional trends than any combination of independent studies (Noble-James et al. 2017).

It is important that the instrument is readily accessible so that frequent *in situ* calibration samples can be taken at its position for conversion of fluorescence units into chlorophyll concentration. The SAN Parks jetty is a possible option. Calibration will involve regular taking of discrete samples for extracted chlorophyll analyses of both the whole sample and a 2 - 5 µm screened sub-sample. In this way the relative contribution of the small size fraction (picoplankton) to the total phytoplankton community can be measured and the potential far-field effects in the lagoon may be assessed. Sampling should occur during the flood tide to target input to the lagoon.

A minimum of two stations should also be sampled as potential control sites to the SAN Parks jetty site mentioned above for size-fractionated chlorophyll. Frequent water samples (a number of times a week) are currently being taken for phytoplankton identification and enumeration at two sites in the existing shellfish growing areas in the entrance to Small Bay and in North Bay as part of the South African Live Molluscan Shellfish Monitoring and Control Programme. It is recommended that this sampling effort is extended to include discrete samples for size-fractionated chlorophyll analysis. Collection of samples at the three sites should be paired as close as possible in time.

7. Operational surveys

Operational monitoring is to be conducted within the respective lease area following initiation of production. Those areas or sub-areas where farming has not yet started will not need to be surveyed.

7.1 Benthic sampling

a) Chemical investigation (redox/sulfides) at the local scale, three stations; in close proximity to culture structures (0 m), at 30 m which defines the AZE, and at 60 m, along a transect in the direction of prevailing near-bottom currents, i.e. most likely to reflect farm impact. To be conducted annually or during the period of maximum biomass for that production cycle or as close as possible to that time. Additional measurements must be taken at the three reference sites for the respective lease area. A minimum of three replicate grab or core samples are retrieved from each sampling point for S^{-2} (and Eh) measurements in the surficial (upper 2 cm) layer of sediment. Each replicate must be analyzed separately, i.e. not composited. Results are tested for significant differences between sample S^{2-} and indicator thresholds and reference station values according to statistical procedures given in the British Columbia, Ministry of Environment, protocols for marine environmental monitoring (BCME 2002).

For finfish stations at 30 m and 60 m determine if there has been a S^{2-} exceedance by a 1-sample t-test:

H_0: $\mu \leq 1500$ µM; H_A: $\mu > 1500$ µM (1-tailed)

For stations at the fish cages (0 m), test the following hypothesis:

H_0: $\mu \leq 3000$ µM; H_A: $\mu > 3000$ µM (1-tailed)

If there is evidence for exceedance at a particular station, do nested 1-way ANOVA to test for farm (F) and reference (R) stations:

H_0: $\mu_F \leq \mu_R$; H_A: $\mu_F > \mu_R$ (1-tailed)

For shellfish, samples are collected under the culture structures and tested as for the finfish 0 m stations:

H_0: $\mu \leq 3000$ µM; H_A: $\mu > 3000$ µM (1-tailed)

In the case of an exceedance perform nested 1-way ANOVA as above.

If a farm station S^{2-} is significantly greater than the reference condition, the exceedance is likely a result of fish farming and management action is required.

b) Sediment characteristics such colour (e.g. pale/grey, brown/black), visible out-gassing, presence of sulfide oxidising bacteria (e.g. *Beggiatoa* spp.) and smell (e.g. none, medium, strong) must be noted on sample data sheets and photographed. Qualitative assessments are widely employed internationally as a simple, cost-effective means of assessing sediment condition (Keeley et al. 2014). This information should be considered in conjunction with the above statistical analyses in a 'weight-of-evidence' approach to illustrate the status and extent of farm impact. Such assessments could be performed on a regular voluntarily basis by the farmer to complement the annual compliance monitoring.

c) Full macrofaunal analyses shall be conducted at re-randomized sediment station positions with the lease areas every 3 - 5 years. Re-randomization reduced the risk of temporal autocorrelation and is recommended over fixed station positions where the monitoring objective is to assess the overall condition of a habitat (Noble-James et al. 2017). Control positions shall remain fixed providing they comply with the requirements for a control site. Sediment grain size, TOC/N, and porosity analyses shall be performed in parallel with benthic macrofauna sampling. It is more common in environmental monitoring of aquaculture facilities for sampling to be conducted around the period of maximum production. However, it is recommended that it should be aligned with the State of Bay sampling programme to facilitate comparison between the data-sets.

