



**PROPOSED DEVELOPMENT OF THE MODULAR TILAPIA  
PRODUCTION UNIT (FEZILE DABI FISH FRAMING  
PROJECT – FREE STATE PROVINCE)**

**Draft Basic Assessment Report**

November 2017

**Prepared for:**  
Fezile Dabi District Municipality

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Today's Impact | Tomorrow's Legacy



**destea**

department of  
economic, small business development,  
tourism and environmental affairs  
FREE STATE PROVINCE

(For official use only)

**File Reference Number:**

**Application Number:**

**Date Received:**

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Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

**Kindly note that:**

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of “not applicable” in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.

15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

# 1 EXECUTIVE SUMMARY

## Introduction and Background

The Fezile Dabi District Municipality (herein after referred to as applicant) appointed Enviroworks, an Independent Environmental Assessment Practitioner (EAP), to undertake the required Basic Assessment Process for the proposed Modular Tilapia Production Unit – Fish Farming Project in the Free State Province. The proposed site is situated in Jim Fouche on the banks of the Vaal Dam between Villiers and Deneyville on the North Eastern boundary of the Free State Province on route R176, approximately 16 km from Oranjeville. The site falls across 3 farm portions namely Driefontein 387, Parkerton 1386 and Tweefontein A 117.

The proposed project is a listed activity in terms of Sections 24(2) and 24(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (as amended). The Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in terms of Chapter 5 of the NEMA provide for the control of certain activities that are listed in Government Notice Regulations No. (GN) No. 325, 327 and R324. Activities listed in these notices must comply with the regulatory requirements listed in GN No. R326, which prohibits such activities until written authorisation is obtained from the competent authority. Such environmental authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA regulations, 2014. GN No. 326 sets out the procedure and documentation that need to be compiled with undertaking a Basic Assessment Report.

## Project Description

The applicant proposes the construction of a modular Tilapia Production Unit, Fezile Dabi, Free State Province.

The newly proposed development will include the following:

- Grow-Out Facility (1205m<sup>2</sup>)
- Hatchery & Brood Stock Facility (1881m<sup>2</sup>)
- Laboratory Facility (107m<sup>2</sup>)
- Fish Processing Facility (795m<sup>2</sup>)
- Staff Changing Rooms (655m<sup>2</sup>)
- Feed Production & Processing Facility (1442m<sup>2</sup>)
- Workshop Building (184m<sup>2</sup>)
- Gate House (10m<sup>2</sup>)
- Administration Block (722m<sup>2</sup>)
- Agri-Processing vegetable & Pack house (852m<sup>2</sup>)
  - Residential Zone\*\*
  - Trading Centre\*\*
  - Integrated crop production\*\*

\*\*The footprints for the proposed area's steel need to be finalized, the developer will not be allowed to have a development footprint over 200000m<sup>2</sup>, as this will require the application of an EIA and the process will need to be initiated, should the development area be more than 200000m<sup>2</sup>

**To summarise for Impact Assessment purposes:**

- Modular Fish Units will be installed and accompanied by support units.
- The total site / property size is 389000m<sup>2</sup> of which approximately 150000m<sup>2</sup> will be transformed.

**Legislative Context**

The proposed project constitutes the following listed activities in terms of the NEMA:

Government Notice 327 of 2014: Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

**Activity 6 (i):** The development and related operation of facilities, infrastructure or structures for aquaculture of—

- (i) finfish, crustaceans, reptiles or amphibians, where such facility, infrastructure or structures will have a production output exceeding 20 000 kg per annum (wet weight);

**Activity 9:** The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—

- (i) with an internal diameter of 0,36 metres or more; or
- (ii) with a peak throughput of 120 litres per second or more;

**Activity 27:** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—

- (i) the undertaking of a linear activity; or
- (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

**Report Structure**

This report is set out as followed:

- **Section A: Activity Description** provides an overview of the development proposal and listed activities which are triggered in terms of listing notices GN 326 and 327; of the EIA Regulations, 04 December 2014.
- **Section B: Description of Receiving Environment** provides detail on the affected landscape in its present state. A range of aspects relating to the biophysical (e.g. geology, soil surface and sub-surface water and biodiversity), socio-economic, historic and cultural character of the immediate site and surrounding areas are described herein, whilst applicable legislation, policy and guidelines considered are recognised.
- **Section C: Public Participation** describes the consultation component of this study between the EAP and Interested or Affected Parties (I&AP's) and organs of state. Regulatory requirements of this process are discussed, with a summary of consultation made with state departments and comments and response given. Comment periods will be afforded to parties, with an initial registration period provided to parties.
- **Section D: Impact Assessment, Management, Mitigation and Monitoring Measures,**

describe how the proposed project may impact on the geographical and physical, biodiversity, socio-economic and historical and cultural aspects of the receiving environment. Resources use of the proposed project phases, attributed to waste and emissions, water use, power supply and energy efficiency are further discussed.

- **Section E: Recommendation of the EAP** provides, based on such findings as various site surveys, impact assessment, investigation of alternatives and the review of strategic policy to consider the needs and desirability, the outgoing opinion of the EAP is detailed. Any noteworthy recommendations emanating from the study are described here.
- **Section F: Appendices** lists all supportive documents enclosed with this report, after which declarations of the Applicant, EAP and Specialist Parties are given.

### **Public Participation Process**

A comprehensive **public participation** will run from the 09<sup>th</sup> of November 2017 to engage stakeholders and interested and affected parties on the development proposal. I&AP's will be informed of the Basic Assessment Process through advertisements in two (2) local newspapers and poster site notices which were erected at strategic locations on the site. The surrounding landowners will be informed of the proposed project by means of the distribution of comment forms and the Basic Assessment Report (BAR), as well as relevant organs of state.

This BAR was also made available for a 30-day comment period from **09 November 2017**. The Basic Assessment (BA) will be made available on Enviroworks website ([www.enviroworks.co.za](http://www.enviroworks.co.za)) and a link to Enviroworks website were sent via email to all relevant stakeholders and organs of state.

### **Specialist Findings**

A Heritage specialist (Lloyd Rossouw), Geohydrologist (Christian Vermaak) and Fresh Water Ecologist will be appointed in the next two weeks to conduct the required specialist studies and report on their findings.

### **Recommendations from the Environmental Assessment Practitioner**

The final recommendations for the proposed development will be incorporated in the final Basic Assessment, which will include the inputs and recommendations of the specialists.

Based on the outcome of the Basic Assessment report and the Impact assessment, as attached in Appendix F, the EAP has no objections to the proposed project and is of the opinion that an Environmental Authorisation may be provided to the applicant. This said, it is imperative that the following recommendation and the EMP are implemented and adhered to during all phases of the project.

#### **Monitoring:**

- The project must be constantly monitored for the impacts of excessive nitrates and the distribution of Alien Invasive Species. Strict measures must be in place to prevent any damages in this regard

#### **Dust Nuisance:**

- Implement dust suppression measures e.g. regular watering of dusty surfaces.

**Noise Nuisance:**

- Limit working hours of noisy equipment,
- Ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.

**Site Specific Conditions:**

- The design of the tanks must comply with the relevant SANS and SABS codes and Standards.
- All Municipal by-laws with respect to the storage of dangerous goods and health and safety must be adhered to.

All mitigation measures for the installation of the tanks and associated infrastructure as stipulated in the EMP must implemented.

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## Acronyms and Abbreviations

|                   |   |   |
|-------------------|---|---|
| <b>BA</b>         | - | Basic Assessment  |
| <b>BAR</b>        | - | Basic Assessment Report   |
| <b>CBA</b>        | - | Critical Biodiversity Area  |
| <b>DESTEA</b>     | - | Department of Economic, Small Business Development, Tourism and Environmental Affairs |
| <b>DWS</b>        | - | Department of Water and Sanitation (previously known as DWA / DWAF)                   |
| <b>EAP</b>        | - | Environmental Assessment Practitioner   |
| <b>EIA</b>        | - | Environmental Impact Assessment   |
| <b>EMF</b>        | - | Environmental Management Framework  |
| <b>EMPr</b>       | - | Environmental Management Program Report   |
| <b>ESA</b>        | - | Ecological Support Area   |
| <b>GN</b>         | - | Government Notice   |
| <b>IDP</b>        | - | Integrated Development Plan   |
| <b>I&amp;AP's</b> | - | Interested and Affected Parties   |
| <b>NEMA</b>       | - | National Environmental Management Act   |
| <b>NNR</b>        | - | No Natural Area Remaining   |
| <b>ONA</b>        | - | Other Natural Area  |
| <b>PSDF</b>       | - | Provincial Spatial Development Framework  |
| <b>SAHRA</b>      | - | South African Heritage Resources Agency   |
| <b>SDF</b>        | - | Spatial Development Framework   |
| <b>SKA</b>        | - | Square Kilometre Array  |
| <b>SIP</b>        | - | Strategic Integrated Projects   |

# 1 SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES

NO  
X

If YES, please complete the form entitled “Details of specialist and declaration of interest” for the specialist appointed and attach in Appendix I.

## 1.1 Project Description

### a) Describe the project associated with the listed activities applied for

The Fezile Dabi District Municipality (herein after referred to as applicant) appointed Enviroworks, an Independent Environmental Assessment Practitioner (EAP), to undertake the required Basic Assessment Process for the proposed Modular Tilapia Production Unit – Fish Farming Project in the Free State Province. The proposed site is situated in Jim Fouche on the banks of the Vaal Dam between Villiers and Deneyville on the North Eastern boundary of the Free State Province on route R176, approximately 16 km from Oranjeville. The site falls across 3 farm portions namely Driefontein 387, Parkerton 1386 and Tweefontein A 117.

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#### Project Description

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- Agri-Processing vegetable & Pack house (852m<sup>2</sup>)

- Residential Zone\*\*
- Trading Centre\*\*
- Integrated crop production\*\*

\*\*The footprints for the proposed area's steel need to be finalized, the developer will not be allowed to have a development footprint over 200000m2, as this will require the application of an EIA and the process will need to be initiated, should the development area be more than 200000m2

#### **Fauna Species**

The proposed species are the Mozambique tilapia (*Oreochromis mossambicus*). The project also proposes to apply for an Alien Invasive Species permit, through competent Authority (Department of Environmental Affairs in terms of the National Environmental Management Biodiversity Act, 2004 (Act No.10 of 2004) as amended, for the farming permit of the Nile tilapia (*Oreochromis niloticus*) species.

Until such authorization has been granted the project may only stock the Mozambique Tilapia.

#### **Flora Species**

The project proposed to establish feed production unit for the Tilapia, the proposed feed will be Duckweed (*Lemnoideae*)

### **b) Provide a detailed description of the listed activities associated with the project as applied for**

|   |                       |   |
|---|-----------------------|---|
| <b>GN 327 2014 as amended 07 April 2017 (GNR 326)</b> | <b>Activity 6 (i)</b> | The development and related operation of facilities, infrastructure or structures for aquaculture of—<br>(i) finfish, crustaceans, reptiles or amphibians, where such facility, infrastructure or structures will have a production output exceeding 20 000 kg per annum (wet weight);                              |
|   | <b>Activity 9</b>     | The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—<br>(i) with an internal diameter of 0,36 metres or more; or<br>(ii) with a peak throughput of 120 litres per second or more;  |
|   | <b>Activity 27</b>    | The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—<br>(i) the undertaking of a linear activity; or<br>(ii) maintenance purposes undertaken in accordance with a maintenance management plan. |

## **1.2 Feasible and Reasonable Alternatives**

**“alternatives”**, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;

- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h) of GN 982, Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

The alternatives identified for the land is adjacent to the preferred activity.

**a) Site alternatives**

| <b>Alternative 1 (Preferred alternative/Site) Description:</b> |           | <b>Lat (DDMMSS)</b> | <b>Long (DDMMSS)</b> |
|--|-----------|---------------------|----------------------|
| Farms Driefontein 387, Parkerton 1386 and Tweefontein A 117.   | Corner: A | 26° 59' 28.94" S    | 28° 21' 09.12" E     |
|  | Corner: B | 26° 59' 27.20" S    | 28° 21' 11.61" E     |
|  | Corner: C | 26° 59' 42.84" S    | 28° 21' 35.82" E     |
|  | Corner: D | 26° 59' 52.76" S    | 28° 21' 33.82" E     |
|  | Middle    | 26° 59' 36.20" S    | 28° 21' 23.81" E     |
| <b>Alternative 2</b>   |           |                     |                      |
| <b>Description:</b>  |           | <b>Lat (DDMMSS)</b> | <b>Long (DDMMSS)</b> |
| Tweefontein A 117  | Corner: A | 26° 59' 43.22" S    | 28° 21' 23.20" E     |
|  | Corner: B | 26° 59' 41.64" S    | 28° 21' 29.76" E     |
|  | Corner: C | 26° 59' 42.97" S    | 28° 21' 35.63" E     |
|  | Corner: D | 26° 59' 53.27" S    | 28° 21' 33.46" E     |
|  | Middle    | 26° 59' 46.28" S    | 28° 21' 31.65" E     |
| <b>Alternative 3</b>   |           |                     |                      |
| <b>Description</b>   |           | <b>Lat (DDMMSS)</b> | <b>Long (DDMMSS)</b> |
|  |           |                     |                      |

In the case of linear activities:

**Alternative:**

Alternative S1 (preferred)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Latitude (S):

Longitude (E):

|  |  |
|--|--|
|  |  |
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|  |  |

Alternative S2 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

|  |  |
|--|--|
|  |  |
|  |  |
|  |  |

Alternative S3 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

|  |  |
|--|--|
|  |  |
|  |  |
|  |  |

For route alternatives that are longer than 500 m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

**b) Lay-out alternatives**

| <b>Alternative 1 (preferred alternative)</b>   |                  |                  |
|--|------------------|------------------|
| Description  | Lat (DDMMSS)     | Long (DDMMSS)    |
| <p>Alternative 1 will consist of the following units:</p> <ul style="list-style-type: none"> <li>• Grow-Out Facility (1205m<sup>2</sup>)</li> <li>• Hatchery &amp; Brood Stock Facility (1881m<sup>2</sup>)</li> <li>• Laboratory Facility (107m<sup>2</sup>)</li> <li>• Fish Processing Facility (795m<sup>2</sup>)</li> <li>• Staff Changing Rooms (655m<sup>2</sup>)</li> <li>• Feed Production &amp; Processing Facility (1442m<sup>2</sup>)</li> <li>• Workshop Building (184m<sup>2</sup>)</li> <li>• Gate House (10m<sup>2</sup>)</li> <li>• Administration Block (722m<sup>2</sup>)</li> <li>• Agri-Processing vegetable &amp; Pack house (852m<sup>2</sup>)</li> <li>• Residential Zone**</li> <li>• Trading Centre**</li> <li>• Integrated crop production**</li> </ul> <p>**The footprints for the proposed area's steel need to be finalized, the developer will not be allowed to have a development footprint over 200000m<sup>2</sup>, as this will require the</p> | 26° 59' 36.20" S | 28° 21' 23.81" E |

