



THE ROAD TO
ZERO WASTE
EASTERN CAPE
CONFERENCE 2015

PROPOSED ORGANIC WASTE PROCESSING PROJECTS IN THE WESTERN CAPE



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BSc Hons Biochem

PAST AND PRESENT

- Composting – “Bagful of **Environmental** Surprises”
: 2002 - Durban Convention Centre Wastecon
- Past – more focus on open windrow composting
- Present – open windrow composting ++
technological solutions
- Past to Present – significant policy & legislative shifts
(1990’s emphasis on LFS licencing and not composting)

DRIVERS TOWARDS ORGANIC WASTE PROCESSING

- **Economy**

- Waste Transportation costs
- Landfill Disposal Cost
- Material Recovery facilities : Front end – Organic Waste Diversion - Value Added process
- Technological Solution: Energy Recovery

- **Environmental - Legal**

- Greater social acceptance, reduced environmental and aesthetic impacts depending on site location
- National and Provincial Policies : Organic waste diversion

CASE STUDY 1

WINELANDS PORK (WP): ABATTOIR WASTE TREATMENT FACILITY, WASTE TO ENERGY PROJECT

PRESENTATION OUTLINE

- **Purpose**
- **Location**
- **EIA Process**
- **Beneficiation Process**
- **Project Benefits**
- **Legal Framework**
- **Alternatives**
- **Specialist Studies**
- **Points of Interest**

PURPOSE

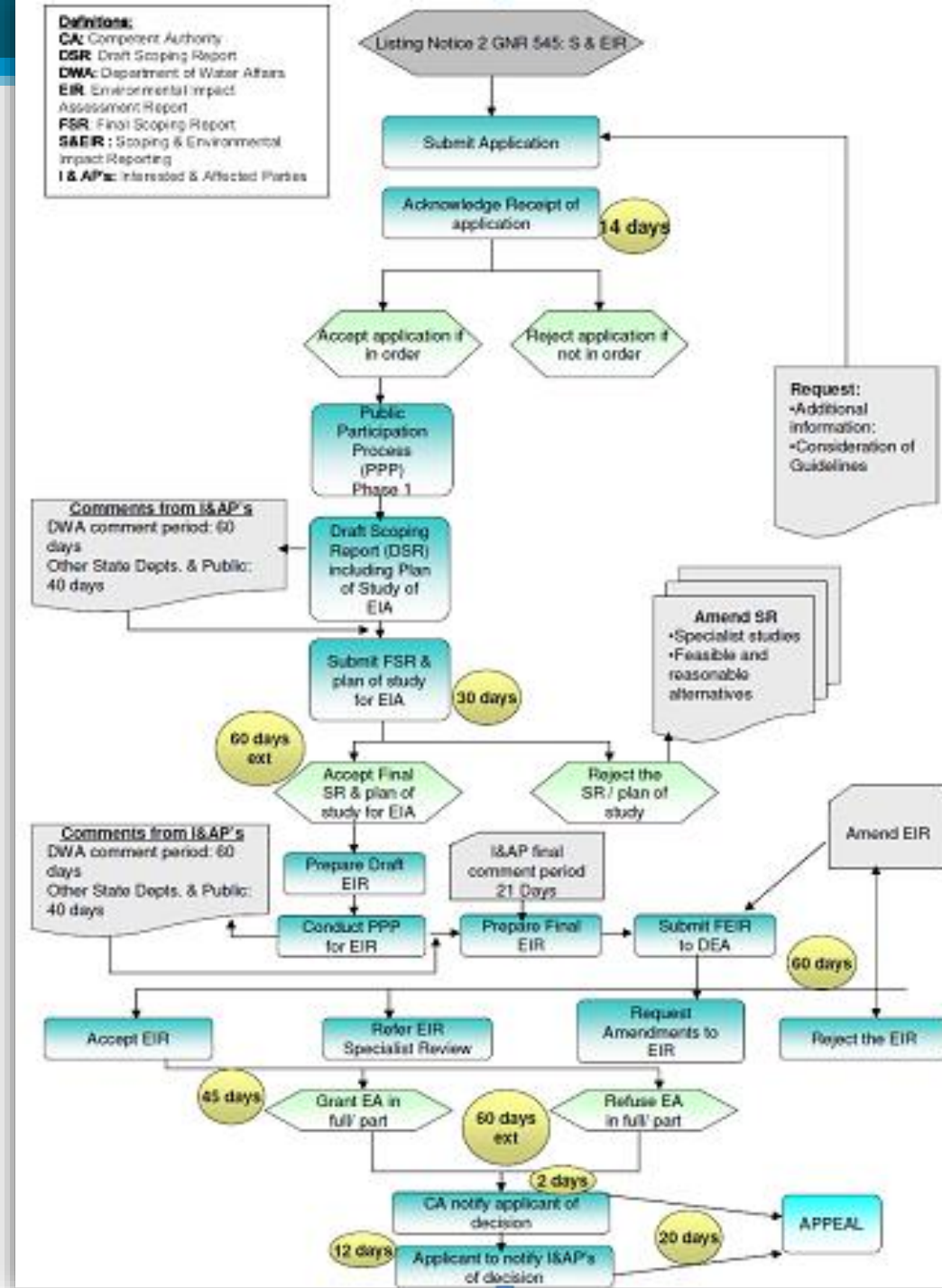
- **Primary focus:** Establishment of a waste treatment & beneficiation facility to treat and add value to waste streams produced.
- Divert abattoir waste from landfill
- Treat / beneficiate waste through an Advanced Anaerobic Digestion (AAD) Treatment process
- Biogas produced will be used to power the CHP (combined heat and power) and / or boiler
- Potential use of end products as fertiliser or soil enhancer