The sampling plan proposed for benthic macrofauna in which data are collected at both farm site stations and reference stations, in both baseline and operational periods is referred to as a beyond BACI (Before After Control Impact) design (Underwood 1992). The rationale for this approach is that organisms may show any pattern of difference between locations (both farm and control sites) before a putative impact (aquaculture). Differences among locations are to be expected but there is no reason to presume that these differences remain constant through time. Thus there will be statistical interactions between locations (farm and reference) and time of sampling (before and after). An environmental impact is indicated when there is more temporal change in the farm site exposed to a perturbation than is usually the case in similar populations in similar locations where no such disturbance occurs (Underwood 1992). An impact must appear as an interaction between the differences among locations prior to the impact and those differences existing after it begins.

Firstly, determine whether the mean value of the Shannon-Wiener or Infaunal Trophic Indices for a growing area, i.e. BB, OB-N or OB-S, is significantly less than the threshold values by a 1-sample t test:

H_0: $\mu \geq 3$; H_A: $\mu < 3$ Shannon-Wiener Index (1-tailed)

H_0: $\mu \geq 25$; H_A: $\mu < 25$ Infaunal Trophic Index (1-tailed)

If there is evidence for exceedance undertake asymmetric ANOVA to test the following hypotheses:

H_0: there is no interaction between farm/reference site and baseline/operational; H_A: there is an interaction (2-tailed).

If a significant interaction is indicated, there is evidence that the exceedance is due to farming activities and management intervention will be required. Alternate metrics may also be used in conjunction with the above indices. Multivariate analyses should also be undertaken to maximize information from the taxonomic data particularly with regard to identifying relationships between different growing areas. However, the Shannon-Wiener index and Infaunal Trophic Index provide the primary means of assessing compliance.

d) Similar asymmetric ANOVA can be performed on TOC/N and geotechnical descriptors (porosity, granularity) to ascertain whether there has been an impact in the growing area. These analyses are provided as supporting information for the above benthic faunal analysis and are not used to initiate management interventions.

e) Samples for metal analyses (Al, Cu and Zn) should be taken at the same time (3 - 5 years) as the faunal survey at the finfish sites but under cage arrays. Given the dispersive nature of the bottom sediments in the finfish growing areas it is regarded as highly unlikely an exceedance will occur. Should the type of anti-foulants change, this must be updated and considered accordingly. Sampling should be limited to directly under the fish cage structure (the zone of most likely impact) initially and extended should thresholds not be met. Results from replicate cores from each cage group should be tested using a 1-sample t test:

H_0: $\mu \leq 270$ mg/kg; H_A: $\mu > 270$ mg/kg Copper (1-tailed)

H_0: $\mu \leq 410$ mg/kg; H_A: $\mu > 410$ mg/kg Zinc (1-tailed)

Should either metal be shown to exceed the threshold, additional sample will be required incorporating the AZE and reference stations. Three samples should be taken 30 m from cage structures in the direction of residual bottom currents and one at each of the reference stations. Replicate sample stations at the AZE boundary (30 m) should be spaced such that they can be regarded as independent. The AZE boundary samples should be tested for conformance with the beyond AZE thresholds using a 1-sample t test:

H_0: $\mu \leq 34$ mg/kg; H_A: $\mu > 34$ mg/kg Copper (1-tailed)

H_0: $\mu \leq 150$ mg/kg; H_A: $\mu > 150$ mg/kg Zinc (1-tailed)

Should either metal exceed threshold values perform asymmetrical ANOVA to test the following hypotheses:

H_0: there is no interaction between farm/reference site and baseline/operational; H_A: there is an interaction (2-tailed).

If a significant interaction is indicated, there is evidence that the exceedance is due to farming activities and management intervention will be required.

f) Frequent servicing/calibration of bottom water oxygen sensors must be undertaken, dependent on the rate of fouling and functioning of sensors (e.g. monthly). Both the correlation between oxygen and temperature and the calculated Apparent Oxygen Utilization (which is largely dependent on temperature) should be assessed as indicators of increased oxygen demand by sediments and the near-bottom water column. The time series should be analyzed using the Mann Kendall non-parametric statistical test (or similar) to identify whether there is a significant monotonic trend in the data (Pohlert 2018). The Mann Kendall test is used in place of linear regression analysis as it does not require the assumption of a normal distribution of residuals. Change-point detection (Taylor 2000, Killick & Eckley 2014) can then be employed to identify when the change(s) occurred and the statistical confidence thereof. Evidence in the time series for a developing departure in the sentinel site oxygen and temperature relationship relative to the reference site should trigger additional sampling to verify and determine the extent of sediment deterioration. This could take the form of an initial CTD survey of bottom oxygen/temperature. A chemical investigation of S^{2-} may be required to establish the oxic status of the impacted sediments. Management action will be based on this follow-up investigation.