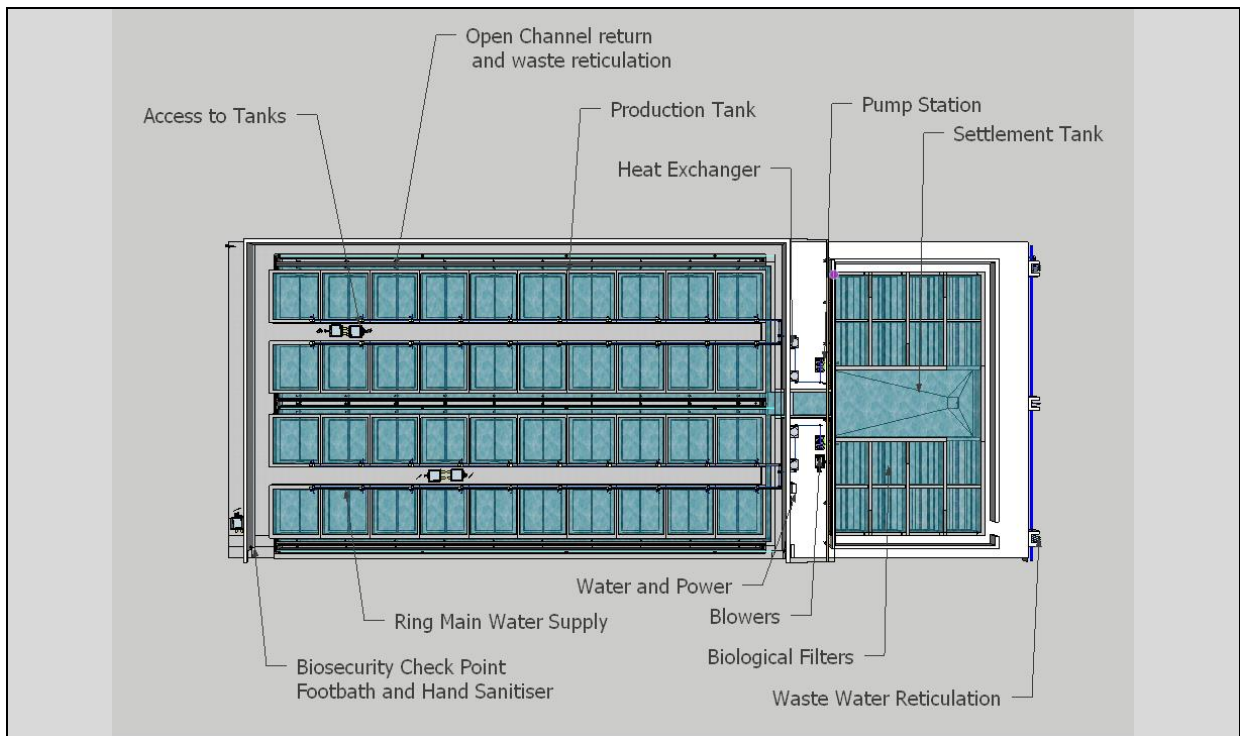
|   |                  |                  |
|---|------------------|------------------|
| application of an EIA and the process will need to be initiated, should the development area be more than 200000m <sup>2</sup>  |                  |                  |
| <b>Building - Alternative 2</b>   |                  |                  |
| Description   | Lat (DDMMSS)     | Long (DDMMSS)    |
| <p>Alternative 2 will deem of a smaller fishery unit and will consist of the following units:</p> <ul style="list-style-type: none"> <li>• Grow-Out Facility (1205m<sup>2</sup>)</li> <li>• Hatchery &amp; Brood Stock Facility (1881m<sup>2</sup>)</li> <li>• Laboratory Facility (107m<sup>2</sup>)</li> <li>• Fish Processing Facility (795m<sup>2</sup>)</li> <li>• Staff Changing Rooms (655m<sup>2</sup>)</li> <li>• Feed Production &amp; Processing Facility (1442m<sup>2</sup>)</li> <li>• Workshop Building (184m<sup>2</sup>)</li> <li>• Gate House (10m<sup>2</sup>)</li> <li>• Administration Block (722m<sup>2</sup>)</li> <li>• Agri-Processing vegetable &amp; Pack house (852m<sup>2</sup>)</li> </ul> | 26° 59' 46.28" S | 28° 21' 31.65" E |

**c) Technology alternatives**

**Alternative 1 (preferred alternative)**

The proposed system design seeks to optimise production for tilapia whilst contextualising the system requirements to local conditions and in so doing minimise the reliance on external support and highly skilled personal without compromising productivity.

In designing the system special attention has been paid to the capacity for growth and the ability to increase production over time as the skills and management practises on the farm improve, whilst also allowing trainee farmers some margin for error in the early stages of production. Consequently there is considerable redundancy built in when looking at the initial production models however, is necessary for future increases in stocking densities and hence outputs. A number of production scenarios have been modelled and will be presented.



Above is a top view of a single module, the farm is intended to contain 6 modules within 3 units, with 2 modules being housed in a single unit. The RAS system is essentially divided into 2 distinct sub units, production and filtration. The larger the filtration unit relative to the production unit the more stable and reliable the system will be. A ratio of 3:1 is largely considered as the optimal relationship between production and filtration, and the current design abides by this principle. The total volume for the system is 1370KL with the production units accounting for 66% or 960KL of this.

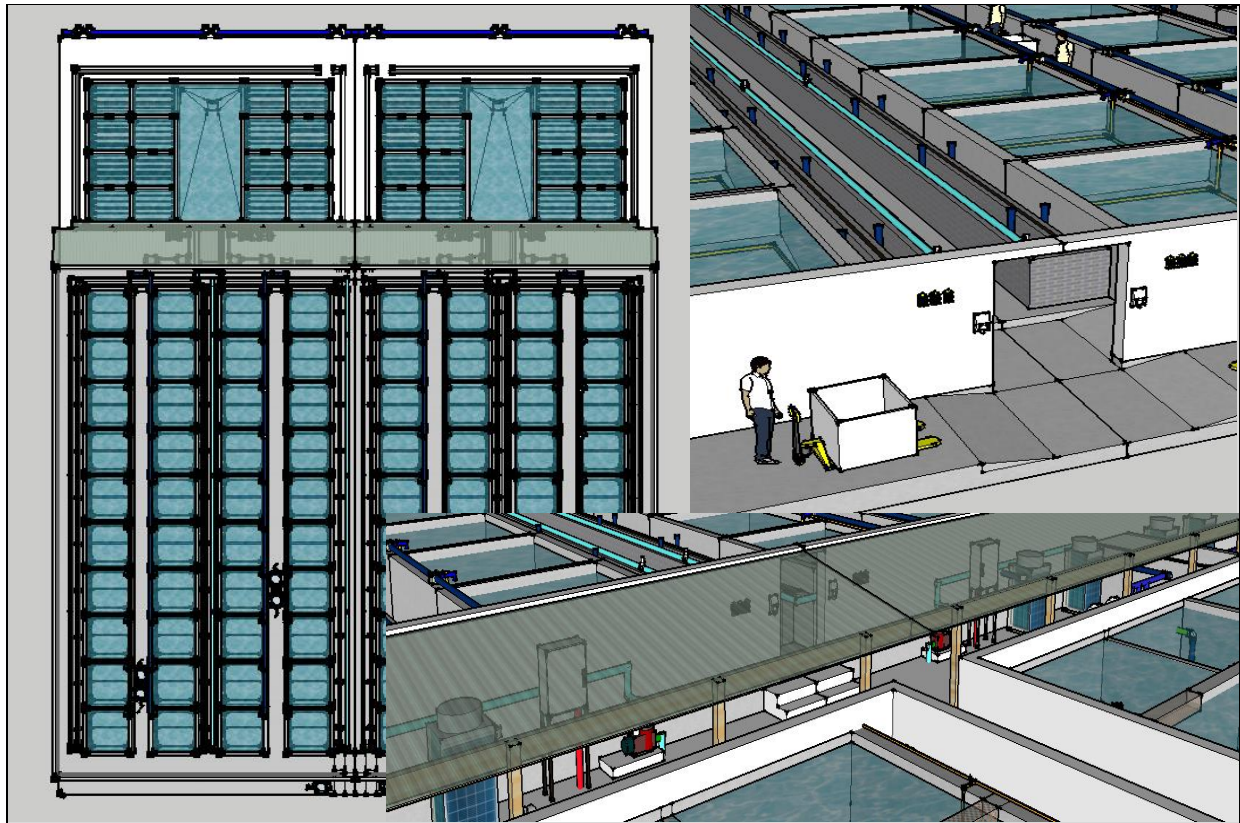
The filtration unit is divided into 2 main sections, namely settlement or mechanical filtration, biological filtration and nitrogen assimilation and sump tank. Details are summarised in the table below.

| <b>System Volumes</b>                       |                      |               |                            |                |
|---|----------------------|---------------|----------------------------|----------------|
| <b>Growout Tanks</b>                        | <b>m<sup>3</sup></b> | <b>Number</b> | <b>Total m<sup>3</sup></b> | <b>Liters</b>  |
| Production Tanks (4 X 4 X 1.5)              | 24                   | 40            | 960                        | <b>960000</b>  |
| <b>Filtration System (30% Total Volume)</b> |                      |               |                            |                |
| <b>Mechanical Filtration</b>                |                      |               |                            |                |
| Gutters                                     | 60                   | 1             | 60                         | 60000          |
| Settlement Tank                             | 140                  | 1             | 140                        | 140000         |
| <b>Biological Filtration</b>                |                      |               |                            |                |
| Gravel Bed                                  | 15                   | 6             | 90                         | 90000          |
| MBBR  | 15                   | 6             | 90                         | 90000          |
| <b>Sump</b>                                 | 15                   | 2             | 30                         | 30000          |
| <b>Total Filter Volume</b>                  |                      |               |                            | <b>410000</b>  |
| <b>Total System Volume</b>                  |                      |               |                            | <b>1370000</b> |

Each module is operated independently for increased biosecurity and greater manageability of cohorts. The farm design allows for weekly harvesting and therefore easier processing and marketing as a result of consistent production.

The system is housed in a steel frame building clad with isotherm (thermal insulation) providing a climate controlled facility for reduced heating costs. Units have single entrance in the front with biosecurity check point; a simple corridor leads to the processing plant. A second smaller entrance/exit at the back of the unit allows for easy access to all equipment and utilities.





## 2 Pumping requirements

The total volume of the production tanks are 960KL. The performance of a RAS system is largely dependent on the rate of water exchange and ability of the biological filters to process the waste. 4 Exchanges per day is considered the minimum rate required for RAS with 6 exchanges being good and 8 ideal, the required pumping rates are summarised in the table below.

In order to replace the total volume of the production tanks once every 3 hours a pumping rate of 320KL/h is required. The operating head of the system is less than 1m. Pipe diameters have been informed by the required flow rates and consultation with hydrologists and pumps specified in-line with recommendations from reputable suppliers. *(See Appendix)*

## Pumping Requirements

| Volume           |        | Exchanges Per day (l/h) |        |        |
|------------------|--------|-------------------------|--------|--------|
|                  |        | 4                       | 6      | 8      |
| Production Tanks | 960000 | 160000                  | 240000 | 320000 |
| L/h/ Tank        | 24000  | 4000                    | 6000   | 8000   |

Pump 2 x 2 (2.2KW) Low head high volume Pumps @ 75KL/h each  
 2 Duty and 1 Standby x 2 = 6 Pumps/Module

### 3 Air Requirements

Air requirements for the system are calculated as oxygen consumed or the biological oxygen demand (BOD) calculated as a function of total system biomass, feeding rate and dietary composition. As a general rule of thumb approximately 250g of oxygen is consumed by metabolism and subsequent biological filtration for every 1kg of feed added to the system.

The blower capacity is specified to supply 2 x BOD. The maximum operating depth for blowers is 1.6m; therefore the minimum required pressure is 2 KPA.

| <b>Air/Blower Requirements</b> |              | Volume (g/min) |               |     |
|--------------------------------|--------------|----------------|---------------|-----|
| Minimum Operating Pressure     | 300          | <b>600</b>     | 800           |     |
| <b>0.2 Bar</b>                 | <b>2 KPA</b> | Min            | <b>Target</b> | Max |

Min. Required Blower = 35m<sup>3</sup>/hour

Blowers for a single unit of production should produce a minimum for 35m<sup>3</sup> of air per hour at a pressure of no less than 2 KPA. The table above summarises the air required for the system at a density of 30, 60 and 90kg/m<sup>3</sup> respectively. Blowers need to be oil free rotary blowers to avoid contaminating the culture system.

Potentially a single blower to supply all 6 modules may be more cost effective than 6 smaller units; this will need to be investigated in consultation with engineers when making a final decision.

### 4 Additional Considerations:

Dissolved oxygen is a limiting factor for fish production, ensuring sufficient oxygen is present in the system is therefore of key importance, and is an essential component of the life support systems. Incorporating back-up and redundancy in the design is therefore necessary.

The addition of a pressurized 'pure' oxygen back-up is recommended. This can be incorporated into the existing air supply lines through direct injection and can be automated.

Oxygen generators and nano-bubblers represent a relatively new technology and have the potential to massively improve the production of on the farm. The system takes advantage of an oxygen/water interface that allows for effective superstition with oxygen which in turn facilitates increased stocking densities and biological filter activity.

## **5 Heating**

Maintaining a constant temperature between 26°C and 28°C is essential for optimising production on the farm. Every attempt has been made to ensure the thermal stability of the system in order to reduce the energy requirements needed for maintaining a constant temperature. A number of heating options are available and a detailed study will need to be made in order to determine the exact energy budget required.

It is likely that a combination of heating methods be employed in order to minimise operational costs. These include, but are not limited to, solar heating for bulk heating, solar and wind energy to augment power consumption, coal boiler for additional heating in colder months and heat exchange pumps for precise thermal control. Determining the most appropriate solution will be a function of the final engineers report.

## **6 Production Tanks**

Designing a suitable production tank is essential for the effective operation of the farm. Workers should have easy access to the tanks and tanks should as far as possible exhibit good self-cleaning properties, be durable and easy to work in.