LOCATION: Stikland Industria, Bellville

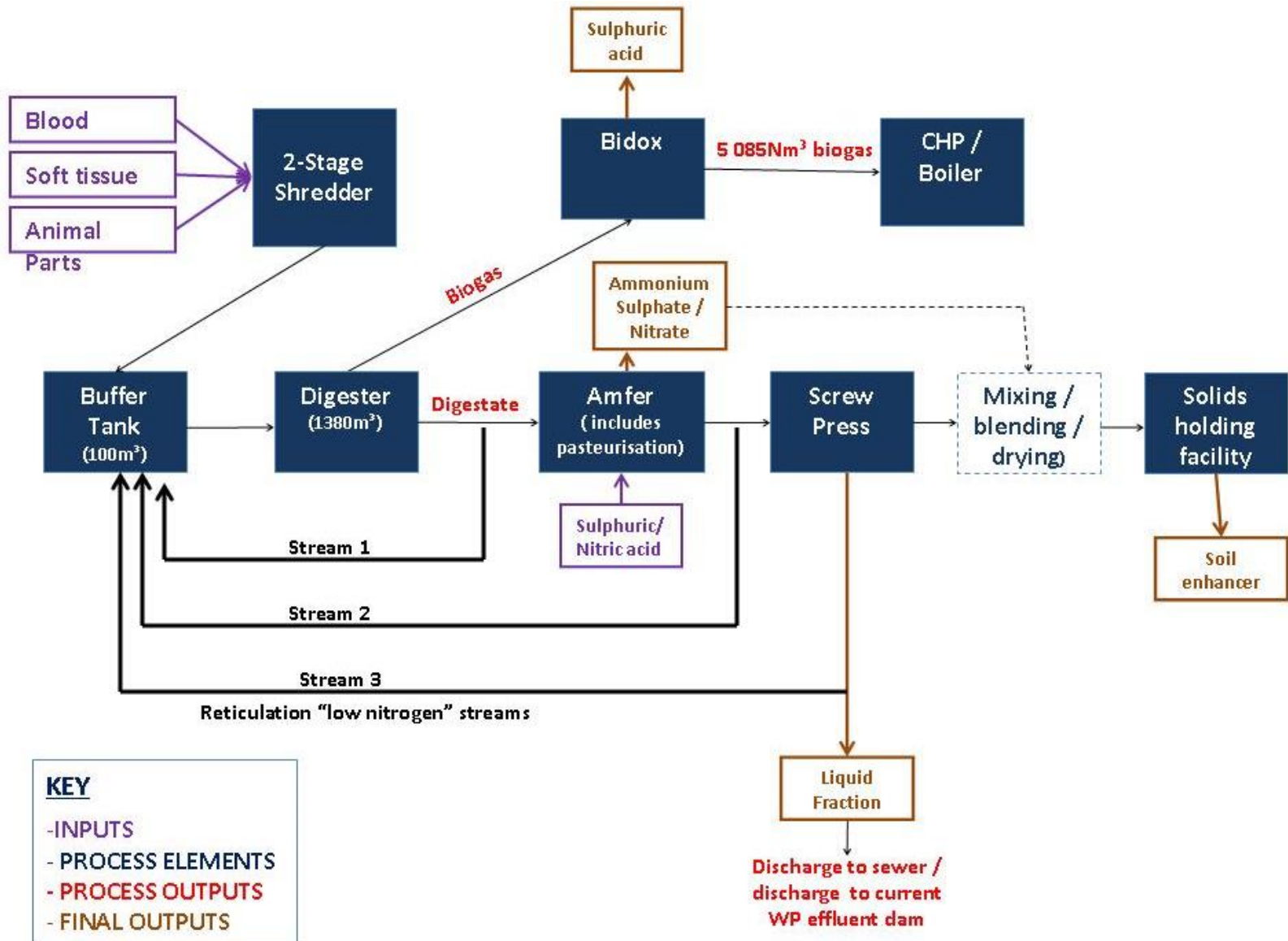


EIA PROCESS

- The generic Scoping & EIR process flow diagram.
- Provides insight into:
 - process
 - applicable time frames
 - Activities
- ‘Old’ process diagram as applications were submitted prior to 4 Dec 2014