7.2 Water column

a) Frequent (monthly) servicing of the fluorometer is required to maintain proper functioning and calibration. More frequent (e.g. weekly) sampling is required of size-fractionated chlorophyll at both the entrance to the lagoon and reference control sites. Fixed point sampling (Eulerian) as proposed here integrates temporal and spatial variability that typifies the dynamic water movements associated with tidal cycles and currents. The proposed sampling scheme combines high frequency sampling over short time periods relative to phytoplankton generation times, with longer term low frequency sampling, both of which are required to identify putative farm impacts from natural cycles. (see Martin-Platero et al. 2018). The data should be subject to trend and change-point analyses as above. Should the time

series record of chlorophyll indicate departures from the apparent natural cycles inherent in the embayment, additional sampling may be required. More importantly, if the proportion of picoplankton entering the lagoon is shown to have increased relative to reference sites and in concert with the expansion of shellfish farming (change-point detection), rapid synoptic surveys must be undertaken to identify the source and magnitude of the depletion in large celled phytoplankton. Management action may be required based on the findings of these surveys.

b) Annual, non-quantitative samples should be taken of fouling organisms on farm infrastructures, preferably in conjunction with the State of the Bay Programme (Clark et al. 2017).

8. Small Bay

Small Bay comprises an area that have been under cultivation for an extended period and which is subjected to many sources of pollution, including aquaculture (see State of the Bay reports e.g. Clark et al. 2017). Despite obvious indications of habitat degradation in the bay, it is often regarded as a 'sacrificial zone' and perhaps even beyond remediation. However, Small Bay is an important nursery ground for finfish, particularly white stumpnose, (Clark et al. 2017) and a popular recreational hub. The bay provides many other crucial ecological services such as assimilative capacity for organic anthropogenic wastes such as fish processing and sewage effluent, as well as a repository for heavy metals and other contaminants in anaerobic sediments. Shellfish aquaculture in the bay has been shown to impact on the ecology of the benthos (Stenton-Dozey et al. 1999, 2001) and the water column (Heasman et al. 1998). Impacts, however, were regarded as very localized and of small concern for the broader bay system. The relatively recent expansion of aquaculture, and scope for further expansion, in the bay does raise new concerns regarding its sustainability, particularly with regard to assimilative capacity for aquaculture biodeposits.

As an initiation of a monitoring effort in Small Bay it is proposed that a sentinel station is established on the eastern lease boundary of the major longline culture portion in the bay. This position is based on the predominant clockwise circulation within the bay. As with sentinel stations in BB and OB, bottom oxygen and temperature sensors should be moored close to the seabed, and paired with a reference station at North Buoy. North Buoy is currently a monitoring station in the State of the Bay Programme and is outside the putative influence of the shellfish cultivation structures (Stenton-Dozey et al. 2001). Evidence for significant departure from the oxygen temperature relationship indicating oxygen depletion relative to the sentinel site should trigger more extensive sampling. Initially this could be

limited to a CTD survey of bottom water oxygen levels over the lease areas. Time series analyses as with the other sentinel stations can be performed to monitor any further deterioration associated with the lease areas.

Irrespective of the sentinel station records, a chemical survey of S^{2-} should be undertaken in the near future to establish the oxic status of the lease areas in Small Bay. The survey should include North Buoy and two other stations as reference conditions. Statistical tests for compliance with S^{2-} thresholds should be performed as outlined earlier and followed up with management interventions should the situation warrant. It is recommended that this survey is preceded by a CTD bottom oxygen survey to map the extent of oxygen depletion associated with the culture area.

9. Sampling procedures

9.1 Macrofauna

Three replicate samples from box-cores, grabs (e.g. Van Veen) or diver-operated suction samples (recommended) are to be taken at each sample site. Sample units should collect at least 0.07 m^2 sediment (diameter 30 cm) and, where possible, to a depth of 30 cm, giving a total surface area of > 0.2 m^2 per site. This is double the minimum recommended area for benthic macrofauna collection by Preslawski et al. (2018). The post-collection procedures given below are based predominantly on Rumohr (1999) and Prezlawski et al. 2018).

a) Gently wash samples with seawater through a 1 mm sieve, avoiding directing flow onto sieve to preserve integrity of fragile organisms. The sieve can be placed in a container into which wash water flows and gently agitated to release light-bodied animals. Continue until all sediment that can pass the sieve is washed through.

b) For grab or box core samples it may be necessary to transfer the sample to the sieve portion by portion as a sediment-water slurry.

c) If re-sieving of samples is carried out a mesh finer than the initial 1 mm must be used.

d) Fragile animals such as some polychaetes, should be picked out by hand during the sieving, to minimize damage. Also stones and large shells should be picked out to avoid a grinding effect during sieving.