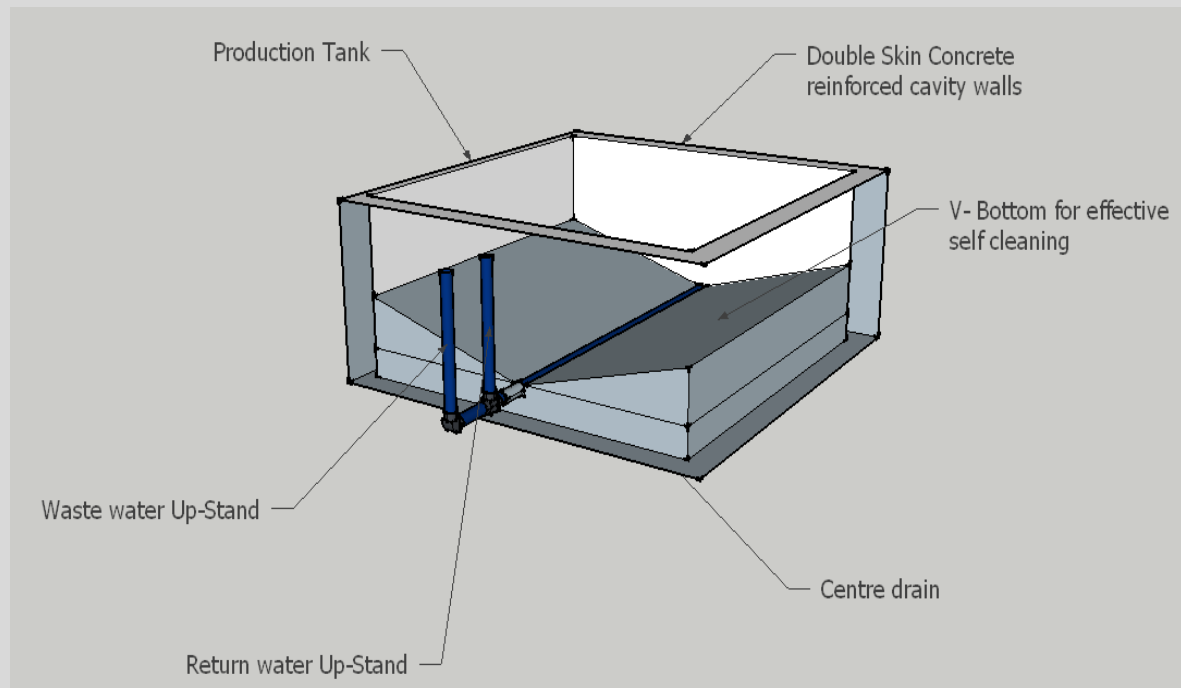
Before settling on a final tank design a number of options were investigated, the options considered included:

- Round Tanks – Vinyl lined with steel mesh Frame, although these tanks represent the least expensive option, they lose points in durability and workability. However were ruled out as they are highly space inefficient and considering the cost of the building to house the facility optimising space was prioritised.
- Earthen Ponds – Lined with commercial dam liner. These represent a very affordable and durable option, but sacrifice workability and space efficiency, concerns were also raised as to the potential thermal losses to the surround ground.
- Square tanks were selected as the most appropriate shape since these are highly space efficient and provide good workability. Regarding the construction materials, various options have been considered
  - Precast Fibreglass – These tanks look very good and are easy to install and maintain, however require specialist skills for construction and lose points for durability and workability. The cost is also a concern.
  - Pre-cast concrete formwork represents the best finish and most durable option, but incurs a high cost relative to brickwork and leaves little margin for error.
  - Cavity walls – Plastered brickwork were selected as the preferred construction method as these represent the best balance of cost, durability and workability. In addition brick and concrete are readily available and require no specialised skills for construction.
- A summary of the tank types and selection criteria are provided in the table below.

| Production Tanks |            |      |            |            |          |             |       |
|------------------|------------|------|------------|------------|----------|-------------|-------|
| Type             | Material   | Cost | Space eff. | Durability | Function | Workability | Score |
| Round            | Vinyl      | 5    | 1          | 3          | 5        | 2           | 16    |
| Rectangle        | Earthen    | 5    | 4          | 3          | 3        | 2           | 17    |
| Square           | Fibreglass | 3    | 4          | 4          | 5        | 3           | 19    |
| Square           | Concrete   | 2    | 4          | 5          | 5        | 4           | 20    |
| Square           | Brick      | 3    | 4          | 5          | 5        | 4           | 21    |

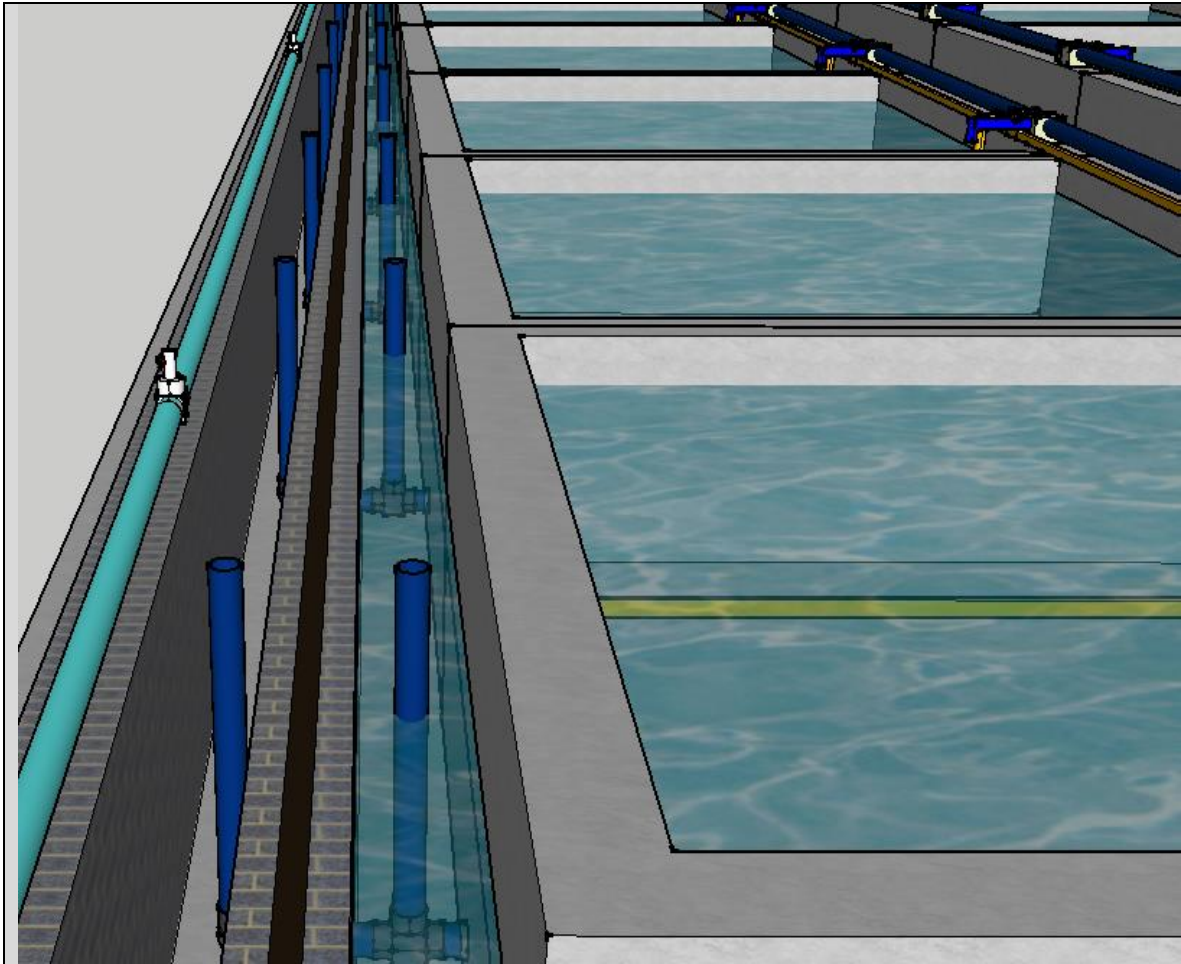
The final tank design is presented in the image below. The tanks are 4mx4m and 1.5m deep with a volume of 24m<sup>3</sup>. A v-shaped bottom (15° slope) concentrates solid wastes towards a central drain

pipe that runs along the length of the tank. This tank design has been tried and tested and is highly efficient at self-cleaning and is easy to work in.



Return water is transported to the filtration system in an open channel. This allows for low pressure systems, prevents the risk of blockages, increases the volume of the system and contributes towards filtration through providing solids removal (mechanical) and nitrogen assimilation.

The channels are flooded in order to provide additional volume and facilitate mechanical filtration by way of filter sags (essentially large bottle brushes) that are placed in the channel and used to filter out any large solid waste, the sags can be easily cleaned using a high pressure hose and washed directly into the waste channels running alongside.



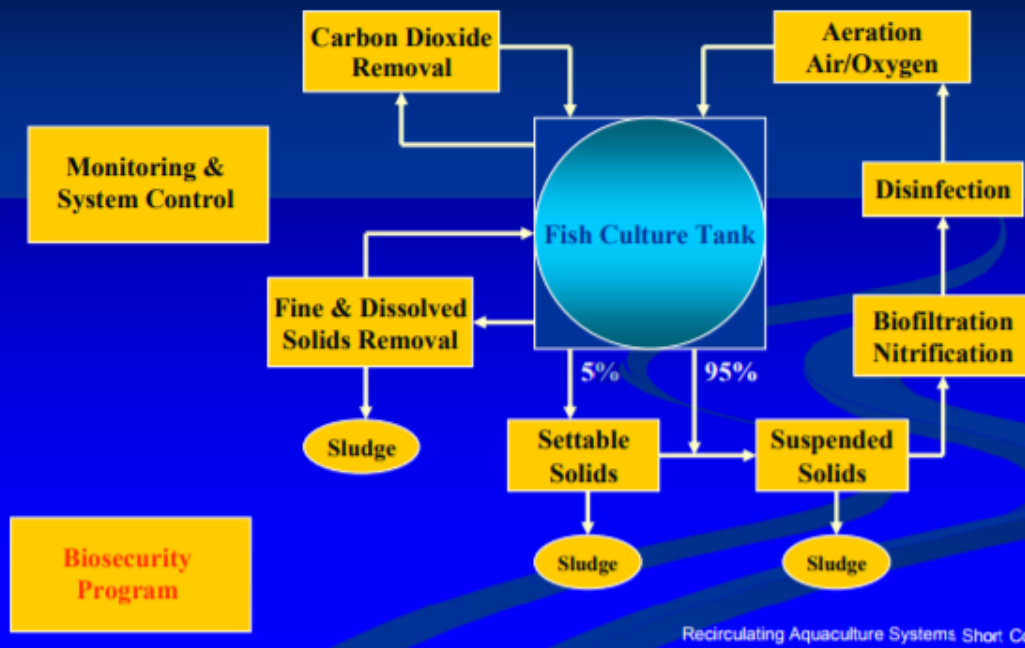
The secondary waste channel provides added biosecurity allowing for any individual tank to be isolated and quarantined from the system without having to shut off the water supply. During harvesting and cleaning the waste water can be easily evacuated from the system, bypassing the filters completely.

## 7 Filtration

Processing Nitrogenous waste products is the primary function of the filtration unit. The production of Total Ammonium Nitrate (TAN) will determine the filtration requirements of the system. Nitrogenous wastes are essentially a bi-product of protein metabolism; therefore the amount of TAN produced can be calculated as a function of bio-mass of fish, feeding rate and dietary composition. *(See appendix: Biofiltration Design Overview)*

The slide below provides a good overview of the processes involved in a typical filtration unit for aquaculture.

# Overview of System Design



## 8 Filter Types

A number of filtration methods were investigated and considered, these included:

- Rotating Drum Filters, these are highly effective, however also very expensive, and prone to mechanical failures resulting in a high degree of dependence on external service providers and skilled staff.
- Fluidized Sand Filters, these are highly effective and very space efficient, however require very precise operating conditions and are therefore prone to failures.
- MBBR/K1 Filters, these are fairly space efficient and very reliable, however are expensive.
- Gravel Bed, tried and tested and highly reliable; however require a larger footprint than other options.
- Settlement Tanks, tried and tested and highly reliable; however require a larger footprint than other options.
- Swirl Separators, these are highly effective and very space efficient, however require very precise operating conditions and are therefore prone to failures.
- Sand Filters, deemed unsuitable for commercial aquaculture due to glogging.
- Trickle Tower Filters, very good all-rounder.
- Rotating Biological Contactors, arguably the most effective filtration method, but limited local supply.

- The table below summarises the filter types and scores them according to relevant criteria.

| Type                    | Cost | Support | Function | Cleaning | Reliability | Maintenance | Space | Availability | Score |
|-------------------------|------|---------|----------|----------|-------------|-------------|-------|--------------|-------|
| Rotation Drum Filters   | 1    | 1       | 4        | 2        | 1           | 1           | 5     | 3            | 18    |
| Fluidized Sand Filters  | 4    | 2       | 4        | 5        | 1           | 1           | 5     | 5            | 27    |
| MBBR/K1 Filters         | 2    | 4       | 4        | 4        | 4           | 3           | 4     | 5            | 30    |
| Gravel Bed              | 5    | 4       | 4        | 4        | 5           | 5           | 2     | 5            | 34    |
| Settlement Tanks        | 5    | 4       | 4        | 4        | 5           | 5           | 1     | 5            | 33    |
| Swirl Separators        | 2    | 2       | 4        | 5        | 1           | 2           | 3     | 4            | 23    |
| Sand Filters            | 3    | 3       | 1        | 1        | 2           | 1           | 2     | 5            | 18    |
| Rotating Bio-Contactors | 3    | 3       | 5        | 4        | 5           | 3           | 4     | 3            | 30    |
| Trickle Tower Filters   | 3    | 4       | 4        | 3        | 4           | 4           | 4     | 5            | 31    |

The table below summarises some of the filtration methods and documented TAN removal rates drawing particular attention to the development of rotating biological contactors over the years.

| <b>Submerged Filters</b>                       |                                 |
|--|---------------------------------|
| Bead Filters (Wheaton et al, 1994)             | 0.2-0.3 g/m <sup>2</sup> -day   |
| Fluidized Sand Filters (Thomasson, 1991)       | 0.25-0.35 g/m <sup>2</sup> -day |
| MBBR (Rusten et al, 2006; Drennan et al, 2006) | 0.46 g/m <sup>2</sup> -d        |
| <b>Emergent Filters</b>                        |                                 |
| Trickling Filters (Wortman, 1990)              | 1.0 g/m <sup>2</sup> -day       |
| Trickling Filters (Greiner and Timmons, 1998)  | 0.75–1.0 g/m <sup>2</sup> -day  |
| Trickling Filters (Lyssenko and Wheaton, 2006) | 0.64 g/m <sup>2</sup> -day      |
| RBC (Miller and Libey, 1985)                   | 0.63–0.78 g/m <sup>2</sup> -day |
| RBC (Van Gorder and Jug-Dujakovic, 2005)       | 1.2 g/m <sup>2</sup> -day       |
| RBC (Marin et al, 2011)                        | 1.4 g/m <sup>2</sup> -day       |

## 9 Filter Design and Capacity

The capacity of the filtration unit has been modelled against a number of theoretical stocking densities (30, 45, 60, 75, and 90). Given the selected filtration methods, namely a settlement tank followed by a series of gravel bed and MBBR filter units the maximum filtration capacity or carrying capacity of the system was calculated and is summarised in the table below.

Gravel bed filters; represent between 30% and 80% of the required filtration requirements



depending in the stocking density the remaining filtration requirements being provided through MBBR. This filtration configuration was selected to be a robust and “user friendly” system that does not compromise production. As the density of the system is increased additional MBBR media can be added in order to maintain sufficient biological filtration capacity.