WASTE BENEFICATION PROCESS FLOW DIAGRAM FOR WP



BENEFICIATION PROCESS ADDITIONS TO INCREASE BENEFITS

- Biogas produced in the Digester is collected & processed
 - Used to power CHP/boiler that provides energy to the WP abattoir
- Sulphuric / nitric acid will be added during the AMFER process
 - Increases the potential of the end product to be used as a soil enhancer
- Possibility of using the ammonium sulphate / nitrate further in an additional Screw Press output mixing and drying stage

LEGAL FRAMEWORK-NEMA

Government Notice R.984 4 December 2014	Listing Notice 2 National Environmental Authorisation Activities (subject to Scoping and Environmental Impact Reporting (S&EIR))
2(6)	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding- i) Activities which are identified and included in listing Notice 1 of 2014; ii) Activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or iii) The development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic meters or less.
2(28)	Commencing of an activity, which requires an atmospheric emission licence in terms of section 21 of the National Environmental Management: Air Quality Act 2004 (Act No. 39 of 2004), excluding- i) Activities which are identified and included in listing Notice 1 of 2014; ii) Activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or iii) The development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic meters or less.

LEGAL FRAMEWORK-NEM:WA

Government Notice No. 921 Activity No(s):	Category A Waste Management Activities (subject to Basic Assessment Reporting (BAR))
5	The recovery of waste including the refining, utilisation, or co processing of waste in excess of 10 tons but less than 100 tons of general waste per day or in excess of 500kg but less than 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
Government Notice No. 921 Activity No(s):	Category B Waste Management Activities (subject to Scoping and Environmental Impact Reporting (S&EIR))
2	The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.
3	The recovery of waste including the refining, utilisation, or co processing in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
4	The treatment of hazardous waste in excess of 1 ton per day calculated as a monthly average; using any form of treatment excluding the treatment of effluent, wastewater or sewage
10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity)

LEGAL FRAMEWORK-NEM:AQA

- Category 10: Animal Matter Processing
 - **Description:** Processes for the rendering, drying, dehydrating, *digesting*, evaporating or protein concentrating of any **animal matter** not intended for human consumption.
 - **Application:** All institutions handling more than 1 ton of raw materials per day.

Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies (Act 36 of 1947)

- 12) Manufacture and sale of fertilizers and farm feeds containing substances derived from animal carcasses
 - No person shall manufacture or sell any fertilizer or farm feed containing bone or any other substance derived from an animal carcass, unless such bone or substance-
 - (a) has been **sterilized** in such manner as may be prescribed

ALTERNATIVES

- SITE ALTERNATIVE

Only 1 site has been identified for the AD plant & supporting infrastructure.

- Only site situated on WP premises
- Meets size and access requirements
- Located in an industrial zoned area

ALTERNATIVES (CONTINUED)

- Technical Alternatives

- *Alternative 1- Boiler*

- Biogas will be used as fuel to heat the water in the boiler which will power the WP abattoir.

- *Alternative 2- Combined Heat and Power (CHP)*

- Simultaneous production of electricity and heat from a single fuel source (biogas).

- *Alternative 3- Both (preferred)*

- A boiler & CHP will be used in combination to produce energy for WP abattoir operations

ALTERNATIVES (CONTINUED)

- Process Input and Output Alternatives
 - *Alternative 1-* Mixing/blending/ drying process (preferred)
Ammonium sulphate/nitrate can be mixed/blended with screw press product or dried
 - **Option 1:** Addition of Sulphuric Acid to the AMFER
 - **Option 2:** Addition of Nitric Acid to the AMFER (preferred)
 - *Alternative 2-* No mixing/blending/drying process
Ammonium sulphate/nitrate will be collected as an output & sold.
 - **Option 1 & 2 as above**

ALTERNATIVES (CONTINUED)