e) Once washing is completed remove large-bodied animals that do not float during washing to a sample container.

f) Specimens retained on the sieve are washed off from the underside with a seawater squirt bottle into a funnel and sample container. Minimal amounts of water should be used in this step to ensure adequate preservative concentration.

g) Fix samples with 4 % buffered formaldehyde (1 part 40 % formaldehyde plus 9 parts filtered seawater) in tightly sealed containers. Sodium tetraborate at a final concentration of 2 % may be used as a buffering agent. Label both the outside and inside of the container with sample details on durable labels.

h) Staining with e.g. Rose Bengal may be used to facilitate sorting and increase sorting accuracy. The stain can be added to the formaldehyde solution used for fixing.

i) As formalin is toxic and probably carcinogenic it should be handled with great care. Adequate ventilation should be applied for all procedures and thorough rinsing with tap water prior to sorting is mandatory.

j) After sorting into broad taxonomic groups, specimens are identified to the lowest possible taxonomic resolution and enumerated. Classification must be undertaken by a qualified professional.

k) After an adequate fixing period samples can be preserved in 70 - 80 % alcohol or saturated propylene phenoxetol for long term storage.

l) It is advisable to store some specimens of each taxon for later taxonomic validation if required.

9.2 Sulfides and redox potential

Sediment samples for chemical measures of oxic status must be taken at three compliance stations: 0 m, 30 m and 60 m along the main axis of residual bottom current flow for finfish areas. For shellfish, samples are limited to directly below the culture structures. Samples must also be taken at three reference stations that were previously established for the particular growing area.

Sample collection and measurement of S^{2-} and Eh is based predominantly on Wildish et al (2004) and Fisheries and Oceans Canada (2015b, 2015b). Samples must be collected by either grab or core with a sampling area of at least 200 cm^2. The device must prevent leakage of water or sediment during retrieval. If a grab is used the sample is suitable for analysis if overlying water is clear indicating minimal disturbance of the sediment. The sample device should have penetrated at least 5 cm. If after 3 attempts no sediment is retrieved in grabs then it is likely the bottom substratum is hard and the sample station should be re-positioned

by no more than 3 m, maintaining the required distance from the cages. When a sediment sample cannot be taken that position shall be recorded as hard bottom and not suitable for future sampling. Three replicate grabs or cores must be taken from each sample position and each should be treated separately as outlined below.

a) Perform S^{2-} and Eh (if required) analyses within 5 min after sample retrieval. If it is not possible to make these measurements at sea, the samples may be stored on ice and then refrigerated for up to 72 h prior to analysis (see Wildish et al. 2004). Samples can be held in syringes until later analysis providing they are capped and chilled.

b) Sub-samples are taken of the top 2 cm of the sediment surface by means of a cut-off syringe or spatula and transferred to a suitable glass or plastic container and gently homogenized after removing unrepresentative material (e.g. shells, large worms, stones). A minimum of 25 ml of sediment is required for each Eh and S^{2-} analyses.

c) For S^{2-} measurements, place 10 ml of freshly prepared EDTA/NaOH/ascorbic acid buffer in a graduated container and add homogenized sediment up to 20 ml graduation mark (add buffer first).

   i. Briefly stir mixture and insert electrode below surface of the slurry.

   ii. Gently move electrode until reading stabilizes, typically 1 - 4 mins. If electrode does not stabilize within a reasonable time re-calibration may be necessary.

   iii. Rinse electrode with distilled water to remove any sediment and gently wipe to remove any oily residue prior to further use

d) After the 10 ml sub-sample has been removed for S^{2-} measurement, place the redox electrode in the remaining sediment.

   I. The electrode should be held stationary in one position.

   II. Record the Eh value and sample temperature once drift has achieved a relatively stable reading (< 10 mV/min), usually within 3 min. Temperature is required for calculation of a correction factor.

   III. Rinse electrode with distilled water to remove any sediment and gently wipe to remove any oily residue prior to further use.

Details regarding calibration and electrodes used in the measurement of Eh and S^{2-} are provided in Wildish et al. (2004), Fisheries and Oceans Canada (2015a) and PNS (2018b).

9.3 Geotechnical and other geochemical indicators

Collection of sediment for determination of metals (Cu, Zn and Al), TOC/N, porosity and grain size are as described for S^{2-} and Eh. Separate sub-samples of surficial sediment (upper 2 cm) from three replicate cores shall be thoroughly homogenized prior to splitting into separate containers for the different analyses. Caution should be taken to prevent contamination by metallic surfaces. Samples must be kept chilled in the field and stored frozen. The amount of sediment required should be as advised by the analytical laboratories for the respective analyses. Depending on the laboratory, some analyses may be carried out on the same sample, e.g. porosity (water content) and TOC/N. To align with methods currently employed in the State of the Bay Programme, metals should be determined by ICP optical spectrometry after strong acid extraction and microwave digestion (total fraction), TOC/N by elemental analysis (not weight loss on ignition), and sediment particle size distribution by dry sieving (Barry Clark, Anchor Environmental, personal communication). Porosity is calculated from weight loss of wet sediment on drying at 60°C.