In calculating a TAN removal rate a value of 4g/m<sup>2</sup> was used representing a conservative estimate. The specific surface area (SSA) is provided for each filter media and filter composition is tabulated for each of the relevant densities.

| <b>Tanks (m<sup>3</sup>)</b>  | <b>Stocking Density</b>            |              |              |              |              |
|---|------------------------------------|--------------|--------------|--------------|--------------|
| 24  | 30                                 | 45           | 60           | 75           | 90           |
| <b>Weight</b>   | 720                                | 1080         | 1440         | 1800         | 2160         |
| <b>Feed (kg)</b>  | 14.4                               | 21.6         | 28.8         | 36           | 43.2         |
| <b>TAN (kg produced per day/tank)</b>                                     | 0.52                               | 0.78         | 1.04         | 1.30         | 1.56         |
| <b>TAN For system (kg) (0.52 x 40 Tanks)</b>                              | 20.7                               | 31.1         | 41.5         | 51.8         | 62.2         |
| <b>Hydrolic Loading (kg/lpm)</b>  | 3.0                                | 4.5          | 6.0          | 7.6          | 9.1          |
| <b>Oxygen Consumed (g/min)</b>  | 144.0                              | 216.0        | 288.0        | 360.0        | 432.0        |
| <b>Amonia Removal Rate 4-6g/m<sup>2</sup>/day</b>                         |                                    |              |              |              |              |
| <b>Required surface area for biological filtration @ 4g/m<sup>2</sup></b> |                                    |              |              |              |              |
| <b>Surface Area of filter Media (m<sup>2</sup>)</b>                       | 5184                               | 7776         | 10368        | 12960        | 15552        |
| <b>Specific Surface Area (SSA)</b>  | <b>m<sup>2</sup>/m<sup>3</sup></b> |              |              |              |              |
| <b>Gravel (100mm-19mm) (50)</b>   | 104                                | 156          | 207          | 259          | 311          |
| <b>Oyster Shells (70)</b>   | 74                                 | 111          | 148          | 185          | 222          |
| <b>K1 MBBR (220)</b>  | 24                                 | 35           | 47           | 59           | 71           |
| <b>Filter Composition</b>   |                                    |              |              |              |              |
| <b>Capacity of Filter Unit - Gravel (10m3)</b>                            | 60                                 | 60           | 60           | 60           | 60           |
| <b>Surface area (m<sup>2</sup>)</b>                                       | 3000                               | 3000         | 3000         | 3000         | 3000         |
| <b>Capacity of Filter Unit - Oyster (10m3)</b>                            | 20                                 | 20           | 20           | 20           | 20           |
| <b>Surface area (m<sup>2</sup>)</b>                                       | 1400                               | 1400         | 1400         | 1400         | 1400         |
| <b>Capacity of Filter Unit - MBBR (6m3)</b>                               | 15                                 | 30           | 42           | 48           | 54           |
| <b>Surface area (m<sup>2</sup>)</b>                                       | 3300                               | 6600         | 9240         | 10560        | 11880        |
| <b>MAX SSA for Biological Filter</b>                                      | <b>7700</b>                        | <b>11000</b> | <b>13640</b> | <b>14960</b> | <b>16280</b> |
| <b>Additional SSA</b>   | 2516                               | 3224         | 3272         | 2000         | 728          |
|   | 33%                                | 29%          | 24%          | 13%          | 4%           |

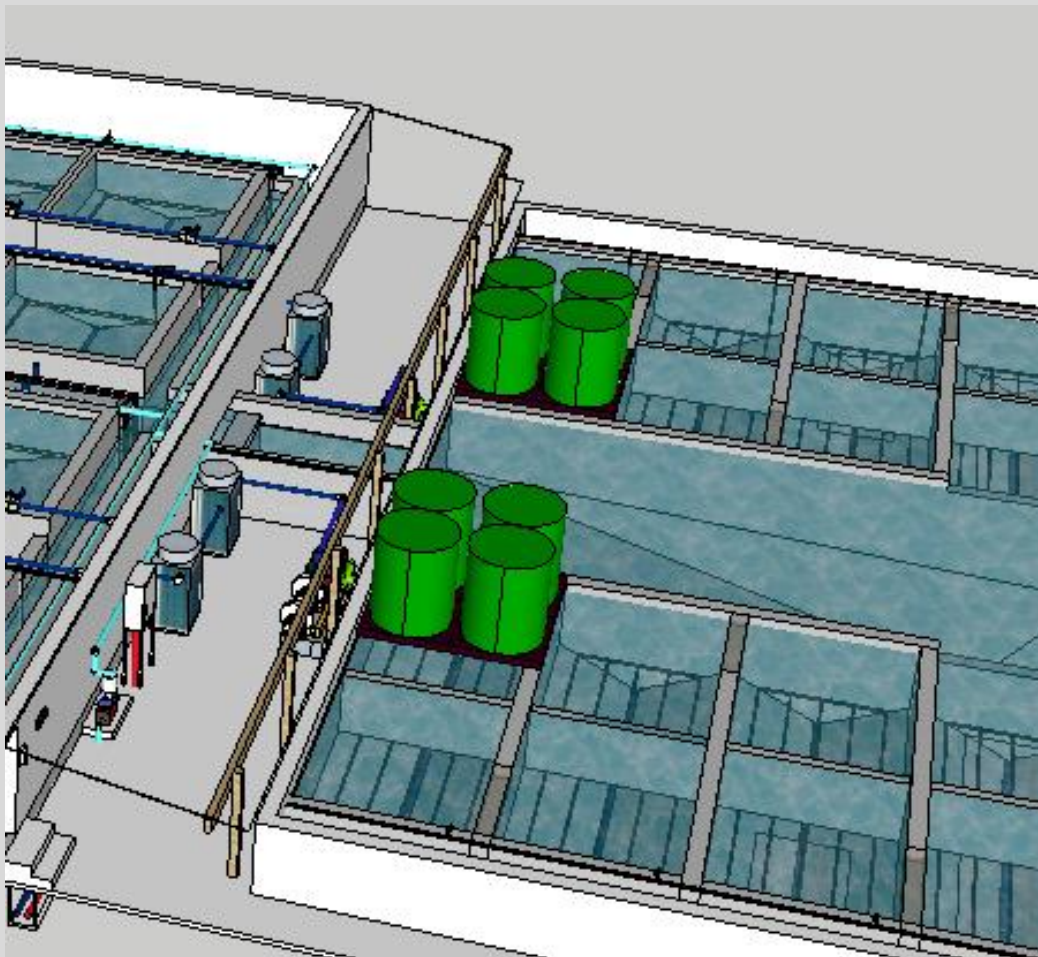
The inclusion of oyster shells as a media serves two purposes.

- As a filter media, the jiggered edges and ridges of the shells provide a good surface for the

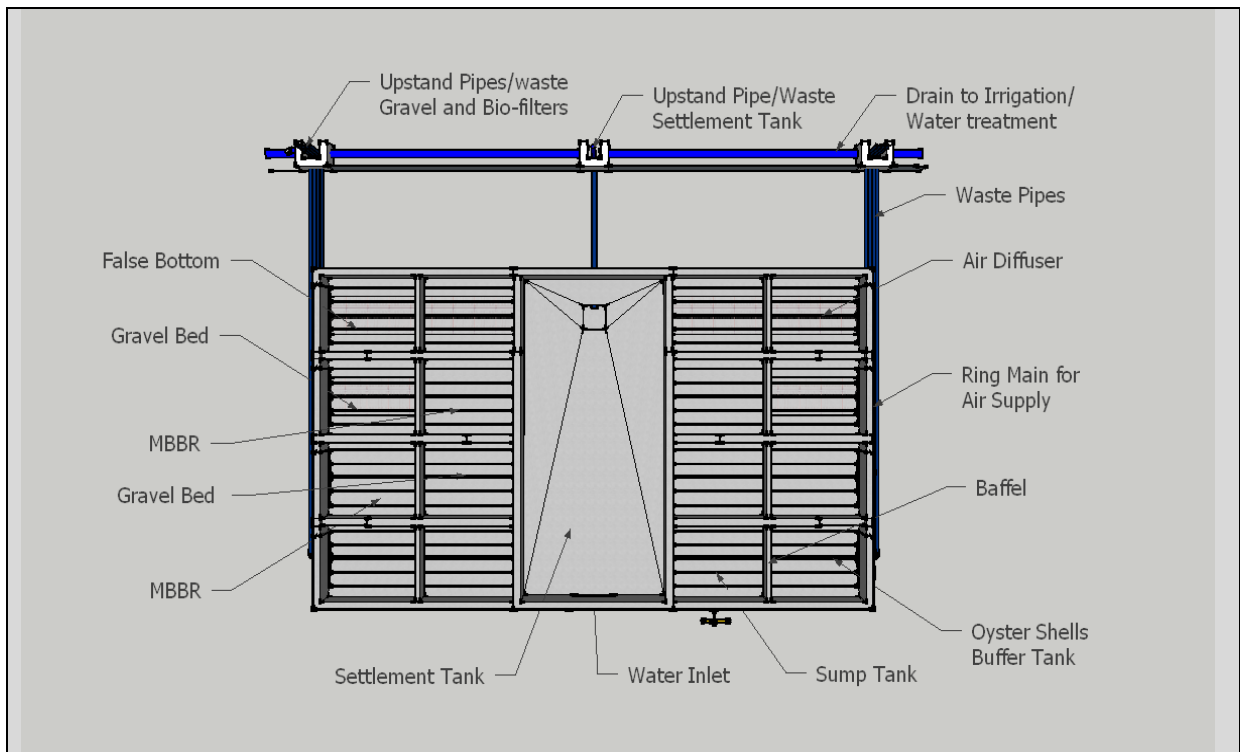
colonisation of bacteria

- Importantly the shells are comprised of calcium carbonate, if the pH of the system should drop, as is typical after feeding, the acidity reacts with the shells and releases calcium bicarbonate thus raising the pH. The shells therefore act as a natural pH buffer in the system whilst functioning as an efficient form of biological filtration.

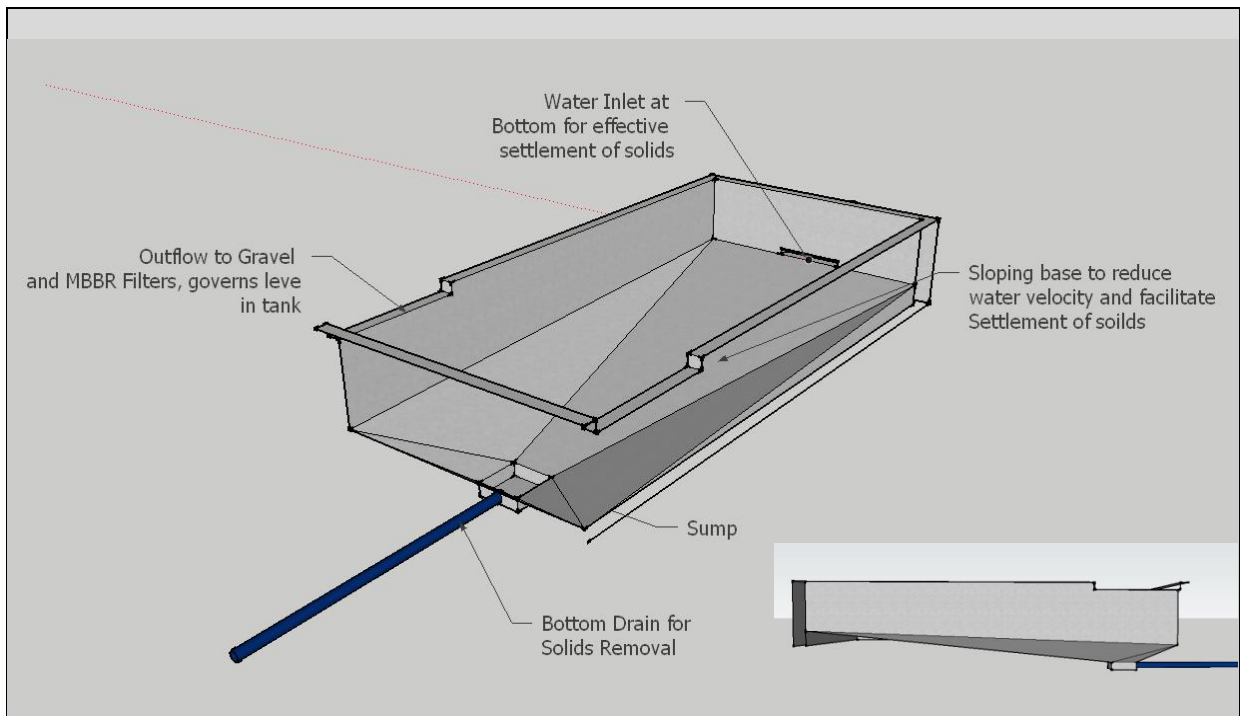
Should additional filtration be required trickle filters can easily be added (image below), and may be considered primarily as carbon dioxide scrubbers, should there ever be the need?



The image below illustrates the various components of the filtration unit; filtration begins in the flooded open channel system leading into a 140KL settlement tank, this overflows into a series of gravel bed and MBBR filtration units before being recirculated via a sump. Each section is briefly discussed below.

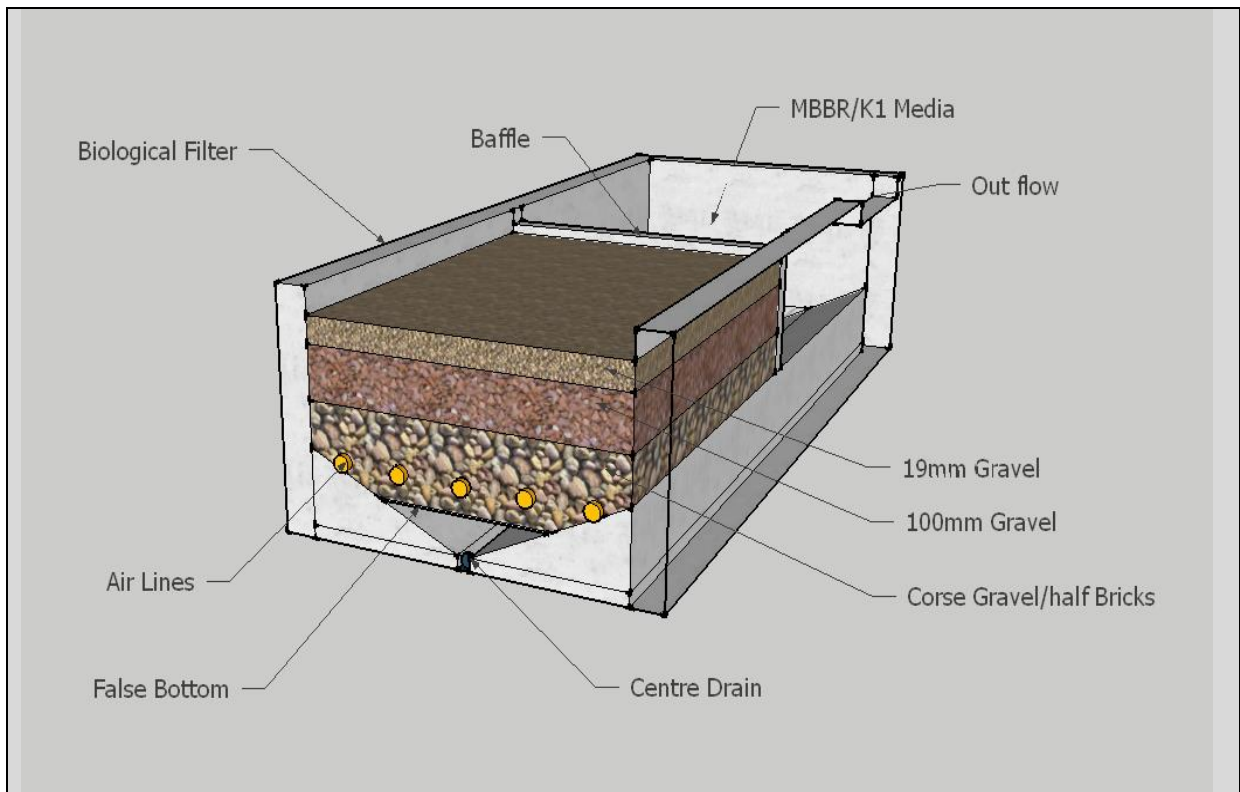


The settlement tank is designed to optimise the settlement of suspended solids, the water enters at the bottom of the tank at which point the tank gets deeper and slopes towards a central drainage point. This essentially slows down the velocity of the water and allows heavier particles to sink while the water slowly rises over the out-flow points and into the biological filters. A central drain allows for fast and effective removal of waste from the system and waste drainage and reticulation system allows for the effective beneficiation of this free energy into commercial horticulture.

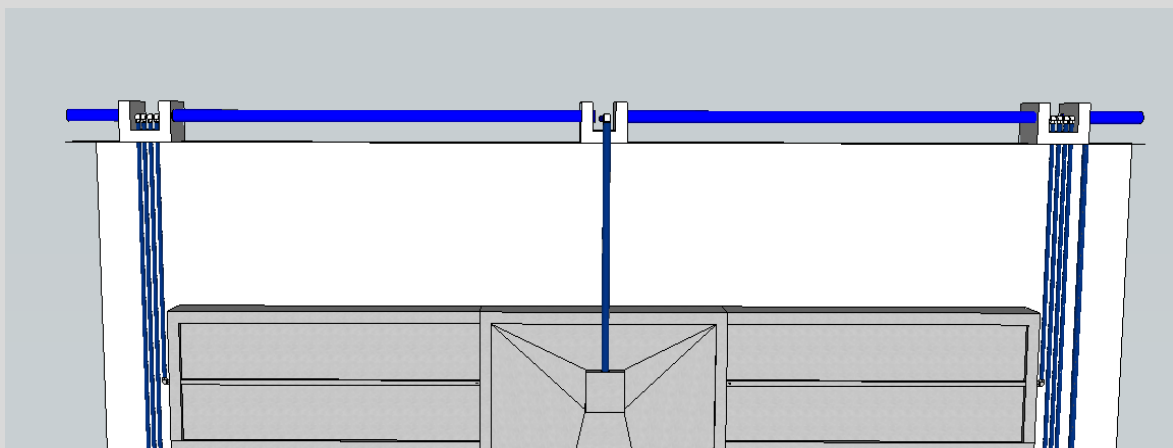


The biological filtration units consist of a series of gravel bed and MBBR filter units, illustrated in the image below. A central baffle forces the down against the flow of air and through the gravel before exiting into the second chamber and rising up through the moving bed bioreactor, and then repeating the process.

