CHAPTER TWO: PROJECT DESCRIPTION

2.1 INTRODUCTION

Die Boeram Venter Trust (the applicant) is proposing the establishment and operation of a composting and fertiliser processing facility on Farm 715 Division Uitenhage, approximately 377 ha in extent. The farm is currently zoned for agricultural use and falls outside of the urban edge of the Nelson Mandela Bay Municipality (NMBM), while still within its jurisdiction, with a northern portion of the farm falling within the jurisdiction of the Sundays River Valley Municipality (SRVM). The portion of the site proposed for the development falls within the jurisdiction of the NMBM.

The final layout and footprint for the project will be determined through the Scoping and EIA process taking into account input received from I&APs (including affected organs of state), recommendations from the specialist assessments as well as technical input. The specialist assessments will be summarized for inclusion in the Draft EIA, which will be released for a 40 day public review period in the EIA phase of the assessment process.

2.2 PROJECT OVERVIEW

Farm 715 is currently zoned for agricultural use and is being used for small scale crop farming as well as rangeland (cattle and game), including associated infrastructure (farm house, dams and irrigation infrastructure, storage/maintenance sheds). The farm is currently fenced and it is proposed the project is developed in phases to provide for the following:

- Composting site (approximately 10 ha)
    - Mechanical bagging and bulk storage
- Fertiliser processing plant (approximately 2 400m^2), in a phased manner
    - Phase One: Storage and collection area
    - Phase Two: Product intake and processing area
- Associated bulk infrastructure (internal roads, water, electricity, stormwater management and sanitation)

The total proposed developed area is anticipated to be approximately 10.5 ha and the development footprints (composting and fertiliser processing plant) will require a suitable zoning while the remainder of the farm is proposed to continue zoned for agriculture. The proposed future zoning of the development footprints will be determined in consultation with the competent authority, the NMBM.

The applicant proposes to produce fertiliser primarily from the composting of poultry litter, using an aerobic process. The composting facility will receive approximately 75 000m^3 (30 000 tons) of poultry litter annually, via enclosed side tipper trucks. The compost will be placed in windrows for a period of two to four months, to produce approximately 25 000m^3 of fertiliser annually. The discrepancy in the volume of the bulk delivered and the product produced is accounted for as follows. The poultry litter delivered to the facility loses bulk due to bacterial decay of organic matter and evaporative water losses. The volume lost will vary dependent on the composition of the raw material and its moisture content. After completion of the composting cycle the compost can either be sold directly to users in bagged or bulk form; or be processed further (pelletised) before being

sold. The applicant proposes a phased approach to the bagging, bulk storage; and further processing of the fertiliser.

The product intake and processing section of the fertiliser processing plant is required predominantly to produce pelletised fertiliser. Pelletised fertiliser is applied with the aid of mechanical spreaders and is utilised for various forms of crop farming. Citrus farming however, requires more controlled application of fertiliser at the base of trees, thus negating the need for pelletised fertiliser, which is used in mechanical spreaders. Due to the nature of the agricultural activities in the region, citrus farming in the Addo and Sunlands area, it is anticipated the greater initial demand will be for non-pelletised fertiliser. Based on growth in demand for pelletised fertiliser the applicant intends to construct the fertiliser processing plant in phases.

During Phase One the applicant proposes to manually bag the composted fertiliser (after completion of the composting cycle) by means of a mobile mechanical bagger and store the bagged product in existing storage sheds on site prior to collection or distribution to markets. The applicant also proposes to cater for the bulk storage and collection of fertiliser during Phase One, which would require the construction of the bulk storage and collection area of the fertiliser processing plant. Once the compost has completed its cycle it will be transported via tractor-trailer to the storage and collection area of the fertiliser plant for storage in silo's.

Figure 2.1 Example of a mobile mechanical bagger

The applicant intends, as far as possible, to utilise the existing internal vehicle tracks on site. These tracks may need to be upgraded for use by vehicles transporting the poultry litter to the composting facility and between the composting facility and processing plant as well as vehicles collecting the bagged and bulk fertiliser from the fertiliser plant.