- Effluent Management Alternatives

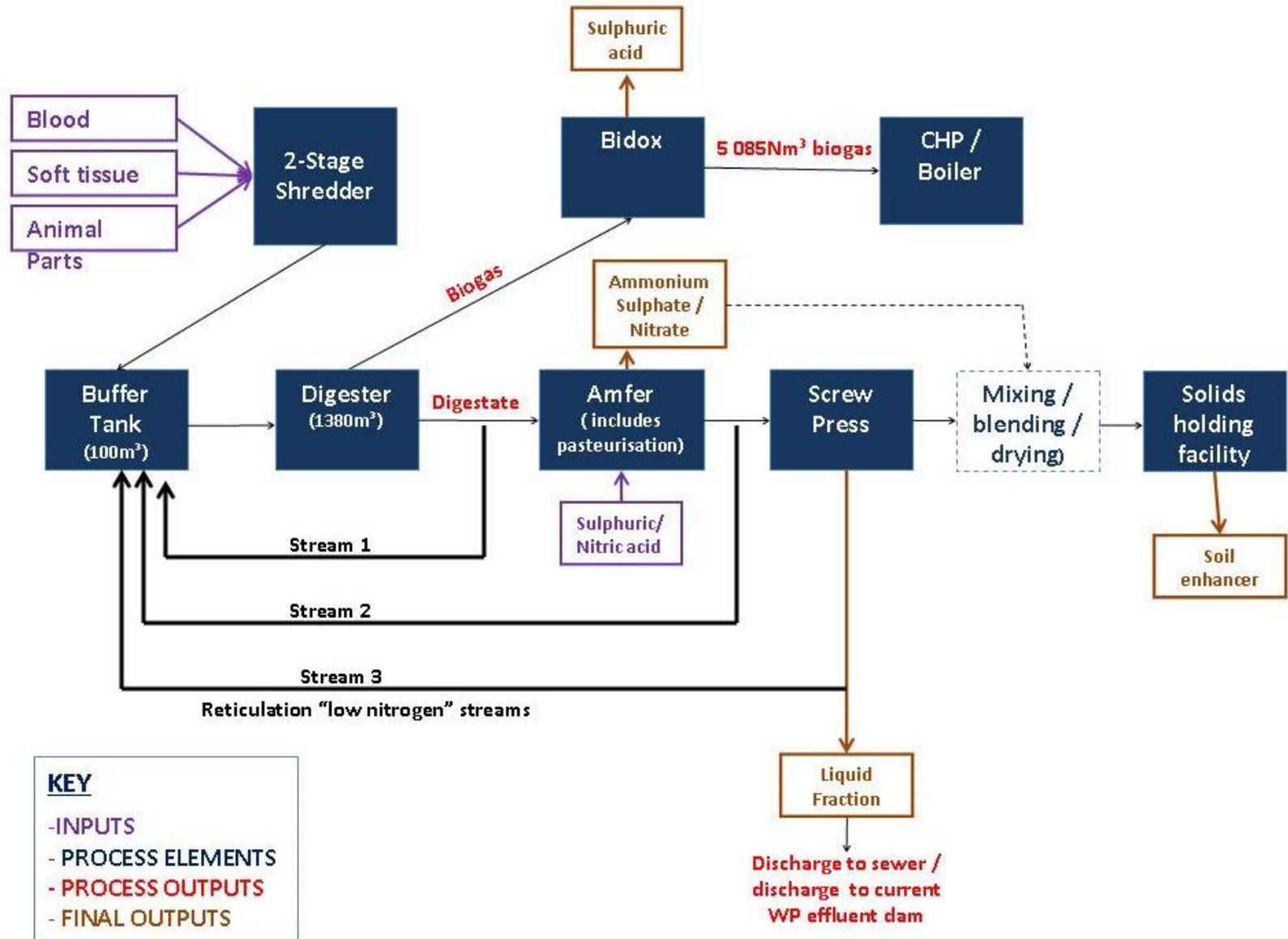
- *Alternative 1- Discharge to sewer*

If the wastewater quality meets specified standards then it will be directly discharged to sewer.

- *Alternative 2- Discharge to WP existing effluent dam*

If wastewater quality does not meet specified standards then it will be discharged to current WP effluent dams

PROPOSED PROCESS DIAGRAM FOR WP



SPECIALIST STUDIES

- Virology Study- required due to historical legislation (pasteurization vs sterilization debate)
- Qualitative Risk Assessment on Animal Disease Hazards associated with the Establishment of a Biogas Plant for WP: Dr. G Thompson.
- Air Quality Impact Study – Digestion of Animal matter
- Major Hazard Installation Risk Assessment – WP listed as a MHI : AD + ammonia plant & LPG units on site

Risk Assessment Findings and Conclusions

(direct extracts)

“Of the 31 possible microbiological hazards associated with biogas/anaerobic digestion identified by this study, only 7 were found to present a significant risk in that, unlike the other potential pathogens, they could/would survive the pasteurisation process built into the plant design”.

“Further assessment of the potentially significant hazards to establish the overall risk of each – based on a combination of risk of occurrence and consequence – indicated that all but one, viz., Clostridium spp., pose ‘very low’ risk. These findings implies that the risk mitigation mechanisms incorporated into the design of the biogas/anaerobic digestion plant at Winelands Pork are satisfactory; the exception being for *Clostridium* spp. where the risk was assessed as ‘low’”

In order to provide additional risk mitigation in respect of *Clostridium* spp. two recommendations are made:

- 1.Consideration of the European Commission's solution, i.e. to require that *digestate derived from AD/biogas plants utilising abattoir waste is only used as a soil improver on land devoted to arable agriculture* (i.e. not for use on grazing pastures unless a period of 3 months has elapsed since application of the soil improver);
- 2.During the commissioning phase of the Winelands Pork anaerobic digestion/biogas plant an assessment is made into the *Clostridium* spp. content of digestate (with an emphasis on potentially pathogenic species).

The latter option would enable a more informed decision to be arrived at and enable Winelands Pork to demonstrate 'due diligence'.