The gravel bed filters are very easy to maintain and very reliable. At low stocking densities represent 80% of required filtration capacity. As the efficiency of the farm improves greater densities can be achieved through the addition of MBBR material.



A false bottom allows for concentration and removal of waste via a central drain whilst a counter current air flow prevents fowling and de-oxygenation. A common drainage line (below) allows for duplication and effective removal of waste water and simple integration into irrigation schemes.

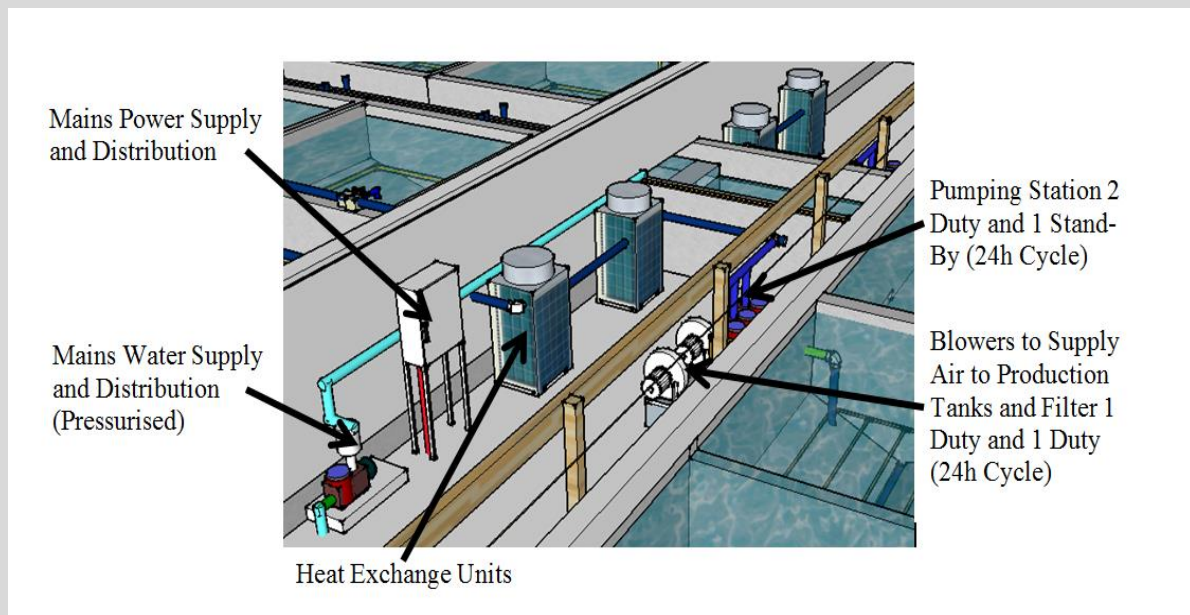
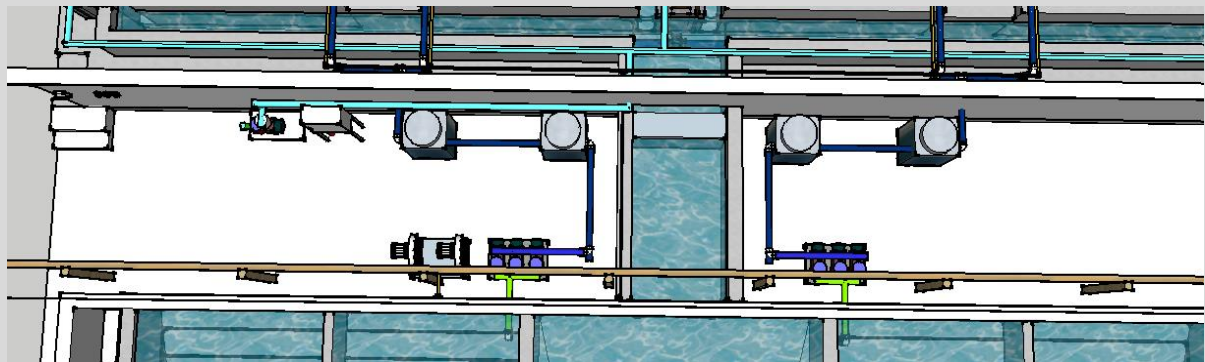


## 10 Utilities

Water and power run through common servitude (right) between the production and filtration units

(below). All the electrical equipment and systems are housed in this area and are easily accessible.

The image below summarises the basic life support equipment required.



Alternative 2

Alternative 3

**Note: There are no feasible technology alternatives, as tanks need to be constructed according to SANS.**

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

|                                       |  |  |
|---------------------------------------|--|--|
| Alternative 1 (preferred alternative) |  |  |
|                                       |  |  |
| Alternative 2                         |  |  |
|                                       |  |  |

|               |
|---------------|
| Alternative 3 |
|               |

**e) No-go alternative**

The No-go alternative will leave the proposed area as is. The proposed no-go alternative will leave approximately ninety million ZAR in capital value unspent which could be used to appoint contractors and provide numerous employment opportunities during the construction phase. Additionally, 2.3 million ZAR would be lost in employment opportunities during the first 10 years of the development, 100% of which would accrue to previously disadvantaged individuals.

Paragraphs 3 – 13 below should be completed for each alternative.

**10.1 Physical Size of the Activity**

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:

Alternative A1<sup>1</sup> (preferred activity alternative)

Alternative A2

Alternative A3 (if any)

Size of the activity:

|                       |
|-----------------------|
| +150000m <sup>2</sup> |
| m <sup>2</sup>        |
| m <sup>2</sup>        |

or, for linear activities:

Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Length of the activity:

|   |
|---|
| m |
| m |
| m |

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Size of the site/servitude:

|                       |
|-----------------------|
| +100000m <sup>2</sup> |
| m <sup>2</sup>        |
| m <sup>2</sup>        |

**10.2 Site Access**

Does ready access to the site exist?

|          |    |
|----------|----|
| YES<br>X | NO |
|----------|----|

If NO, what is the distance over which a new access road will be built

|     |
|-----|
| N/A |
|-----|

Describe the type of access road planned:

|     |
|-----|
| N/A |
|-----|

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

<sup>1</sup> "Alternative A.." refer to activity, process, technology or other alternatives.

### 10.3 Locality Map

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

**NOTE: SEE A3 LOCALITY MAP IN APPENDIX A1**

### 10.4 Layout/Route Plan

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

**NOTE: SEE A3 LAYOUT/ROUTE PLAN IN APPENDIX A2**

### 10.5 Sensitivity map

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100-year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.



The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

**NOTE: SEE A3 SENSITIVITY MAP IN APPENDIX A3**

### 10.6 Site Photographs

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

**NOTE: SEE SITE PHOTOGRAPHS IN APPENDIX B**

### 10.7 Facility Illustrations

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

**NOTE: SEE FACILITY ILLUSTRATIONS APPENDIX C**

### 10.8 Activity Motivation

Motivate and explain the need and desirability of the activity (including demand for the activity):

|  |                 |                |                |
|--|-----------------|----------------|----------------|
| <b>1. Is the activity permitted in terms of the property's existing land use rights?</b>   | <b>YES</b><br>X | NO             | Please explain |
| A re-zoning application is being undertaken and will be lodged to the relevant department. Please see Appendix J1 for letter form re-zoning company. and I   |                 |                |                |
| <b>2. Will the activity be in line with the following?</b>   |                 |                |                |
| <b>(a) Provincial Spatial Development Framework (PSDF)</b>   | <b>YES</b><br>X | NO             | Please explain |
| According to the PSDF of the Free State, to contribute to the broader growth and development policy objectives of government, the NSDP puts forward a set of five normative principles. Point number B states that:<br><br>Provincial Government see the agricultural sector and processing of agricultural products as critical to the well being of the province, both as a provider of basic agricultural goods and as an employer. |                 |                |                |
| <b>(b) Urban edge / Edge of Built environment for the area</b>   | YES<br>X        | <b>NO</b><br>X | Please explain |
| <b>(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible</b>   |                 |                |                |
|  | <b>YES</b><br>X | NO             | Please explain |

|  |                 |                |                |
|--|-----------------|----------------|----------------|
| <b>municipal IDP and SDF?).</b>  |                 |                |                |
| The proposed project will not compromise the existing IDP or SDF. It falls within an area set aside for agricultural development.  |                 |                |                |
| <b>(d) Approved Structure Plan of the Municipality</b>   | <b>YES</b><br>X | NO             | Please explain |
| No approved Structure Plan of the Municipality could be obtained.  |                 |                |                |
| <b>(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)</b>   | YES<br>X        | <b>NO</b><br>X | Please explain |
|  |                 |                |                |
| <b>(f) Any other Plans (e.g. Guide Plan)</b>   | Yes             | <b>NO</b><br>X | Please explain |
| None   |                 |                |                |
| <b>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</b>   | <b>YES</b><br>X | NO             | Please explain |
| Yes. The land use falls within the SDF of the local municipality in that the area is being developed for agriculture/manufacturing   |                 |                |                |
| <b>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</b>  | <b>YES</b><br>X | NO             | Please explain |
| The proposed activity will generate opportunities for work.  |                 |                |                |
| <b>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</b>   | YES             | <b>NO</b><br>X | Please explain |
| The property has ample space in order to develop the infrastructure needed.  |                 |                |                |
| <b>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</b> | <b>YES</b><br>X | NO             | Please explain |

|   |                 |                |                |
|---|-----------------|----------------|----------------|
| The proposed project will have no impact on the infrastructure planning of the municipality.  |                 |                |                |
| <b>7. Is this project part of a national programme to address an issue of national concern or importance?</b>   | <b>YES</b><br>X | NO             | Please explain |
| The project proposes to uplift the local community through creating jobs and aiding the local communities economy.  |                 |                |                |
| <b>8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)</b>                    | <b>YES</b><br>X | NO             | Please explain |
| Yes, the close proximity of the Vaal Dam will enable the project with water as required and permissible by the Department of Water and Sanitation. The current structures on the property will also aid in the development of the project |                 |                |                |
| <b>9. Is the development the best practicable environmental option for this land/site?</b>  | <b>YES</b><br>X | NO             | Please explain |
| The proposed site is in close proximity of a water source, with current structures which has been incorporated into the development plan of the project to mitigate impacts as far as reasonably possible.                                |                 |                |                |
| <b>10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?</b>  | <b>YES</b><br>X | NO             | Please explain |
| Yes, the project will propose to uplift the community and produce a lively aquaculture production unit which will in turn create jobs and support the local community.  |                 |                |                |
| <b>11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</b>  | YES             | <b>NO</b><br>X | Please explain |
| No, the proposed development will not set a precedent. As the project will consist of   |                 |                |                |
| <b>12. Will any person's rights be negatively affected by the proposed activity/ies?</b>  | YES             | <b>NO</b><br>X | Please explain |
| The proposed aims to uplift the local community.  |                 |                |                |
| <b>13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?</b>   | YES             | <b>NO</b><br>X | Please explain |
| The activity fall outside the urban edge.   |                 |                |                |
| <b>14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?</b>   | YES             | <b>NO</b><br>X | Please explain |
| N/A   |                 |                |                |
| <b>15. What will the benefits be to society in general and to the local communities?</b>  |                 |                | Please explain |
| Yes, the project will propose to uplift the community and produce a lively aquaculture production unit which will in turn create jobs and support the local community.  |                 |                |                |
| <b>16. Any other need and desirability considerations related to the proposed activity?</b>   |                 |                | Please explain |

|   |                |
|---|----------------|
| None  |                |
| <b>17. How does the project fit into the National Development Plan for 2030?</b>  | Please explain |
| The project is in synchronisation with the NDP 2030 with regard to creation of employment opportunities, the development of agro-processing, food security and the empowerment of farm workers by training and the reversal of the decline in the agricultural sector.  |                |
| <b>18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.</b>   |                |
| Through the undertaking of a Basic Assessment Process by a competent EAP, informed by guidelines, the consideration of impacts and alternatives (advantages and disadvantages coupled thereto) has been made. Moreover, the conducting of public participation and specialist investigations form part of the process, whilst mitigation measures and the need and desirability of the proposed project were interrogated. This ensured that all provisions of the Act were considered and as such Integrated Environmental Management were accounted for.  |                |
| <b>19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.</b>   |                |
| <p>Through the undertaking of a Basic Assessment process by a competent EAP, informed by guidelines, the consideration of impacts and alternatives (advantages and disadvantages coupled thereto) has been made. Moreover, the conducting of a public participation process and specialist investigations formed part of this basic assessment process, whilst mitigation measures and the needs and desirability of the proposed project were interrogated. This ensured that all provisions of the Act were considered and as such integrated environmental management were accounted for as follow:</p> <p><i>(2) Environmental Management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural heritage and social interests equitably.</i></p> <p>The goal of this BA is to identify and mitigate potential socio-economic impacts in order to meet the terms of Section 24 of the Constitution.</p> <p><i>(3) Development must be socially, environmentally and economically sustainable.</i></p> <p>The overall goal of this BA is to predict, identify and manage potential positive and negative impacts in the socio-economic, cultural-heritage and biophysical environments in order to meet the needs of present generations without compromising the needs of future generations which will give effect to sustainable development.</p> <p><i>(4)(a) Sustainable development requires the consideration of all relevant factors including the following:</i></p> <ul style="list-style-type: none"> <li><i>i. That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</i></li> <li><i>ii. that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</i></li> <li><i>iii. that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;</i></li> </ul> |                |

- iv. *that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;*
- v. *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*
- vi. *that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*
- vii. *that a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*
- viii. *that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*

An Environmental Management Program Report (EMP`r) was compiled to mitigate and manage all activities during the planning, construction and operational phases.

*(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*

All aspects, including socio-economic, cultural-heritage and biophysical was evaluated and assessed in order to minimize potential negative impacts which will give effect to Integrated Environmental Management, as set out in Chapter 5 of NEMA, 1998.

*(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*

A public participation process was undertaken in terms of Section 41 of the NEMA EIA Regulations, which came into effect on 4 December 2014, in order to give effect to Section 32 of the Constitution in such a way that adherence is given to Section 24 of the Constitution.

*(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*

The proposed project will serve as alternative energy to reduce the impact on a constrained electricity grid and transport sections.

*(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.*

The EMPr will be applicable throughout the lifecycle of the project.

*(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by*

*vulnerable and disadvantaged persons must be ensured.*

A public participation process was undertaken in terms of Section 41 of the NEMA EIA Regulations, which came into effect on 4 December 2014, in order to give effect to Section 32 of the Constitution in such a way that adherence is given to Section 24 of the Constitution.

*(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.*

The Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) decision making process has to be in accordance with the above.

*(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.*

*(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.*

This BAR does give effect to Section 5 of NEMA whereby all social, economic and environmental impacts of activities were considered, assessed and evaluated.

*(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.*

Human rights will be taken into account during all phases of the proposed project.