The following project activities will need to be undertaken for the proposed development to proceed:

- Clearing of vegetation on site for the establishment of the composting site, the fertiliser processing plant and stormwater detention facility.
- Construction of the processing plant (2 400m^2) in phases
    - Phase 1: Product Storage and collection area
    - Phase 2: Product intake and processing area
- Establishment of suitable stormwater management system
- Clearing of vegetation for the installation of bulk services (suitable internal road network between the composting site and the processing facility, sanitation, water, electricity).

The section below provides more detail on the respective project components. The layout and footprint for the composting facility and fertiliser processing plant will be subject to input received

from I&APs (including affected authorities), as well as from the relevant technical and environmental specialists, during the environmental impact assessment process.

2.2.1 Composting Facility

It is proposed that the poultry litter is sourced from various poultry production facilities in and around the Metro from where it will be delivered directly to the site (Farm 715) via covered side-tipper trucks. The composting footprint will consist of approximately 120 rows (or windrows) of poultry litter approximately 3m wide, 1.5m high and 100m long (75 000m^3 or 30 000 tons of poultry litter annually). Gaps of approximately 2m wide are required between the rows to allow for the movement of vehicles (delivery of product, machinery for watering, mechanical compost turner, mechanical bagger and compost collector). The composting footprint is proposed to be approximately 10ha in extent.

Figure 2.2 Example typical windrows

Figure 2.3 Example of a compost turner

The poultry litter, once delivered, will remain in a windrow for a period of between 2 to 4 months until it is fully composted. The composting time is determined by the heat and moisture content of the compost which is anticipated to fluctuate depending on the time of the year. Due to the staged nature of the process it is unlikely that all 120 rows will be in use at exactly the same time. It is however estimated that the site will accommodate 3 cycles annually.

Figure 2.4 Example of windrow covers

During the composting process the windrow is monitored for moisture content and temperature, as these factors influence the efficiency of the process. A mechanical compost turner will be used to turn the windrows as this becomes necessary (to inhibit anaerobic conditions and maintain optimum temperature and moisture levels). See figure 2.2 above for an example of a typical mechanical compost turner. It is expected that during the first two months turning of the compost will take place approximately once a week, to allow temperature and moisture conditions to reach optimum composting levels. During the last two months turning is expected to take place once every two weeks. The frequency of the turning is dependent on the temperature and moisture content of the compost, which is determined through regularly testing; every third day during the

first two months, and every second week during the last 2 months of the cycle. Additional tests for pathogens and microbes are undertaken every third week during the estimated 2 to 4 month cycle.

It is proposed the environmental assessment process assesses the feasibility of utilising windrow covers as moisture guards. A key component of the composting process is the management of moisture levels. The covering of the windrows during periods of rain could assist in maintaining the moisture content of the manure as well as assist with the management of nutrient enriched runoff water.

The air quality specialist study must, amongst others, assess the effectiveness of odour control mechanisms in the elimination of odours, e.g. Airborne10 and similar substances.

The footprint for the composting component of the project on the farm will need to take into account the following:

- Bio-physical constraints (e.g. ecological corridors, drainage lines, sensitive areas, species of special concern).
- Geology and geohydrology
- Air quality issues of concern (odour) - an assessment of odour control measures.
- Borehole yield
- Technical requirements (runoff water and stormwater management, accessibility, slope, existing infrastructure).

2.2.2 Fertiliser Processing Plant

As noted in section 2.2, after completion of the composting cycle the applicant proposes a phased approach to the bagging, bulk storage and further processing of the fertiliser.