9.4 Rapid synoptic surveys

To be undertaken to determine the spatial extent and magnitude of phytoplankton depletion by bivalve cultivation. Depletion of phytoplankton becomes a concern when the scale of cultivation is large enough to remove particles faster than physical re-supply, e.g. through tidal currents, and phytoplankton production (Cranford et al. 2006). This effect has implications for both the production carrying capacity for the cultivated stock and the ecological carrying capacity of other components of the ecosystem (Cranford et al. 2008). A critical additional component of the study is to quantify the biofilter effect of the bivalves on the size structure of the phytoplankton.

The survey involves the rapid, high resolution mapping of chlorophyll with a CTD equipped with a fluorometer. Ideally the CTD is attached to a geo-referencing, undulating vehicle towed behind a boat but can be deployed as individual casts manually from a boat, however, with loss of spatial resolution. The aim is to collect 3-D data rapidly, within 1 - 2 h, before tidal flushing causes distributional changes (Cranford et al. 2008). Phytoplankton size structure is measured in discrete water samples taken during the survey:

a) Water samples (1 - 2 litre) are collected from 2 - 3 m depth and stored chilled, in the dark for processing on return to shore.

b) As soon as possible on return to shore 0.5 - 1 litre sub-samples are filtered through a 5 µm screen and a 2 µm Nucleopore (or similar) membrane filter.

c) Screened and unfractionated (100 - 200 ml) sub-samples are then filtered onto Whatman GF/F filters and the filters stored at - 20 °C for later chlorophyll determination by *in vivo* fluorescence or other acceptable method.

10. Management actions

A breach of the required S^{2-} benthic impact indicators for finfish will require additional sampling to verify and provide greater spatial detail of the magnitude of non-compliance. Sampling should be intensified around the cage/group to accurately map the distribution of non-conformance with the oxic thresholds within the AZE. Based on these findings management actions may include:

a) Extension of the AZE by the AMC. The Scottish EPA allows larger AZE's in dispersive, as opposed to accumulative, environments where supporting information warrants.

b) Reduction in the scale of farming at the site to align with local assimilative capacity. This will involve adjusting on-site stocking levels.

c) Reduction in feed wastage according to a benthic amelioration plan submitted by the operator. Preferable option as it has direct commercial implications for the operator. The plan should include:

    i) update of staff training on feeding methods,

    ii) installation of submerged video or other device to track feed pellets in real-time to minimize overfeeding (feedback-control).

d) Movement of structures within the lease area to allow recovery on the benthos. Alternatively, investigate whether a re-orientation of cage set-up could take better advantage of dispersive currents. Fallowed sites should be monitored annually to track recovery.

The operator shall be obliged to provide audited (e.g. by certified accountant) information in relation to production and feed input for the implicated entity as deemed necessary by the AMC. If follow-up annual sampling indicates no improvement, further limitation of production levels shall be imposed with attendant reduction in feed. If seabed conditions do not improve in response to production/feed reductions, relocation of the cage structures will be required.

Non-conformance with the shellfish benthic S^{2-} indicator shall require more intensive sampling of an area to verify results and map the zone of negative influence. Based on these

findings management actions are limited to:

e) Re-alignment of the culture structures to promote improved dispersion by currents where possible.

f) Reduction in production levels by limiting the number of dropper lines for settlement of mussels or deployment of oyster baskets.

Should these actions prove ineffective at the following annual monitoring campaign, a further decrease in production will be imposed. Additional management actions could require clearing of a site.

Management actions in response to a failure to meet the benthic faunal thresholds are as above but more drastic in that they apply to the whole site, not just ill-performing sub-sets thereof. In the event that the sediment macrofauna oxic thresholds are not achieved, reductions in production feed use/wastage shall be applied as outlined earlier to the whole site. Follow-up benthic fauna surveys shall be carried out on an annual basis until monitoring indicates the benthos has recovered to an oxic status. Continued non-compliance is indicative that the site is unsuitable for aquaculture and it should be de-stocked.