*(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.*

The decision will take place in an open and fair manner and to give effect to Section 32 of the Constitution. I&AP's will be notified of the decision in terms of the requirements as set out in Section 41 of the NEMA EIA Regulations, 2014.

*(l) There must be intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.*

All relevant Governmental Authorities will be considered during the BA process to give their inputs on the project.

*(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.*

Actual or potential conflicts of interest between organs of state should/will be resolved through conflict resolution procedures.

*(n) Global and international responsibilities relating to the environment must be discharged in the national interest.*

*(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.*

Through the appointment of various specialists, mitigation measures have been drawn up to ensure that the proposed project does not harm the environment. Architectural plans were designed according to South African Norms and Standards.

*(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.*

An EMPr were compiled in order to prevent or minimize any potential negative impacts to the environment. It will be the responsibility of the Applicant and Contractor to adhere to all measures set out in the EMPr, in order to give effect to Section 28 (1) of NEMA.

*(q) The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.*

*(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.*

A Sensitivity map containing all vulnerable vegetation, water courses and ecosystems were prepared in order to determine that the proposed project will have no negative impact thereon.

## 10.9 Applicable Legislation, Policies and/or Guidelines

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

| Title of legislation, policy or guideline  | Applicability to the project  | Administering authority  | Date |
|--|---|--|------|
| National Environmental Management Act (Act No. 107 of 1998)                                    | The proposed project triggers listed activities which may not commence without authorisation as stipulated in Section 24 (2)(a) of The National Environmental Management Act.   | The Department of Economic, Small Business Development, Tourism and Environmental Affairs. | 1998 |
| Environmental Impact Assessment Regulations 2014 promulgated in terms of Section 24(5) of NEMA | The proposed project triggers activities that would require environmental authorisation as set out in GN R No. 983.   | The Department of Economic, Small Business Development, Tourism and Environmental Affairs. | 2014 |
| Free State Province Spatial Development Framework (2014)                                       | The Free State Government is cognizant of the role that agriculture and the processing of the basic products play with regard to feed security and employment opportunities and would like to build on what is currently available. | Free State Province.   | 2014 |

## 10.10 Waste, Effluent, Emission and Noise Management

### a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

|                    |    |
|--------------------|----|
| YES<br>X           | NO |
| 360 m <sup>3</sup> |    |

If YES, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

Waste comprising of cement bags and general construction-related solid waste will be categorized and labelled in a general waste management area to be collected on site and kept at a temporary designated area (skip) and regularly removed by the Contractor to be disposed of at the Fezile Dabi landfill site. This will be included in the EMPr.

Where will the construction solid waste be disposed of (describe)?

All construction rubble will have to be disposed of by the Contractor at the Fezile Dabi landfill site.

Will the activity produce solid waste during its operational phase?

|                 |    |
|-----------------|----|
| YES<br>X        | NO |
| 5m <sup>3</sup> |    |

If YES, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

The solid waste will be categorized and labeled and form part of the general waste management system. Where possible the waste must be recycled, reduce and reused.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Fezile Dabi Landfill

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

N/A

*If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.*

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?

|     |         |
|-----|---------|
| YES | NO<br>X |
|-----|---------|

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?

|     |         |
|-----|---------|
| YES | NO<br>X |
|-----|---------|

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

### b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

|                |         |
|----------------|---------|
| YES            | NO<br>X |
| m <sup>3</sup> |         |
| YES            | NO      |

If YES, what estimated quantity will be produced per month?

Will the activity produce any effluent that will be treated and/or disposed of on



site? 

|  |          |
|--|----------|
|  | <b>X</b> |
|--|----------|

*If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.*

Will the activity produce effluent that will be treated and/or disposed of at another facility? 

|     |                       |
|-----|-----------------------|
| YES | <b>NO</b><br><b>X</b> |
|-----|-----------------------|

If YES, provide the particulars of the facility:

|                        |            |              |  |
|------------------------|------------|--------------|--|
| <b>Facility name:</b>  | <b>N/A</b> |              |  |
| <b>Contact person:</b> |            |              |  |
| <b>Postal address:</b> |            |              |  |
| <b>Postal code:</b>    |            |              |  |
| <b>Telephone:</b>      |            | <b>Cell:</b> |  |
| <b>E-mail:</b>         |            | <b>Fax:</b>  |  |

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

|     |
|-----|
| N/A |
|-----|

**c) Emissions into the atmosphere**

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities? 

|     |                       |
|-----|-----------------------|
| YES | <b>NO</b><br><b>X</b> |
|-----|-----------------------|

If YES, is it controlled by any legislation of any sphere of government? 

|     |                       |
|-----|-----------------------|
| YES | <b>NO</b><br><b>X</b> |
|-----|-----------------------|

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

|   |
|---|
| The only emission to be released are those of vehicle and dust as part of the construction phase and vehicle emissions during the operational phase of the project. |
|---|

**d) Waste permit**

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA? 

|     |                       |
|-----|-----------------------|
| YES | <b>NO</b><br><b>X</b> |
|-----|-----------------------|

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

**e) Generation of noise**

Will the activity generate noise? 

|     |                       |
|-----|-----------------------|
| YES | <b>NO</b><br><b>X</b> |
|-----|-----------------------|

If YES, is it controlled by any legislation of any sphere of government? 

|     |                       |
|-----|-----------------------|
| YES | <b>NO</b><br><b>X</b> |
|-----|-----------------------|

Describe the noise in terms of type and level:

---

- The only noise impact will be related to construction machinery and construction activities during the construction phase.

### 10.11 Water Use

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

|                |             |                  |                                    |       |                                    |
|----------------|-------------|------------------|------------------------------------|-------|------------------------------------|
| Municipal<br>X | Water board | Groundwater<br>x | River, stream,<br>dam or lake<br>X | Other | The activity will<br>not use water |
|----------------|-------------|------------------|------------------------------------|-------|------------------------------------|

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

**Total initial  
volume:1370000  
litre with a 10%  
top up (worst  
case scenario)**

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

|       |    |
|-------|----|
| YES X | NO |
|-------|----|

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

### 10.12 Energy Efficiency

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

Where possible the development will make use of solar systems to generate electricity.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

# 11 SECTION B: SITE/AREA/PROPERTY DESCRIPTION

## Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases, please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? 

|     |                |
|-----|----------------|
| YES | <b>NO</b><br>X |
|-----|----------------|

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

**Property description / physical address:**

|                              |   |
|------------------------------|---|
| <b>Province</b>              | Free State Province   |
| <b>District Municipality</b> | Fezile Dabi District Municipality   |
| <b>Local Municipality</b>    | Metsimaholo Local Municipality  |
| <b>Ward Number(s)</b>        |   |
| <b>Farm name and number</b>  | The site falls across 3 farm portions namely Driefontein 387, Parkerton 1386 and Tweefontein A 117. |
| <b>Portion number</b>        | Driefontein 387, Parkerton 1386 and Tweefontein A 117   |
| <b>SG Code</b>               | F0140000000038700001<br>F0140000000011700000<br>F01400000000138600006                               |

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

**Current land-use zoning as per local municipality IDP / records:**

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? 

|              |    |
|--------------|----|
| <b>YES X</b> | NO |
|--------------|----|

### 11.1 Gradient of the Site

Indicate the general gradient of the site.

#### Alternative S1:

|           |                         |             |             |              |             |                  |
|-----------|-------------------------|-------------|-------------|--------------|-------------|------------------|
| Flat<br>X | <b>1:50 – 1:20</b><br>X | 1:20 – 1:15 | 1:15 – 1:10 | 1:10 – 1:7,5 | 1:7,5 – 1:5 | Steeper than 1:5 |
|-----------|-------------------------|-------------|-------------|--------------|-------------|------------------|

#### Alternative S2 (if any):

|      |                         |             |             |              |             |                  |
|------|-------------------------|-------------|-------------|--------------|-------------|------------------|
| Flat | <b>1:50 – 1:20</b><br>X | 1:20 – 1:15 | 1:15 – 1:10 | 1:10 – 1:7,5 | 1:7,5 – 1:5 | Steeper than 1:5 |
|------|-------------------------|-------------|-------------|--------------|-------------|------------------|

#### Alternative S3 (if any):

|      |             |             |             |              |             |                  |
|------|-------------|-------------|-------------|--------------|-------------|------------------|
| Flat | 1:50 – 1:20 | 1:20 – 1:15 | 1:15 – 1:10 | 1:10 – 1:7,5 | 1:7,5 – 1:5 | Steeper than 1:5 |
|------|-------------|-------------|-------------|--------------|-------------|------------------|

### 11.2 Location in Landscape

Indicate the landform(s) that best describes the site:

|                                 |                          |                   |                                     |                                  |                          |
|---------------------------------|--------------------------|-------------------|-------------------------------------|----------------------------------|--------------------------|
| 2.1 Ridgeline                   | <input type="checkbox"/> | 2.4 Closed valley | <input type="checkbox"/>            | 2.7 Undulating plain / low hills | <input type="checkbox"/> |
| 2.2 Plateau                     | <input type="checkbox"/> | 2.5 Open valley   | <input type="checkbox"/>            | 2.8 Dune                         | <input type="checkbox"/> |
| 2.3 Side slope of hill/mountain | <input type="checkbox"/> | <b>2.6 Plain</b>  | <input checked="" type="checkbox"/> | 2.9 Seafront                     | <input type="checkbox"/> |
| 2.10 At sea                     | <input type="checkbox"/> |                   |                                     |                                  |                          |

### 11.3 Ground Water, Soil and Geological Stability of the Site

Is the site(s) located on any of the following?

|  | Alternative S1: |             | Alternative S2 (if any): |    | Alternative S3 (if any): |    |
|--|-----------------|-------------|--------------------------|----|--------------------------|----|
| Shallow water table (less than 1.5m deep)                  | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |
| Dolomite, sinkhole or doline areas                         | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |
| Seasonally wet soils (often close to water bodies)         | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |
| Unstable rocky slopes or steep slopes with loose soil      | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |
| Dispersive soils (soils that dissolve in water)            | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |
| Soils with high clay content (clay fraction more than 40%) | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |
| Any other unstable soil or geological feature              | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |
| An area sensitive to erosion                               | YES             | <b>NO X</b> | YES                      | NO | YES                      | NO |

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

## 11.4 Groundcover

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

|  |   |  |  |                              |
|--|---|--|--|------------------------------|
| Natural veld - good condition <sup>E</sup> | <b>Natural veld with scattered aliens<sup>E</sup></b><br><b>X</b> | <b>Natural veld with heavy alien infestation<sup>E</sup></b> X | Veld dominated by alien species <sup>E</sup> | Gardens                      |
| Sport field                                | Cultivated land   | Paved surface  | Building or other structure                  | <b>Bare soil</b><br><b>X</b> |

If any of the boxes marked with an “<sup>E</sup>” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

## 11.5 Surface Water

Indicate the surface water present on and or adjacent to the site and alternative sites?

|                              |     |                       |
|------------------------------|-----|-----------------------|
| Perennial River              | YES | <b>NO</b><br><b>X</b> |
| Non-Perennial River          | YES | <b>NO</b><br><b>X</b> |
| Permanent Wetland            | YES | <b>NO</b><br><b>X</b> |
| Seasonal Wetland             | YES | <b>NO</b> X           |
| Artificial Wetland           | YES | <b>NO</b><br><b>X</b> |
| Estuarine / Lagoonal wetland | YES | <b>NO</b><br><b>X</b> |

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

|  |
|--|
|  |
|--|

## 11.6 Land Use Character of Surrounding Area

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

|                                   |   |                                  |
|-----------------------------------|---|----------------------------------|
| <b>Natural area X</b>             | <b>Dam or reservoir X</b>                   | Polo fields                      |
| <b>Low density residential X</b>  | Hospital/medical centre                     | Filling station <sup>H</sup>     |
| Medium density residential        | School                                      | Landfill or waste treatment site |
| High density residential          | Tertiary education facility                 | Plantation                       |
| Informal residential <sup>A</sup> | <b>Church</b>                               | <b>Agriculture X</b>             |
| Retail commercial & warehousing   | Old age home                                | <b>River, stream or wetland</b>  |
| Light industrial                  | Sewage treatment plant <sup>A</sup>         | Nature conservation area         |
| Medium industrial <sup>AN</sup>   | Train station or shunting yard <sup>N</sup> | Mountain, koppie or ridge        |
| Heavy industrial <sup>AN</sup>    | Railway line <sup>N</sup>                   | Museum                           |

|  |   |                            |
|--|---|----------------------------|
| Power station                            | Major road (4 lanes or more) <sup>N</sup> | Historical building        |
| Office/consulting room                   | Airport <sup>N</sup>                      | Protected Area             |
| Military or police base/station/compound | Harbour                                   |                            |
| Spoil heap or slimes dam <sup>A</sup>    | Sport facilities                          | Archaeological site        |
| Quarry, sand or borrow pit               | Golf course                               | Other land uses (describe) |

If any of the boxes marked with an "N" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

|  |     |         |
|--|-----|---------|
| Critical Biodiversity Area (as per provincial conservation plan)             | YES | NO<br>X |
| Core area of a protected area?   | YES | NO<br>X |
| Buffer area of a protected area?   | YES | NO<br>X |
| Planned expansion area of an existing protected area?                        | YES | NO<br>X |
| Existing offset area associated with a previous Environmental Authorisation? | YES | NO<br>X |
| Buffer area of the SKA?  | YES | NO<br>X |

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

### 11.7 Cultural/Historical Features

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

|           |         |
|-----------|---------|
| YES<br>X  | NO<br>X |
| Uncertain |         |

The site falls within a High sensitivity Area for Palaeontology and will require a Heritage Impact Assessment, the specialist report will be included in the Final Basic Assessment.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

N/A

Will any building or structure older than 60 years be affected in any way?

|     |                       |
|-----|-----------------------|
| YES | <b>NO</b><br><b>X</b> |
| YES | <b>NO</b><br><b>X</b> |

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

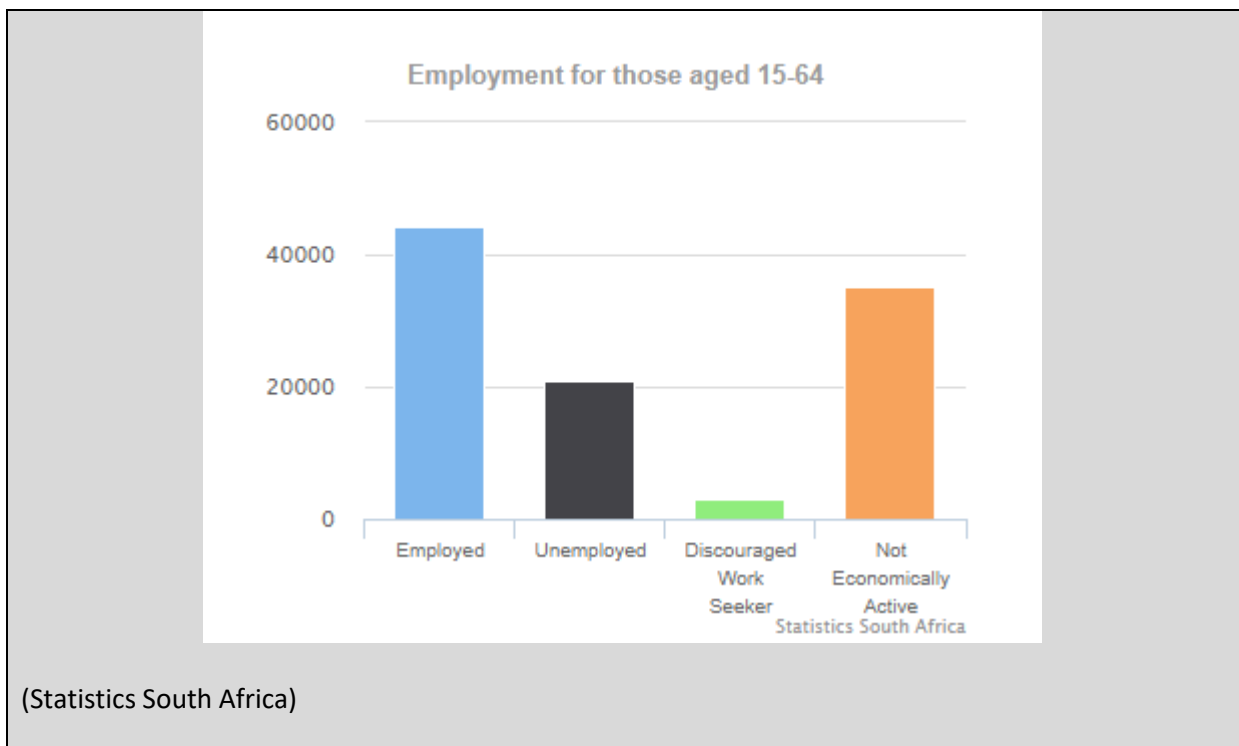
If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