Depending on market demand it is anticipated the completion of the construction of the fertiliser processing plant will be within five years of the establishment of the composting component of the proposed project. Upon completion, the facility will be an enclosed roofed structure with a footprint of approximately 2 400m² and 20 m high. The fertiliser processing plant can be divided into the following areas:

- Product intake area
- Processing area
- Storage and collection area
- Services and offices (boiler, electricity, compressed air, work shed)

The fertiliser plant will produce the:

- Fertiliser for commercial collection
- Enriched organic fertiliser[1]
- Organic fertiliser
- Pelletised fertiliser

[1] As specified in the Fertilisers, Farm Feeds, Agricultural Remedies & Stock Remedies Act (Act 36 of 1947)

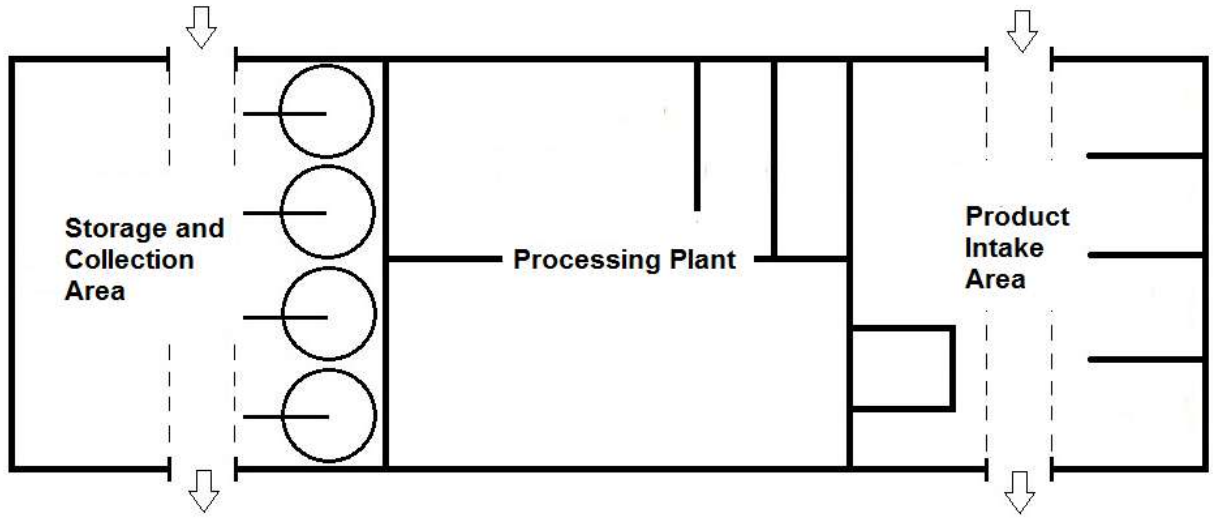

Figure 2.5: Plan view of fertiliser facility layout showing different process areas within the facility.

2.2.2.1 Product Intake Area

The product intake area will be developed during Phase Two of the project, as it is directly linked to the further processing of the fertiliser.

The product intake area is a drive through roofed area, with a concrete floor, where the fertiliser is delivered via tractor-trailer, to a separately demarcated temporary storage area. The product intake area includes a product intake pit, using a small front end loader the product is placed in the product intake pit, which consists of a grid and grinder. The product is placed on top of the grid which acts as a sieve for the removal of any debris, e.g. wood and stone. It is anticipated that this process will produce dust which will require extractors with filters. The grinder acts as the first stage in the refining of the fertiliser from where it is piped into the processing section of the facility and into a bucket elevator.

2.2.2.2 Processing Area

The processing area of the plant is where the fertiliser is further mechanically processed to produce fertiliser for commercial collection, enriched organic fertiliser[2], organic fertiliser and pelletised fertiliser. The following equipment will be installed in the processing area of the fertiliser plant, during phase two:

- 1st bucket elevator
- 1st bin leading to a sieve, grinder and hopper with dust extractor
- Mixer with 3 silo's for optional additives
- 2nd bucket elevator
- 2nd bin leading to the pelletiser and cooler with dust extractor, or
- Direct piping to the 3rd bucket elevator
- 3rd bucket elevator leading to the silo storage and collection area

[2] As specified in the Fertilisers, Farm Feeds, Agricultural Remedies & Stock Remedies Act (Act 36 of 1947)