In the event that chlorophyll monitoring and findings of the rapid synoptic survey clearly implicate a bivalve growing area(s) in the depletion and/or alteration of the structure of the phytoplankton community that feeds into Langebaan Lagoon, management action will be required. Bivalve feeding should produce a continuous, press response in the indicators that are clearly distinguishable over the long-term from natural variations. As a first management action, limits on bivalve production should be imposed at certain sites and the level of recovery monitored over time as for the operational phase. As there are no clearly defined thresholds for the phytoplankton indicators (chlorophyll, proportion of picoplankton) it will require a management decision on what level of impact can be regarded as acceptable. Given the sensitivity and ecological importance of the lagoon it would be prudent to apply strict limits such as no significantly detectable change.

Upon establishing that the threshold levels for Cu and/or Zn have been exceeded in potentially bioavailable forms, various management actions shall be imposed that may require (Keeley et al. 2014):

a) Extension of AZE from fixed distance to site specific, e.g. in dispersive environments (SEPA 2000).

b) Reduction of inputs to the system proposed by the operator. Explore alternatives to Cu

and Zn based antifoulants and lower levels of nutritional therapeutants such as Zn in feed (Clement et al. 2010).

c) Investigation into the bioavailability of the metal by different extraction protocols, e.g. weak acid extractable fraction as a proxy for bioavailability.

d) Scientific investigation into toxicity of the contamination (see Macleod and Eriksen 2009) and potential adjustment of generic threshold limits with site-specific criteria based on these findings.

Further management imposed reductions in inputs shall be enforced until compliance with thresholds is achieved. Fallowing is a controversial strategy for dealing with metal contaminated sediments as generally much longer time periods are required for metal rehabilitation than for organic enrichment. In addition, there is the potential for metal bioavailability to increase with sediment recovery which in turn might hinder further biological remediation (Clement et al. 2010).

11. Food safety

Farms cultivating molluscan shellfish and finfish are required to comply with the South African Live Molluscan Shellfish Monitoring and Control Programme (SAMSM&CP) and the South African Aquacultured Marine Fish Monitoring and Control Programme (SAAMFM&CP) respectively as per the permit conditions contained in the Permit to Engage in Marine Aquaculture. The SAMSM&CP requires that molluscan shellfish farms are classified before marketing their product, a process that could take at least 3 months for a preliminary classification. The SAMSM&CP also requires the testing of Paralytic Shellfish Poisons (PSP), Amnesic Shellfish Poisons (ASP), and Diarrhetic shellfish poisoning (DSP) and phytoplankton as well as *E. coli*, *Salmonella* spp., *Vibrio parahaemolyticus* and *V. cholera*. The SAMSM&CP and SAAMFM&CP require that farms furthermore comply with the National Residue Control Programme, which includes the need to test for banned and controlled substances, heavy metals, pesticides and polychlorinated biphenyls (PCBs). Farms exporting product are furthermore required to comply with importing country requirements which could include arsenic, inorganic arsenic, dioxins, dioxin-like PCBs and non-dioxin like PCBs. The samples are taken by independent samplers namely the National Regulator for Compulsory Specifications (NRCS) and submitted to the relevant laboratories. Should the concentrations of the contaminants exceed the regulatory limits, the implicated farms are temporarily closed and potentially contaminated products are recalled. The farms remain closed until the regulatory limits are complied with and the reopening protocols are adhered to. . The

SAMSM&CP and SAAMFM&CP documents are available whereas the National Residue Control Programmes are kept confidential as it deals with banned and controlled drug residues which are easily manipulated prior to sampling.

12. Biosecurity and Aquatic Animal Health Monitoring

The fundamental measures that underpin aquatic animal disease prevention are the application of biosecurity. This paragraph describes the biosecurity principles necessary to mitigate the risks (probability and consequence) associated with the introduction of pathogenic agents into, the spread within or the release from aquaculture facilities in the bay. Biosecurity is a set of physical and management measures which, when used together, cumulatively reduce the risk of infection in aquatic animal populations at an aquaculture facility. Most of the aquaculture activities in the bay can be described as "semi-open systems". In a semi-open aquaculture production system, it is not possible to have control of water entering or exiting the system or of environmental conditions. Some aquatic animals and potential disease vectors may also enter and exit the system. Pathogenic agents can move into, spread within and be released from an aquaculture facility via various transmission pathways. The identification of all potential transmission pathways is essential for the development of an effective biosecurity plan. Since effective isolation of a semi-open system is not possible, the entire bay is regarded as a single epidemiological management unit which will require the coordination of biosecurity measures implemented between different aquaculture operations.

The basic requirements for and effective biosecurity plan are as follows:
Import Control:

1. Only introducing aquatic animals (Seed, juveniles, stock for on-growing) into the aquaculture facility with a known health status, which is of equal or higher status than the animals in the bay (This requires knowing the health or disease status of the aquatic animals in the bay).
2. Ensuring biosecure transport of aquatic animals from the source to the bay to avoid exposure to pathogenic agents.