### 11.8 Socio-Economic Character

#### a) Local Municipality

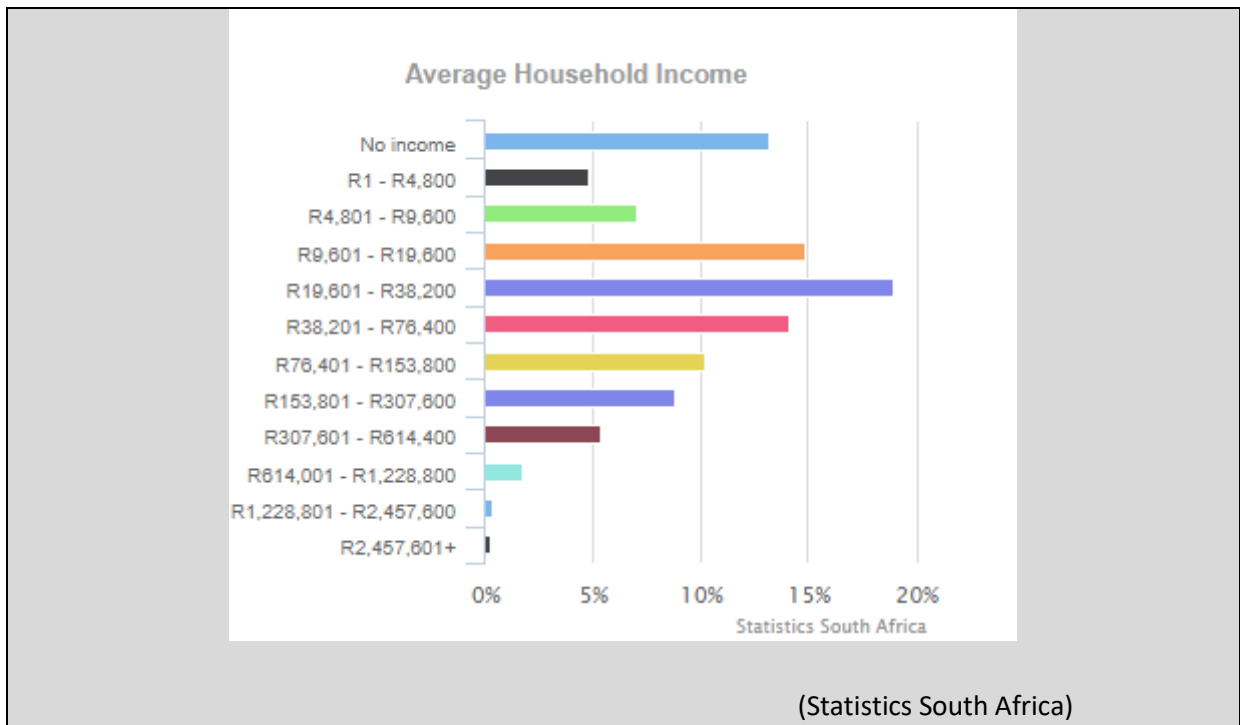
Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:



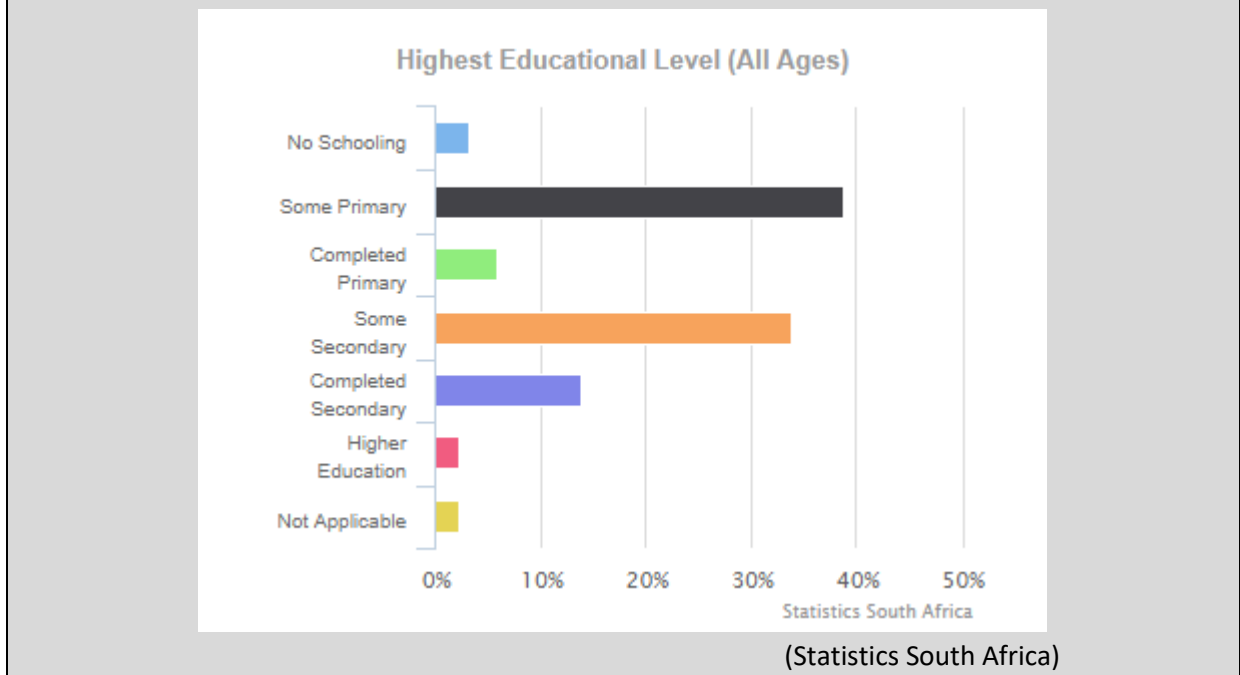
Economic profile of local municipality:

The Economic Profile of the Metsimaholo Local Municipality is summarized below. It is clear that the fourth highest percentage of people have no income. This project will contribute by providing new working opportunities during the construction phase.



Level of education:

It is evident from the below graph that the majority of people only have some primary education, followed by people with some secondary educations. Only 14% completed higher education. The Education levels are as follows:



**b) Socio-economic value of the activity**

|  |                        |
|--|------------------------|
| What is the expected capital value of the activity on completion?                            | <b>R 15,000,000.00</b> |
| What is the expected yearly income that will be generated by or as a result of the activity? | <b>R 8,0837,217.15</b> |



|  |                |         |
|--|----------------|---------|
| Will the activity contribute to service infrastructure?  | YES            | NO<br>X |
| Is the activity a public amenity?  | YES            | NO X    |
| How many new employment opportunities will be created in the development and construction phase of the activity/ies? | 80             |         |
| What is the expected value of the employment opportunities during the development and construction phase?            | R 320,000.00   |         |
| What percentage of this will accrue to previously disadvantaged individuals?   | 90%            |         |
| How many permanent new employment opportunities will be created during the operational phase of the activity?        | 40             |         |
| What is the expected current value of the employment opportunities during the first 10 years?                        | R 3,200,000.00 |         |
| What percentage of this will accrue to previously disadvantaged individuals?   | 100%           |         |

### 11.9 Biodiversity

Please note: The Department may request specialist input / studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or [BGIShelp@sanbi.org](mailto:BGIShelp@sanbi.org). Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

- a) **Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)**

| Systematic Biodiversity Planning Category   |                               |                                      |                                 | If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan  |
|---|-------------------------------|--------------------------------------|---------------------------------|---|
| Critical Biodiversity Area (CBA)  | Ecological Support Area (ESA) | <b>Other Natural Area (ONA)</b><br>X | No Natural Area Remaining (NNR) | The area is highly fragmented and disturbed with low PES and EIS scores. It is therefore of little, if any, significant ecological or conservational value to the larger surrounding ecosystem. |
| Please refer to <b>Appendix A3 – Sensitivity Map</b> for the complete Biodiversity Map. |                               |                                      |                                 |   |

- b) **Indicate and describe the habitat condition on site**

| Habitat Condition                                 | Percentage of habitat condition class (adding up to 100%) | Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes, etc.). |
|---|---|---|
| Natural   | 0 %   | -   |
| Near Natural (includes areas with low to moderate | 80 %  | A large portion of the property (80%) is covered by grass and scattered Alien Invasive species.   |

| Habitat Condition  | Percentage of habitat condition class (adding up to 100%) | Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes, etc.). |
|--|---|---|
| level of alien invasive plants)  |   |   |
| Degraded (includes areas heavily invaded by alien plants)                | 20 %  | A small portion of the property (20%) is heavily degraded with significant amount of Alien infestation.   |
| Transformed (includes cultivation, dams, urban, plantation, roads, etc.) | 0 %   | -   |

**c) Complete the table to indicate:**

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

| Terrestrial Ecosystems  |                                     | Aquatic Ecosystems   |  |  |         |  |           |  |
|---|-------------------------------------|--|--|--|---------|--|-----------|--|
| Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) | Critical                            | Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands) |  |  | Estuary |  | Coastline |  |
|   | Endangered                          |  |  |  |         |  |           |  |
|   | Vulnerable                          |  |  |  |         |  |           |  |
|   | <b>Least Threatened</b><br><b>X</b> |  |  |  |         |  |           |  |

**d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)**

The topography of the proposed site is flat to slightly undulating and undulating terrain, with grassland dominated by *Eragrostis curvula* and *Themeda triandra*, accompanied by *E. capensis*, *E. plana*, *E. racemosa*, *Cymbopogon pospischilii*, *Elionurus muticus* and *Aristida junciformis*. Please refer to the sensitivity map of the proposed site location below.

## 12 SECTION C: PUBLIC PARTICIPATION

### 12.1 Advertisement and Notice

|                             |                     |                  |
|-----------------------------|---------------------|------------------|
| <b>Publication name</b>     | Volksblad Newspaper |                  |
| <b>Date published</b>       | 13 November 2017    |                  |
| <b>Site notice position</b> | <b>Latitude</b>     | <b>Longitude</b> |
| Site Notice "A"             | 26° 59'41.14" S     | 28 21'17.09" E   |
| Site Notice "B"             | 26° 59'47.32" S     | 28 12'42.63" E   |
| <b>Date placed</b>          | 09 November 2017    |                  |

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

### 12.2 Determination of Appropriate Measures

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 982

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 982

| <b>Title, Name and Surname</b> | <b>Affiliation / key stakeholder status</b> | <b>Contact details (tel number or e-mail address)</b> |
|--------------------------------|---|---|
| Eskom                          | Eskom                                       | 016 457 5111  |
| SAHRA                          | SAHRA                                       | 021 462 4502  |
|                                |   |   |
|                                |   |   |
|                                |   |   |

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

### 12.3 Issues raised by Interested and Affected Parties

| <b>Summary of main issues raised by I&amp;APs</b> | <b>Summary of response from EAP</b> |
|---|-------------------------------------|
| <b>To be completed after initial PPP.</b>         |                                     |

### 12.4 Comments and Response Report

The practitioner must record all comments received from I&APs and respond to each comment before the Final BAR is submitted. The comments and responses must be captured in a comments

and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

## 12.5 Authority Participation

Authorities and organs of state identified as key stakeholders:

| Authority /Organ of State  | Contact person (Title, Name and Surname) | Tel No       | Fax No         | e-mail               | Postal address  |
|--|--|--------------|----------------|----------------------|---|
| Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs | Mrs Nozi Mabafokeng Nkoe                 | +27861102185 | +2751 400 9593 | nozicput@gmail.com   | Private bag X20801 Bloemfontein, 9310                                 |
| Department Water and Sanitation: Gauteng   | Mrs Florah Mambolo                       | 012 392 1361 | 012 392 1359   | mamabolof@dws.gov.za | 285 Francis Baard Street-Bothongo Plaza East building, Pretoria, 0001 |

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

## 12.6 Consultation with Other Stakeholders

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

## 13 SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

### 13.1 Impacts that may result from the Planning and Design, Construction, Operational, Decommissioning and Closure Phases as well as proposed management of identified impacts and proposed mitigation measures

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

#### Impact Assessment Methodology

For each potential impact, the EXTENT (spatial scale), MAGNITUDE, DURATION (time scale), PROBABILITY of occurrence, IRREPLACEABLE loss of resources and the REVERSIBILITY of potential impacts must be assessed by the specialist by using the results of their specialist studies. The assessment of the above criteria will be used to determine the significance of each impact, with and without the implementation of the proposed mitigation measures. The scales to be used to assess these variables and to define the rating categories are tabulated in Table 1 and Table 2 below. **Please note that the impacts will be reevaluated when the specialist has provided their inputs.**

| Evaluation component   | Ranking scale and description (criteria)   |
|--|--|
| <b>MAGNITUDE of NEGATIVE IMPACT</b> (at the indicated spatial scale) | <p><b>10 - Very high:</b> Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.</p> <p><b>8 - High:</b> Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.</p> <p><b>6 - Medium:</b> Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.</p> <p><b>4 - Low :</b> Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.</p> <p><b>2 - Very Low:</b> Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.</p> <p><b>0 - Zero:</b> Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p> |
| <b>MAGNITUDE of POSITIVE IMPACT</b> (at the indicated                | <p><b>10 - Very high (positive):</b> Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.</p> <p><b>8 - High (positive):</b> Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.</p> <p><b>6 - Medium (positive):</b> Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.</p>  |

|   |   |
|---|---|
| spatial scale)  | <p><b>4 - Low (positive):</b> Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.</p> <p><b>2 - Very Low (positive):</b> Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.</p> <p><b>0 - Zero (positive):</b> Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>   |
| <b>DURATION</b>   | <p><b>5 - Permanent</b></p> <p><b>4 - Long term:</b> Impact ceases after operational phase/life of the activity &gt; 60 years.</p> <p><b>3 - Medium term:</b> Impact might occur during the operational phase/life of the activity – 60 years.</p> <p><b>2 - Short term:</b> Impact might occur during the construction phase - &lt; 3 years.</p> <p><b>1 - Immediate</b></p>   |
| <b>EXTENT</b><br>(or spatial scale/influence of impact) | <p><b>5 - International:</b> Beyond National boundaries.</p> <p><b>4 - National:</b> Beyond Provincial boundaries and within National boundaries.</p> <p><b>3 - Regional:</b> Beyond 5 km of the proposed development and within Provincial boundaries.</p> <p><b>2 - Local:</b> Within 5 km of the proposed development.</p> <p><b>1 - Site-specific:</b> On site or within 100 m of the site boundary.</p> <p><b>0 - None</b></p> |
| <b>IRREPLACEABLE</b><br>loss of resources               | <p><b>5 – Definite</b> loss of irreplaceable resources.</p> <p><b>4 – High</b> potential for loss of irreplaceable resources.</p> <p><b>3 – Moderate</b> potential for loss of irreplaceable resources.</p> <p><b>2 – Low</b> potential for loss of irreplaceable resources.</p> <p><b>1 – Very low</b> potential for loss of irreplaceable resources.</p> <p><b>0 - None</b></p>   |
| <b>REVERSIBILITY</b><br>of impact                       | <p><b>5 – Impact cannot</b> be reversed.</p> <p><b>4 – Low</b> potential that impact might be reversed.</p> <p><b>3 – Moderate</b> potential that impact might be reversed.</p> <p><b>2 – High</b> potential that impact might be reversed.</p> <p><b>1 – Impact will be</b> reversible.</p> <p><b>0 – No impact.</b></p>   |
| <b>PROBABILITY</b><br>(of occurrence)                   | <p><b>5 - Definite:</b> &gt;95% chance of the potential impact occurring.</p> <p><b>4 - High probability:</b> 75% - 95% chance of the potential impact occurring.</p> <p><b>3 - Medium probability:</b> 25% - 75% chance of the potential impact occurring</p> <p><b>2 - Low probability:</b> 5% - 25% chance of the potential impact occurring.</p> <p><b>1 - Improbable:</b> &lt;5% chance of the potential impact occurring.</p> |
| <b>Evaluation component</b>                             | <b>Ranking scale and description (criteria)</b>   |

|                           |   |
|---------------------------|---|
| <b>CUMULATIVE impacts</b> | <p><b>High:</b> The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Medium:</b> The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Low:</b> The activity is localised and might have a negligible cumulative impact.</p> <p><b>None:</b> No cumulative impact on the environment.</p> |
|---------------------------|---|