The fertiliser is piped to the processing area and 1st bin, from the product intake area, via a bucket elevator. From the 1st bin the product enters a sieve/screen, which removes any remaining debris such as stones and wood. The sieve contains an outlet pipe which directly deposits the debris into a skip for storage and removal. From the sieve the fertiliser is piped to a grinder and hopper for further refining of the product. The hopper includes a dust extractor for the removal of dust. From the hopper the product is piped to a mixer which includes 3 x 1m^3 storage bins or pallets of gypsum or LAN (limestone ammonium nitrate). At this stage inorganic substances such as gypsum or LAN can be added to the fertiliser for further enhancement of the product, depending on the end use requirement, however, not all of the fertiliser will be mixed with inorganic substances.

From the mixer, the fertiliser is transported via the 2nd bucket elevator to the 2nd bin, from where it can be either directly piped to the last bucket elevator and silo storage area, or to a pelletising machine, depending on demand.

The pelletising machine operates through the induction of steam which mechanically bonds and presses the product to form pellets of various sizes, depending on market demand and end user requirements. Steam will be provided from a boiler using HFO (heavy fuel oil), gas or coal. The now heated product requires cooling and is piped to a cooler which is provided with compressed air, this process results in the emission of air of a higher temperature, which passes through a dust collector. Dust collected from the cooler as well as the hopper is reintroduced back into the process as a product.

The last stage in the processing area is where the product (pelletised or non-pelletised) is piped to the 3rd bucket elevator to be deposited into one of four silos (28 tons each) located in the storage and collection area of the facility.

2.2.2.3 Storage and Collection Area

The storage and collection area contains four silos of 28 tons each for the storage and bagging of the product, prior to collection. The applicant proposes to construct the storage and collection area as part of Phase One of the project. Once the compost has completed its cycle it will be transported via tractor-trailer directly to the storage and collection area of the fertiliser processing facility to be deposited into the silo's. The storage area will also store fertiliser that has been bagged by the mobile mechanical bagger, and which cannot be accommodated in the existing storage sheds on site.

During Phase Two of the project the storage and collection area will receive the fertiliser produced in the processing area of the facility, as follows:

- Bulk commercial collection by vehicles
- Inorganic fertiliser
- Organic fertiliser
- Pelletised fertiliser

The inorganic, organic and pelletised fertiliser can be bagged into 5kg, 50kg and 1 ton bags or be directly loaded as bulk onto a truck. Should the fertiliser be bagged, it is piped from the silo in an enclosed conveyor directly to the bagging chute, where it is bagged and stored in the same area, prior to collection. It is anticipated that the bulk loading of the final product into trucks will result in

the generation of dust which may require an extractor with a filter. The bagging, storage and collection area will be an enclosed roofed structure with a concrete floor.

2.2.2.4 Services and Office Area

An area of the facility is set aside for services and offices. Services to be provided include the boiler for steam, air compressor, work shop and offices. The offices will require electricity, water and sanitation services for approximately 5 employees.

2.2.3 Bulk Services

The property is currently used for small scale crop farming and as range land (stock and game) and as such has the following existing infrastructure.

- Functioning borehole and water storage dam
- An existing farmhouse, serviced with water, sanitation and electricity.
- Outbuildings and a shed used as a workshop area and for the storage of various farming equipment.
- Informal vehicle tracks traverse the property which is fully enclosed by a fence.

2.2.3.1 Water Requirements

The poultry litter removed from the poultry facilities contains an estimated 40% moisture content. Once delivered to the composting facility, the poultry litter is only required to be watered once, during the first week of the cycle. "*Moisture is necessary to support the metabolic activity of the micro-organisms. Composting materials should maintain a moisture content of 40–65 percent. Where the pile is too dry, composting occurs more slowly, while a moisture content in excess of 65 percent develops anaerobic conditions. In practice, it is advisable to start the pile with a moisture content of 50–60 percent, finishing at about 30 percent." (*Misra et al. 2003)

The windrows require watering in order to ensure that optimum moisture conditions are maintained. It is estimated that approximately 6000 litres (6kL) of water will be required per 100 meter row. Thus 3 cycles of 120 rows (360 rows annually), will require 2 160 000 litres (2160 kL) of water annually, or 8 300 litres of water per day. It is expected that watering requirements may fluctuate with the season, with greater quantities required in summer and smaller quantities required in winter. As indicated in section 2.2.1 above, due to the staged nature of the process it is unlikely all 120 rows will be in use at exactly the same time. The estimated water demand for the watering of the rows of compost is a cautious approach to the EIA process and assumes the worst case scenario, 3 cycles of 120 rows annually.