POINTS OF INTEREST

- According to the *Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947*, if fertilizers produced are to be sold the product needs to have gone through the **sterilization process**.
- International laws stipulate the **pasteurization process** can be followed.
- Correct method? – Virology Study: Pasteurisation with mitigation
- According to the *Explosives Act 26 of 1956*, the addition of Ammonium Nitrate to the fertilizer can cause it to be classified as an explosive depending on quantities etc

CASE STUDY 2

OKRAN 38:

**ORGANIC RECYCLING PROCESSING
FACILITY ON THE FARM CORONA**

PURPOSE

- **Primary focus:**

To obtain approval for the establishment of an ORPF for the processing and beneficiation of;

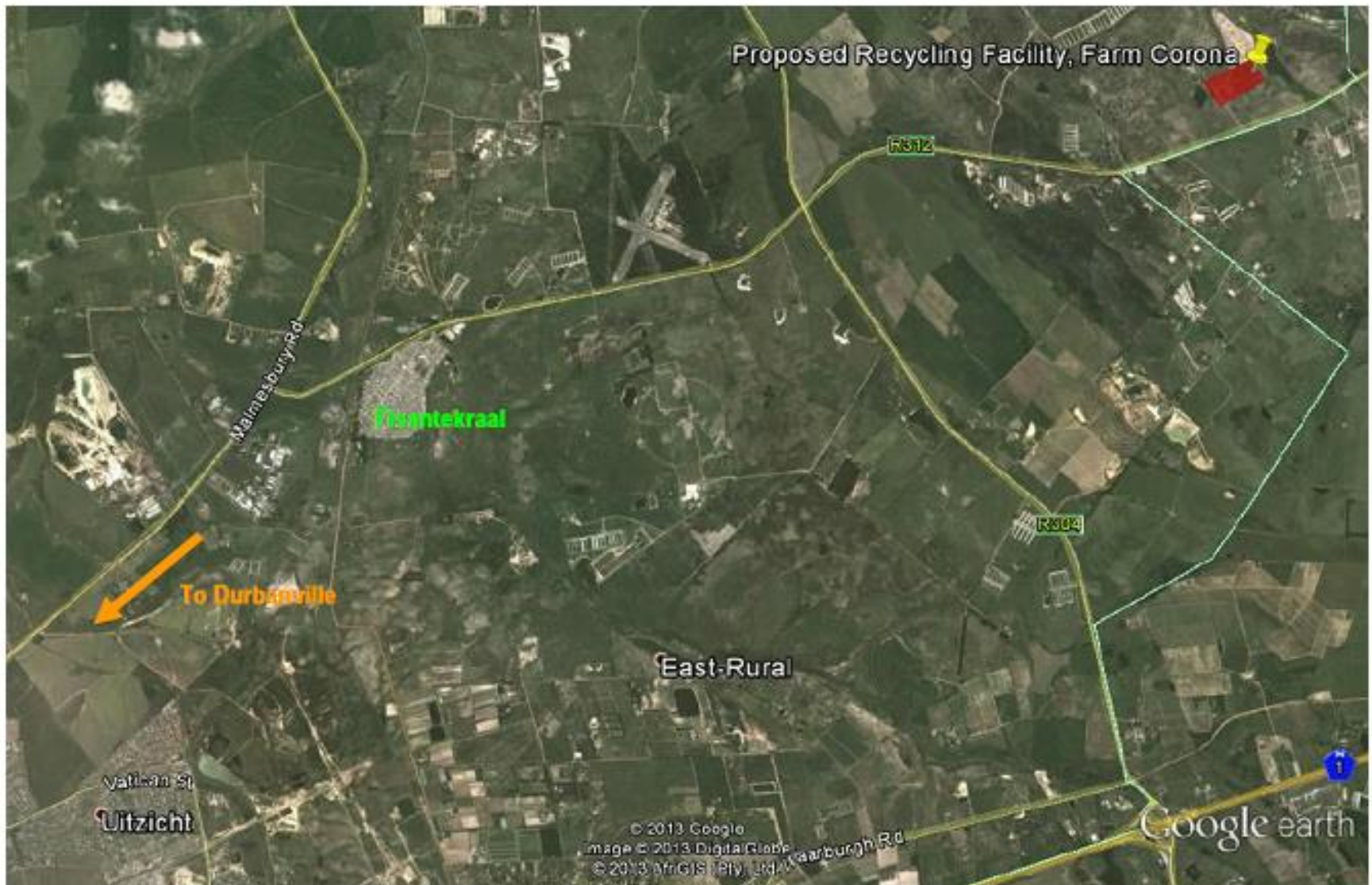
Raw material	Tonnage (or m ³) per month
Sewage Sludge	12 000
Food waste	1 000
Abattoir waste	500
Fruit and vegetables	500
Household organic waste	3 000
Wine and industrial waste	1 000
Green Waste	5 000
Total	23 000

PURPOSE continued

- With the Construction, Operation & Monitoring of :
 - Biodigester
 - Enclosed composting facility
 - an open windrow composting facility,