Early detection and monitoring:

1. Health monitoring of the aquatic animals at the aquaculture facility will include activities like disease surveillance, routine monitoring of stock for important health and production parameters, recording clinical signs of disease, morbidity and mortality rates and their causes.

2. Removing sick or dead aquatic animals from production units as soon as possible and disposing of them in a biosecure manner.

Emergency procedures:

1. Procedure should be developed and implemented to minimize the impact of emergencies, disease events, or unexplained mortality in aquatic animals. These procedures should include clearly defined thresholds that help to identify an emergency incident and activate response protocols, including reporting requirements.

The "Health management procedures for South African bivalves (oysters and mussels) produced for export" document outlines the relevant procedures necessary to support biosecurity and health monitoring in the Bay. Similar procedures will need to be developed in conjunction with the department (DAFF) for finfish.

Please also refer to ADZ EMPr for full list of mitigation measures specific to disease management.

13. Genetics

Proposed species for the Saldanha Bay ADZ include the currently cultivated species (*Crassostrea gigas, Mytilus galloprovinalis* and *Chromomytilus meridionalis*); new indigenous shellfish (*Haliotis midae* and *Pecten sulcicostatus*) and finfish species (*Rhabdosargus globiceps, Argyrosomus inodorus* and *Seriola lalandii*); the seaweed *Gracilaria gracilis*; and a number of alien finfish species (*Salmo salar, Oncorhynchus kisutch, O. tshawytscha* and *O. mykiss*).

There are no perceived genetic risks associated with the farming of the proposed alien finfish species. Conversely, farms cultivating indigenous shellfish, finfish and seaweed species should minimize potential genetic impacts on wild populations as much as possible by adhering to the DAFF genetic management guidelines. 'Genetic Best Management Practice Guidelines' already exist for important commercial shellfish species, such as *H. midae*, and for some of the emerging finfish species, including *A. inodorus*, and these guidelines should be strictly adhered to. For all farms cultivating indigenous finfish and shellfish species in the open production systems proposed for the Saldanha ADZ (e.g. rafts, cages and barrels), it is strongly recommended that broodstock or parent fish are sourced from the area in which the grow-out will take place or from the same genetic zone. In order to retain a healthy genetic

profile it is recommended that an effective broodstock population size of between 30 and 200 individuals are kept in the hatchery and a rotational breeding program should be implemented. If appropriate broodstock management procedures are used, gene frequencies can be maintained approximating those in the wild stocks.

For additional mitigation measures, please refer to the ADZ EMPr which will be reflected in the site specific EMPr's for individual projects.

Further genetic research between any future farmed indigenous species and wild caught species will be explored when this becomes relevant.

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ANNEXURE E

Pricing Guideline for ADZ ECO.

E

Algoa Bay Aquaculture Development Zone MLRF bid Payment guideline, please note that this is a guideline and can be adapted by the bidder.

	Costing item	Budget
1.	Project inception (meeting and report)	
2.	Liaison with stakeholders including the Competent Authority	
3.	Overseeing the implementation of the environmental monitoring	
4.	ECO monitoring and validation of production	
5.	Incident monitoring and reporting	
6.	Maintenance of public stakeholder communications (documents register and communications register)	
7.	Issuing compliance directives	
8.	Conflict resolutions	
9.	Draft, review and update the Emergency Response Protocol	
10.	Monthly site inspections	
11.	Drafting monthly ECO ADZ report, site inspection report and ADZ ECO summary report	
12.	Securitate functions of the AMC (every two months) two physical and four virtual	
13.	Secretariate functions of the CF (every three months) one physical and three virtual - including chairing the CF, venue hire and tea and coffee.	
14.	Daily maintenance of the ADZECO email account, EDMS folders and maintenance of compliance databases	
15.	Ad hoc stakeholder meetings (24) in Algoa Bay	
16.	Appointment of the independent external auditor (three audits)	
17.	Review and update of the EMPr	
18.	Stakeholder consultations for the EMPr if required	
19.	Appointment of specialist service provider to compile the Sampling Plan and amend as and when required (present at the AMC and CF meetings)	
20.	Drafting of reporting templates (amend the existing templates)	
21.	Drafting of the AMC Annual report	
22.	Bi-monthly progress meetings in Cape Town – virtual meetings at discretion of MLRF	
23.	Monthly progress reporting	
24.	Hand over meeting and document sharing with new ECO	

ANNEXURE F

CV Form Template.