Water will also be required by the fertiliser plant for steam generation and cooling purposes, as well as for domestic consumption by approximately 5 employees. The Annual Average Daily Demand (AADD) for 5 workers is estimated to be 750 litres per day. Assuming 25% of the compost is to be pelletised, this will equate to a water requirement of 1 850 litres per day in order to generate steam. The estimated water requirements for the project can thus be summarised as follows:

Composting facility	=	8 300 litres per day
Domestic	=	750 litres per day
Processing Area	=	1 850 litres per day

Thus the total demand for the composting facility and fertiliser plant is estimated to be 10 900 litres per day.

There are existing boreholes and dams on the property, and it is proposed, subject to the outcome of the testing of the yield of the borehole/s, that this underground water is used for the composting process as well as the fertiliser plant (including domestic consumption requirements). The capacity and yield of the borehole/s needs to be determined through specialist investigation during the EIA process. The water will be mechanically applied to the windrows.

It is also proposed that the development provide for rainwater harvesting as a secondary source of water. Two options will be considered in the assessment process and are as follows.

- Assuming a roofed area of 2 400m^2 for the fertiliser plant and losses of 40%, rainwater harvesting from the fertiliser plant could provide approximately 2 367 litres of water per day. Subject to specialist confirmation this water could be used to supplement the water requirements of the fertiliser plant.
- It is further proposed that the stormwater detention facility to be constructed is a two-phased semi-dry detention pond system. Subject to further specialist investigation the stormwater detention system will consist of a primary and a secondary treatment system with an outlet into a collector system. It is proposed this water is used as a secondary source of water for the watering of the rows of compost.

2.2.3.2 Electricity

There is an existing 3 phase 50 kva line on the property which provides power to the farm house on the property. Additional electricity will be required for the fertiliser processing plant and office component of the plant for domestic use. It is proposed the pelletising machine operates through the induction of steam, which will be provided from a boiler using HFO (heavy fuel oil), gas or coal.

2.2.3.3 Sanitation

Additional sanitation services in the form of a water-tight conservancy tank system will be required for the office component of the fertiliser processing plant. Sufficient capacity is required for 5 employees. It is estimated the size of a conservancy tank to accommodate 5 workers is approximately **11.38 m^3**. The applicant will be required to enter into an applicable agreement with a competent contractor for the regular emptying of the conservancy tank, in accordance with the requirements of the NMBM, for disposal at a suitably licensed disposal site.

During the construction phase of the project temporary ablution facilities will be provided on site.

2.2.3.4 Stormwater Management

It is proposed that the composting site is located on a gently sloping area, which is well drained and not vulnerable to erosion. The permeability of the soil will play an important role in minimising leachate infiltration and potential pollution to groundwater resources. This will require confirmation through the specialist Geohydrological assessment.

It is proposed that a “v” drain is created at the base of the footprint of the composting area, into which runoff water will eventuate. This water will be diverted into a two-phased semi-dry detention pond system. Subject to further specialist investigation the stormwater detention system will consist of a primary and a secondary treatment system with an outlet into a collector system,

where it will be regularly tested and treated if required. It is proposed the runoff water is used as a secondary source of water for the watering of the rows of compost.

The capacity of the treatment dam will need to be determined through specialist input. It is further proposed the specialist assessments consider windrow covers for the management of moisture in the manure, particularly during rainfall events. This will further assist in the management of nutrient enriched stormwater runoff.