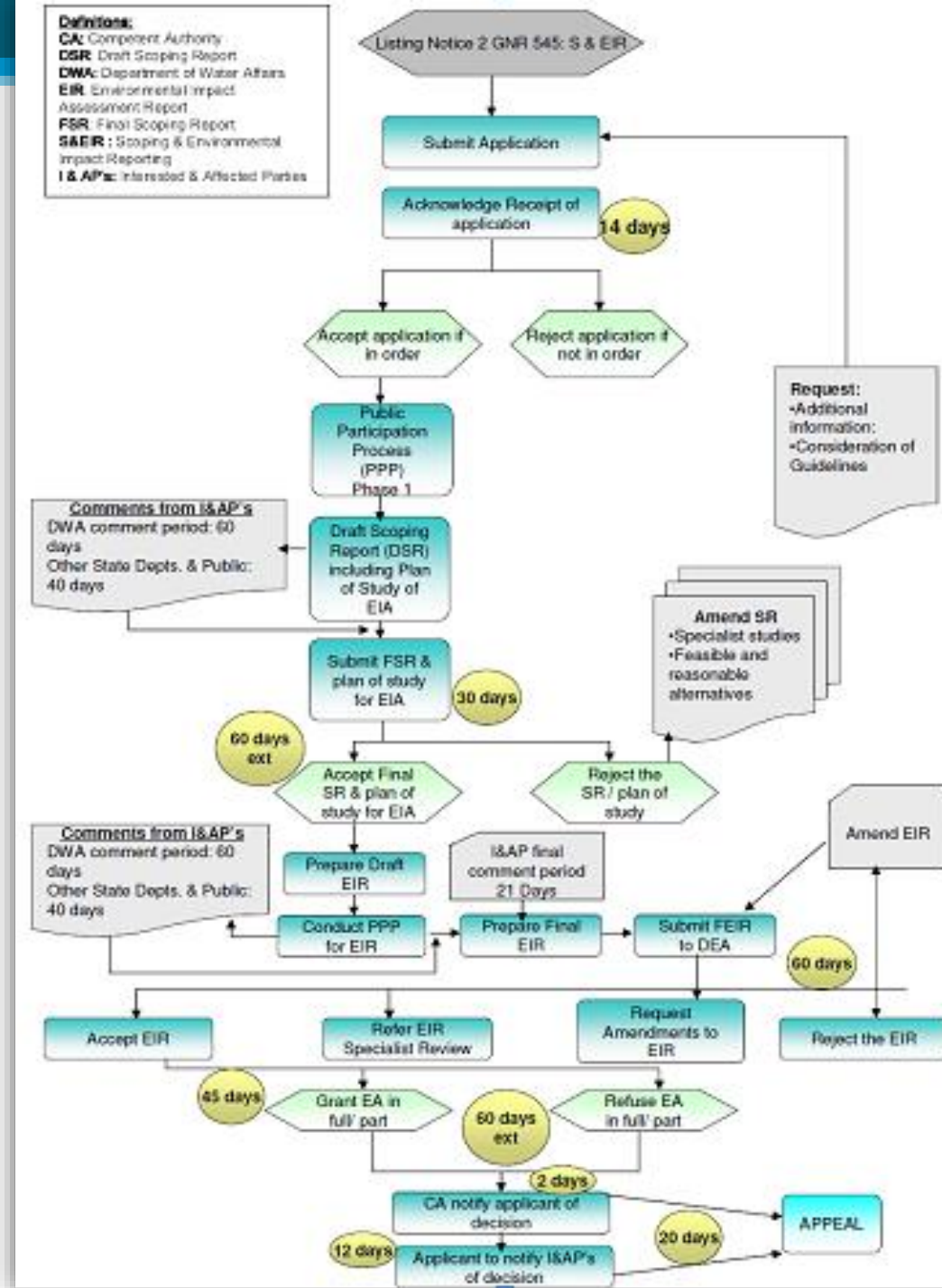
To prepare a compost type product which can be used to augment and improve the overall soil quality in selected areas on the farm . Not the primary focus to sell a commercial product.