Table 1: Evaluation components, rankings scales and description (criteria).

| Significance Points | Environmental Significance | Description  |
|---------------------|----------------------------|--|
| 125 – 150           | <b>Very high (VH)</b>      | An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.  |
| 100 – 124           | <b>High (H)</b>            | An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.   |
| 75 – 99             | <b>Medium-high (MH)</b>    | If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.  |
| 40 – 74             | <b>Medium (M)</b>          | If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.  |
| <40                 | <b>Low (L)</b>             | An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation. |
| +                   | <b>Positive impact (+)</b> | A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.  |

Table 2: Definition of significance ratings (positive and negative)

Once the evaluation components have been ranked for each potential impact, the significance of each potential impact will be assessed (or calculated) using the following formula:

- **SP (significance points) = (magnitude + duration + extent + irreplaceability +reversibility) x probability**

The maximum value is 150 SP (significance points). The unmitigated and mitigated scenarios for each potential environmental impact should be rated as per Table below.

A complete impact assessment in terms of Regulation 19(3) of GN 982 must be included as Appendix F.

NOTE: PLEASE REFER TO APPENDIX F FOR A DETAILED IMPACT ASSESSMENT

### 13.2 Potential Impacts during Planning, Design and Construction Phases

| Planning, design and construction phase   | Preferred Layout Alternative  |                    | No-Go Alternative   |
|---|---|--------------------|---|
|   | Before Mitigation   | After Mitigation   |   |
| <b>Potential Fauna and Flora Impacts:</b>   |   |                    |   |
| <b>Nature of impact:</b><br>Direct impact on Fauna and Flora as a result of vegetation clearance.                                   | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |                    | No impact will occur as the development activities will not take place. Fauna and Flora features of the proposed development site will remain unaffected.         |
| <b>Significance rating:</b>   | Low (L)   | + Medium-high (MH) | -   |
| <b>Cumulative impact:</b>   | -   | -                  | -   |
| <b>Potential Dust Impacts:</b>  |   |                    |   |
| <b>Nature of impact:</b><br>Dust nuisance generated by the operation of machinery and vehicles.                                     | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |                    | No impact will occur as the development activities will not take place. Dust features of the proposed development site will remain unaffected.                    |
| <b>Significance rating:</b>   | Low (L)   | Low (L)            | -   |
| <b>Cumulative impact:</b>   | -   | -                  | -   |
| <b>Potential Noise Impacts:</b>   |   |                    |   |
| <b>Nature of impact:</b><br>Noise nuisance generated by construction works from vehicles and personnel.                             | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |                    | No impact will occur as the development activities will not take place. Noise features of the proposed development site will remain unaffected.                   |
| <b>Significance rating:</b>   | Low (L)   | Low (L)            | -   |
| <b>Cumulative impact:</b>   | -   | -                  | -   |
| <b>Potential Cultural and Heritage Impacts:</b>   |   |                    |   |
| <b>Nature of impact:</b><br>Damage and destruction of vertebrate fossils during excavation activities.                              | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |                    | No impact will occur as the development activities will not take place. Cultural and Historical features of the proposed development site will remain unaffected. |
| <b>Significance rating:</b>   | Low (L)   | Low (L)            | -   |
| <b>Cumulative impact:</b>   | -   | -                  | -   |
| <b>Potential Surface and Groundwater Contamination Impacts:</b>   |   |                    |   |
| <b>Nature of impact:</b><br>Surface and groundwater contamination by construction activities such as the use of hazardous materials | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |                    | No impact will occur as the development activities will not take place. Water features of the proposed development site will remain unaffected.                   |



| Planning, design and construction phase   | Preferred Layout Alternative   |                  | No-Go Alternative   |
|---|--|------------------|---|
|   | Before Mitigation  | After Mitigation |   |
| on site, e.g. fuel and oil.   |  |                  |   |
| <b>Significance rating:</b>   | Medium (M)   | Low (L)          | -   |
| <b>Cumulative impact:</b>   | -  | -                | -   |
| <b>Potential Waste Management Impacts:</b>  |  |                  |   |
| <b>Nature of impact:</b><br>Handling of general waste materials on the construction site.                         | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project  |                  | No impact will occur as the development activities will not take place. Waste features of the proposed development site will remain unaffected.   |
| <b>Significance rating:</b>   | Low (L)  | Low (L)          | -   |
| <b>Cumulative impact:</b>   | -  | -                | -   |
| <b>Potential Traffic Impacts:</b>   |  |                  |   |
| <b>Nature of impact:</b><br>Traffic impacts associated with movement of construction vehicles on site.            | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project  |                  | No impact will occur as the development activities will not take place. Traffic features of the proposed development site will remain unaffected. |
| <b>Significance rating:</b>   | Low (L)  | Low (L)          | -   |
| <b>Cumulative impact:</b>   | -  | -                | -   |
| <b>Potential Fire Risk Impacts:</b>   |  |                  |   |
| <b>Nature of impact:</b><br>Increased risk of fires through the use of hazardous and flammable materials on site. | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project  |                  | No impact will occur as the development activities will not take place. Fire features of the proposed development site will remain unaffected.    |
| <b>Significance rating:</b>   | Low (L)  | Low (L)          | -   |
| <b>Cumulative impact:</b>   | -  | -                | -   |
| <b>Potential Soil Contamination Impacts:</b>  |  |                  |   |
| <b>Nature of impact:</b><br>Increased Soil contamination by means of hazardous substances.                        | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project  |                  | No impact will occur as the development activities will not take place. Soil features of the proposed development site will remain unaffected.    |
| <b>Significance rating:</b>   | Low (L)  | Low (L)          | -   |
| <b>Cumulative impact:</b>   | -  | -                | -   |
| <b>Potential Soil Erosion Impacts:</b>  |  |                  |   |
| <b>Nature of impact:</b><br>Increased Soil erosion due to construction activities.                                | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project. |                  | No impact will occur as the development activities will not take place. Soil features of the proposed development site will remain unaffected.    |
| <b>Significance rating:</b>   | Low (L)  | Low (L)          | -   |

| Planning, design and construction phase  | Preferred Layout Alternative  |                    | No-Go Alternative  |
|--|---|--------------------|--|
|  | Before Mitigation   | After Mitigation   |  |
| <b>Cumulative impact:</b>  | -   | -                  | -  |
| <b>Potential Visual Impacts:</b>   |   |                    |  |
| <b>Nature of impact:</b><br>Increased visual impact due to increased working activities on-site.                       | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |                    | No impact will occur as the development activities will not take place. Visual features of the proposed development site will remain unaffected.         |
| <b>Significance rating:</b>  | Low (L)   | Low (L)            | -  |
| <b>Cumulative impact:</b>  | -   | -                  | -  |
| <b>Potential Socio-Economic Impacts:</b>   |   |                    |  |
| <b>Nature of impact:</b><br>Increased socio-economic conditions due to job creation created by construction activities | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |                    | No impact will occur as the development activities will not take place. Socio-economic features of the proposed development site will remain unaffected. |
| <b>Significance rating:</b>  | + Medium (M)  | + Medium-high (MH) | Medium-high (MH)   |
| <b>Cumulative impact:</b>  | -   | -                  | -  |

### 13.3 Potential Impacts during Operational Phase

|  |   |         |   |
|--|---|---------|---|
| <b>Potential Dust Impacts:</b>   |   |         |   |
| <b>Nature of impact:</b><br>Dust nuisance generated by the passing through of diesel transport vehicles.           | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |         | No impact will occur as the development activities will not take place. Dust features of the proposed development site will remain unaffected.    |
| <b>Significance rating:</b>  | Low (L)   | Low (L) | -   |
| <b>Cumulative impact:</b>  | -   | -       | -   |
| <b>Potential Noise Impacts:</b>  |   |         |   |
| <b>Nature of impact:</b><br>Noise nuisance generated by transport vehicles and personnel.                          | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |         | No impact will occur as the development activities will not take place. Noise features of the proposed development site will remain unaffected.   |
| <b>Significance rating:</b>  | Low (L)   | Low (L) | -   |
| <b>Cumulative impact:</b>  | -   | -       | -   |
| <b>Potential Traffic Impacts:</b>  |   |         |   |
| <b>Nature of impact:</b><br>Traffic impacts associated with movement of diesel transport vehicles on and off site. | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |         | No impact will occur as the development activities will not take place. Traffic features of the proposed development site will remain unaffected. |
| <b>Significance rating:</b>  | Low (L)   | Low (L) | -   |

|   |   |         |  |
|---|---|---------|--|
| <b>Cumulative impact:</b>   | -   | -       | -  |
| <b>Potential Fire Risk Impacts:</b>   |   |         |  |
| <b>Nature of impact:</b><br>Increased risk of fires through the use of hazardous and flammable materials on site. | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |         | No impact will occur as the development activities will not take place. Fire features of the proposed development site will remain unaffected.                                   |
| <b>Significance rating:</b>   | Medium(M)   | Low (L) | -  |
| <b>Cumulative impact:</b>   | -   | -       | -  |
| <b>Potential Soil Contamination Impacts:</b>  |   |         |  |
| <b>Nature of impact:</b><br>Increased Soil contamination by means of hazardous substances.                        | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |         | No impact will occur as the development activities will not take place. Soil features of the proposed development site will remain unaffected.                                   |
| <b>Significance rating:</b>   | Low (L)   | Low (L) | -  |
| <b>Cumulative impact:</b>   | -   | -       | -  |
| <b>Potential Visual Impacts:</b>  |   |         |  |
| <b>Nature of impact:</b><br>Increased visual impact due to increased working activities on-site.                  | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |         | No impact will occur as the development activities will not take place. Visual features of the proposed development site will remain unaffected.                                 |
| <b>Significance rating:</b>   | Low (L)   | Low (L) | -  |
| <b>Cumulative impact:</b>   | -   | -       | -  |
| <b>Potential Ground and Surface Water Contamination Impacts:</b>  |   |         |  |
| <b>Nature of impact:</b><br>Surface and Ground water contamination from seepages                                  | <b>Activity:</b><br>Proposed development of Fezile Dabi Fishery Project |         | No impact will occur as the development activities will not take place. Ground and surface water contamination features of the proposed development site will remain unaffected. |
| <b>Significance rating:</b>   | Low (L)   | Low (L) | -  |
| <b>Cumulative impact:</b>   | -   | -       | -  |

### 13.4 Environmental Impact Statement

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

The applicant proposes the construction of a modular Tilapia Production Unit, Fezile Dabi, Free State

Province.

The newly proposed development will include the following:

Grow-Out Facility (1205m<sup>2</sup>)

Hatchery & Brood Stock Facility (1881m<sup>2</sup>)

Laboratory Facility (107m<sup>2</sup>)

Fish Processing Facility (795m<sup>2</sup>)

Staff Changing Rooms (655m<sup>2</sup>)

Feed Production & Processing Facility (1442m<sup>2</sup>)

Workshop Building (184m<sup>2</sup>)

Gate House (10m<sup>2</sup>)

Administration Block (722m<sup>2</sup>)

Agri-Processing vegetable & Pack house (852m<sup>2</sup>)

Residential Zone

Trading Centre

Integrated crop production

All potential impacts on biological, geological and physical, noise, socio-economic and cultural-heritage aspects range from a moderate to low significance without mitigation and management thereof, however it can all be mitigated to an acceptable low significance rating with implementation of the mitigation measures and strict compliance with the EMPr.

Impacts associated with this proposed project are described and the significance rating given in Section D and Appendix F.

### **No-go alternative (compulsory)**

The No-go alternative will leave the proposed area as is. The proposed no-go alternative will leave approximately ninety million ZAR in capital value unspent which could be used to appoint contractors and provide numerous employment opportunities during the construction phase. Additionally, 2.3 million ZAR would be lost in employment opportunities during the first 10 years of the development, 100% of which would accrue to previously disadvantaged individuals.

## 14 SECTION E: RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

|                 |    |
|-----------------|----|
| <b>YES</b><br>X | NO |
|-----------------|----|

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

The final recommendations for the proposed development will be incorporated in the final Basic Assessment, which will include the inputs and recommendations of the specialists.

Based on the outcome of the Basic Assessment report and the Impact assessment, as attached in Appendix F, the EAP has no objections to the proposed project and is of the opinion that an Environmental Authorisation may be provided to the applicant. This said, it is imperative that the following recommendation and the EMP are implemented and adhered to during all phases of the project.

**Monitoring:**

- The project must be constantly monitored for the impacts of excessive nitrates and the distribution of Alien Invasive Species. Strict measures must be in place to prevent any damages in this regard

**Dust Nuisance:**

- Implement dust suppression measures e.g. regular watering of dusty surfaces.

**Noise Nuisance:**

- Limit working hours of noisy equipment,
- Ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.

**Site Specific Conditions:**

- The design of the tanks must comply with the relevant SANS and SABS codes and Standards.
- All Municipal by-laws with respect to the storage of dangerous goods and health and safety must be adhered to.
- All mitigation measures for the installation of the tanks and associated infrastructure as stipulated in the EMP must implemented.

Is an EMP attached?

|                 |    |
|-----------------|----|
| <b>YES</b><br>X | NO |
|-----------------|----|

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

Mrs Natasha Reynolds

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NAME OF EAP

09 November 2017

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SIGNATURE OF EAP

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DATE

## 15 Section F: Appendixes

### Appendix A: Maps

*Appendix A1: Locality Map*

*Appendix A2: Layout/Route Map*

*Appendix A3: Sensitivity Map*

### Appendix B: Photographs

### Appendix C: Facility illustration(s)

### Appendix D: Specialist reports (including terms of reference)

### Appendix E: Public Participation

### Appendix F: Impact Assessment

### Appendix G: Environmental Management Programme (EMPr)

### Appendix H: Details of EAP and expertise

### Appendix I: Specialist's declaration of interest

## 16 References

Free State Department of Cooperative Governance and Traditional Affairs. 2014. Free State Provincial Spatial Development Framework.

Mucina, L. and Rutherford, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

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