A. PERSONAL PARTICULARS

PERSONAL INFORMATION																			
SURNAME																			
FIRST NAMES																			
IDENTITY NUMBER																			
DATE OF BIRTH											AGE								
TITLE																			
ARE YOU A SOUTH AFRICAN CITIZEN?	YES										NO								
POSTAL ADDRESS											WORK ADDRESS								
				POSTAL CODE															
CODE							TELEPHONE (HOME)												
CODE							TELEPHONE (WORK)												
CODE							TELEPHONE (FAX)												
CELLPHONE											EMAIL								
AFRICAN	M	F	WHITE	M	F	COLOURED	M	F	INDIAN	M	F								
MARITAL STATUS	MARRIED					SINGLE			DIVORCED										

QUALIFICATIONS				
HIGHEST GRADE PASSED IN SCHOOL (PLEASE MARK WITH AN X):				
BELOW GRADE 10	GRADE 10	GRADE 12		
SPECIFY NAME OF SCHOOL				
POST SCHOOL QUALIFICATION (IF APPLICABLE, SPECIFY THE FOLLOWING):				
INSTITUTION				
DEGREE OR DIPLOMA				
MAIN SUBJECTS				
DRIVER'S LICENSE				
DO YOU HAVE A DRIVER'S LICENCE?	YES	NO	Code (as it is appearing on the license card)	
DATE THAT THE DRIVER'S LICENCE WAS ISSUED	DAY and MONTH:	YEAR:		
EXPIRY DATE	DAY and MONTH:	YEAR:		
PLACE WHERE LICENCE WAS ISSUED				
LANGUAGE PROFICIENCY				
LANGUAGE PROFICIENCY — specify level: - good / fair / poor				
LANGUAES (1)	(2)	(3)		
SPEAK				
WRITE				
READ				

ARE YOU PHYSICALLY DISABLED? (SPECIFY)	YES	NO

HEALTH					
ARE YOU IN GOOD HEALTH?					
PHYSICALLY	YES	NO	MENTALLY	YES	NO
IF YOUR ANSWER TO ANY OF THE ABOVE IS NO, SPECIFY					
ANY OTHER COMMENT(S) CONCERNING YOUR HEALTH					

PREVIOUS TERMINATION OF SERVICE (DISCHARGE)				
HAS YOUR SERVICE PREVIOUSLY BEEN TERMINATED?	YES	NO		
IF YES, SPECIFY THE FOLLOWING REASON (SELECT ONE WITH AN X):				
RETRENCHMENT	MISCONDUCT	MEDICAL UNFITNESS	SEVERANCE PACKAGE	VOLUNTARY RESIGNATION
DATE OF TERMINATION:				
IN THE INSTANCE OF VOLUNTARILY RESIGNATION, WAS THERE A DISCIPLINARY CASE PENDING?				
YES	NO			
(IF YES ABOVE, **PROVIDE DETAILS IN A SEPARATE SHEET**)				
EMPLOYER:				

CONFLICT OF INTEREST		
ARE YOU INVOLVED IN ANY OUTSIDE BUSINESS OR ACTIVITIES, OR DO YOU HAVE ANY INTERESTS WHICH MAY CONFLICT OR ARE LIKELY TO CONFLICT WITH THE EXECUTION OF ANY OFFICIAL DUTIES, SHOULD YOU BE THE SUCCESSFUL CANDIDATE FOR THIS POST?		
YES	NO	
HAVE YOU EVER BEEN DECLARED INSOLVENT?	YES	NO

B. SKILLS AND COMPETENCIES

NO	SKILLS AND COMPETENCIES

C. EDUCATIONS

YEAR (DD/MM/YYY)	INSTITUTION	QUALIFICATION

D. PREVIOUS WORK EXPERIENCE (From inception to date)

START DATE (DD/MM/YYY)	END DATE (DD/MM/YYY)	COMPANY (INSTITUTION)	DUTIES

E. PARTICULARS OF WORK REFERENCES LISTED IN SECTION D

NAME:	NAME:
ADDRESS OF COMPANY:	
POSTAL CODE	POSTAL CODE
E-MAIL	E-MAIL
Tel. WORK	Tel. WORK
FAX	FAX
CELLPHONE	CELLPHONE

NAME:	NAME:
ADDRESS OF COMPANY:	
POSTAL CODE	POSTAL CODE
E-MAIL	E-MAIL
Tel. WORK	Tel. WORK
FAX	FAX
CELLPHONE	CELLPHONE

ANNEXURE G

List of key team members.

List of Key Team Members

Name and Surname	Title	Position within the bidder	Years working for the bidder	Years of relevant experience	Role in the project

List of Other Team Members

Name and Surname	Title	Position within the bidder	Years working for the bidder	Years of relevant experience	Role in the project