LOCATION: PAARL

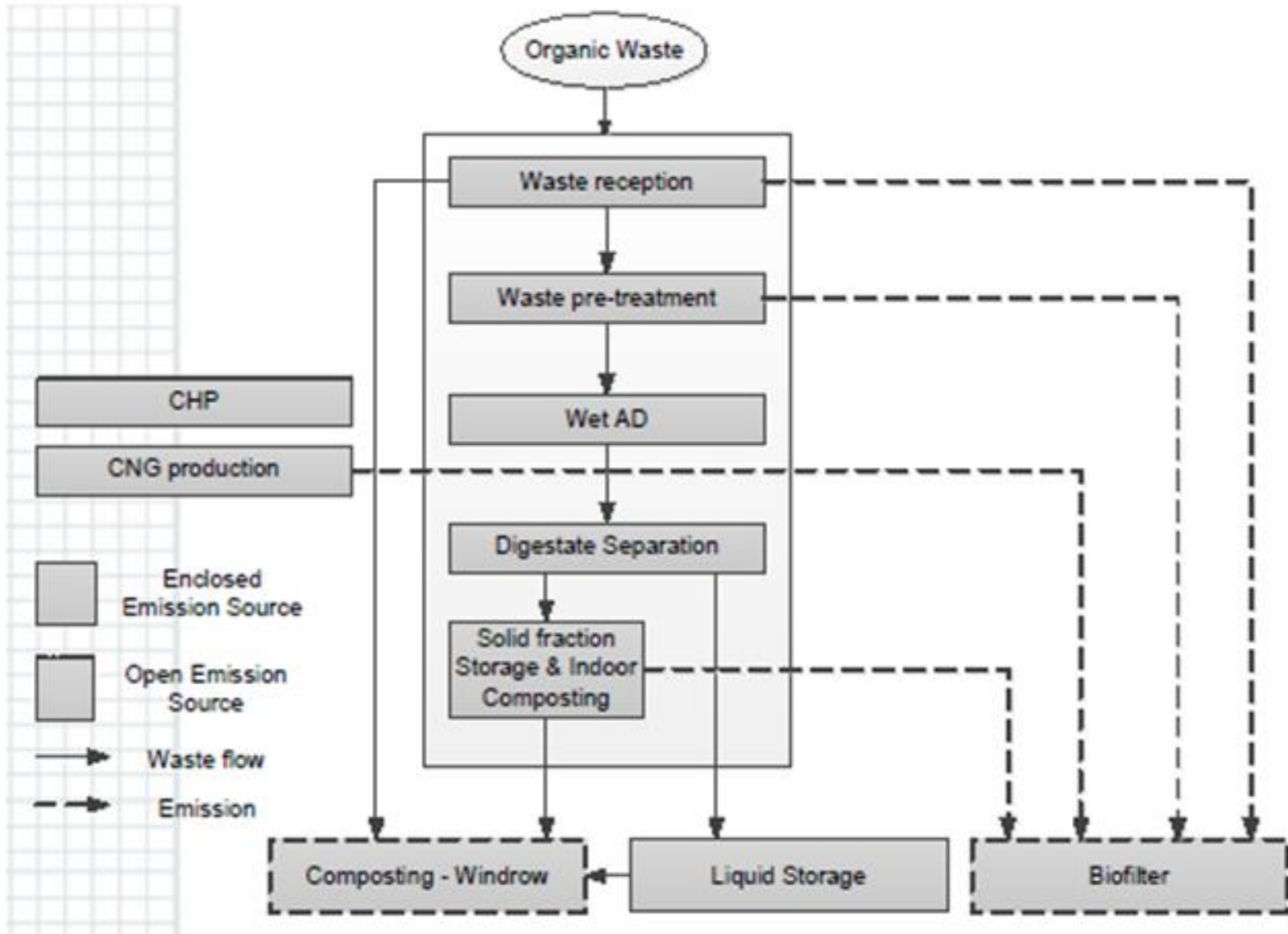


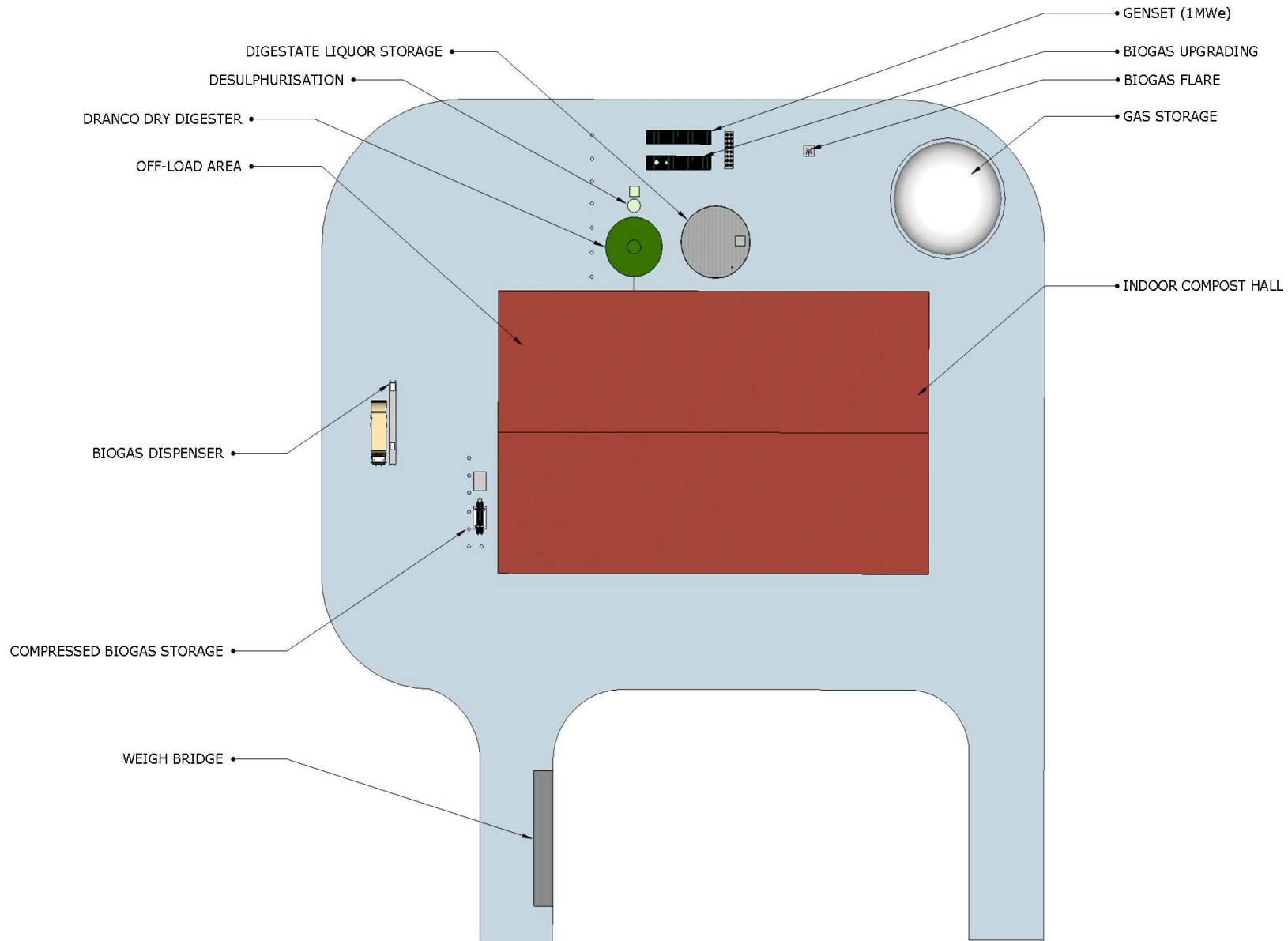
EIA PROCESS

- The generic Scoping & EIR process flow diagram.
- Provides insight into:
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 - applicable time frames
 - Activities
- ‘Old’ process diagram as application was submitted prior to 4 Dec 2014



PROPOSED PROCESS DIAGRAM FOR OKRAN





LEGAL FRAMEWORK-NEMA LISTING NOTICE 1

Government Notice R983 Activity No(s):	Basic Assessment Activity Description (as per Listing Notice 1)
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource: (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare; Excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.
8	The development and related operations of hatcheries or agri-industrial facilities outside industrial complexes where the development footprint covers an area of 2000 square metres or more.
11	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts
14	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
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.
28 (ii)	The transformation of undeveloped, vacant or derelict land to – (i) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares.

LEGAL FRAMEWORK-NEMA LISTING NOTICE 2

Government Notice R984 Activity No(s):	Scoring – EIA Activity Description (as per Listing Notice 2)
6	The development of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding- (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less.
28	Commencing of an activity, which requires an atmospheric emission licence in terms of Section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), excluding – (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less.

LEGAL FRAMEWORK-NEM:WA

Government Notice No. 921 Activity No(s):	Category A Waste Management Activities
3(2)	The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1000m ² .
3(3)	The recycling of general waste at a facility that has an operational area in excess of 500m ² , excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.