2.2.5 Internal Roads and Traffic

The applicant intends, as far as possible, to utilise the existing internal vehicle tracks on the site to access the composting facility and fertiliser plant. These tracks may need to be upgraded for use by the trucks transporting the poultry litter to the composting facility and between the composting facility and processing plant, as well as the vehicles collecting the bagged fertiliser. It is anticipated the delivery component for the composting facility will generate approximately 12 additional vehicle trips per day (12 x 7 ton trucks x 364 days per year). While distribution of the finished product may generate an additional 10 vehicle trips per day. These vehicles will vary in capacity.

Upgrading and/or widening of the existing internal roads may be required. The alignment of internal roads for the project will be determined once the development layout has been finalised. A traffic impact assessment will be undertaken for the EIA phase of the assessment in order to identify and assess impacts to existing roads as a result of the project.

2.3 PROJECT SCHEDULE

The following table provides a preliminary overview of the proposed project schedule and an indication of the anticipated approvals process. It is estimated that the project will be fully developed, in phases, within 7 years of commencement.

Table 2.1 Proposed project schedule

ACTIVITY	ESTIMATED TIMING
Initiate Environmental Impact Assessment (EIA) Process	June 2011
I&AP review of Draft Scoping Report	March/April 2012
Submit Final Scoping Report and Plan of Study for EIA to DEDEAT for Approval	Early May 2012
Specialist Studies	August/September 2012
Compile Draft EIA	October 2012
Review of Draft EIA	October/November 2012
Submit Final EIA to DEDEAT for Approval	Early December 2012
DEDEAT Decision Making (environmental authorisation and waste licence)	March 2013
Detailed Planning and Design Phase	6 months from date of Environmental Authorisation
Rezoning and other approvals (WULA, sub-division of agricultural land, rezoning)	18 months from the date of authorisation
Commence Construction Activities Phase 1 (composting facility and phase 1 of the fertiliser plant)	Within 24 months after obtaining environmental authorisation, other permits and licenses

Commence Construction Activities Phase 2 (remainder of Fertiliser plant)	Five years from date of rezoning approval.
Commence with operations	Within 1 year from date of completion of construction

2.4 CAPITAL INVESTMENT AND EMPLOYMENT GENERATION

The total capital investment of the project is estimated to be approximately R11.7 million. It is estimated that an additional 9 direct permanent employment opportunities will be created through the development, 4 associated with the composting facility and 5 associated with the fertiliser plant. In addition, the construction phase is likely to provide temporary employment opportunities for approximately 40 individuals at the peak of construction.

2.5 CONCLUDING REMARKS

Based on the project description as outlined in this Chapter of the report the following impacts are anticipated which will require further specialist assessment:

Construction Phase

- Clearing of vegetation for the establishment of the composting site and fertiliser plant, including the potential widening of roads.
- Increased vehicular traffic on roads
- Increased dust as a result of increased vehicular traffic and clearing of vegetation
- Potential impacts on archaeology and palaeontology during construction
- Temporary construction phase employment opportunities

Operational Phase

- Potential odour and dust impacts associated with the composting facility and fertiliser plant, including associated health impacts
- Increased dust generation due to vehicular traffic from the delivery and collection of product
- Potential impacts to groundwater from leachate
- Potential impacts to surface water from stormwater runoff
- Increase in demand for bulk services (water, electricity, sanitation)
- Permanent employment generation

Decommissioning Phase

The decommissioning of the project is not proposed at this stage and will be subject to any relevant legislation at the time of decommissioning.

Based on the potential impacts identified for the construction and operational phases of the project the specialist studies forming part of the EIA phase of the assessment are proposed to include:

- Biophysical assessment (vegetation and fauna)
- Heritage impact assessment
- Air quality assessment
- Geohydrological assessment
- Wetland Specialist Assessment

- Traffic impact assessment
- Materials handling and waste management
- Visual impact Assessment
- Bulk Services report - including stormwater and surface water runoff and management; water, electricity and sanitation

Chapter Six provides the Plan of Study for EIA and the terms of reference for the specialist studies. Alternatives considered as part of this assessment are discussed in Chapter Five of this report.