3(6)	The treatment of general waste using any form of treatment at a facility that has the capacity to process in excess of 10 tons but less than 100 tons.
3(12)	The construction of facilities for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).
Government Notice No. 921, Activity No(s):	Category B Waste Management Activities
4(2)	The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.
4 (3)	The recovery of waste including the refining, utilisation, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
4 (4)	The treatment of hazardous waste in excess of 1 ton per day calculated as a monthly average; using any form of treatment excluding the treatment of effluent, wastewater or sewage.
4 (6)	The treatment of general waste in excess of 100 tons per day calculated as a monthly average, using any form of treatment.
4(10)	The construction of facilities for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity)

LEGAL FRAMEWORK-NEM:AQA

Government Notice No. 248 Activity No(s):	Activities
Category 10: Animal matter processing	Processes for the rendering cooking, drying, dehydrating, digesting, evaporating or protein concentrating of any animal matter not intended for human consumption. Application: All installations handling more than 1 ton of raw materials per day

LEGAL FRAMEWORK- NATIONAL WATER ACT

- The following water uses listed under Section 21 of the National Water Act (Act No. 36 of 1998) may apply:
 - (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
 - (g) disposing of waste in a manner which may detrimentally impact on a water resource;
 - (h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.

ALTERNATIVES

- ACTIVITY ALTERNATIVES

- ***Alternative A:***

- Construct an open windrow composting facility

- ***Alternative B (Preferred Alternative):***

- Construct an open windrow composting facility, an enclosed composting facility & install a biodigester

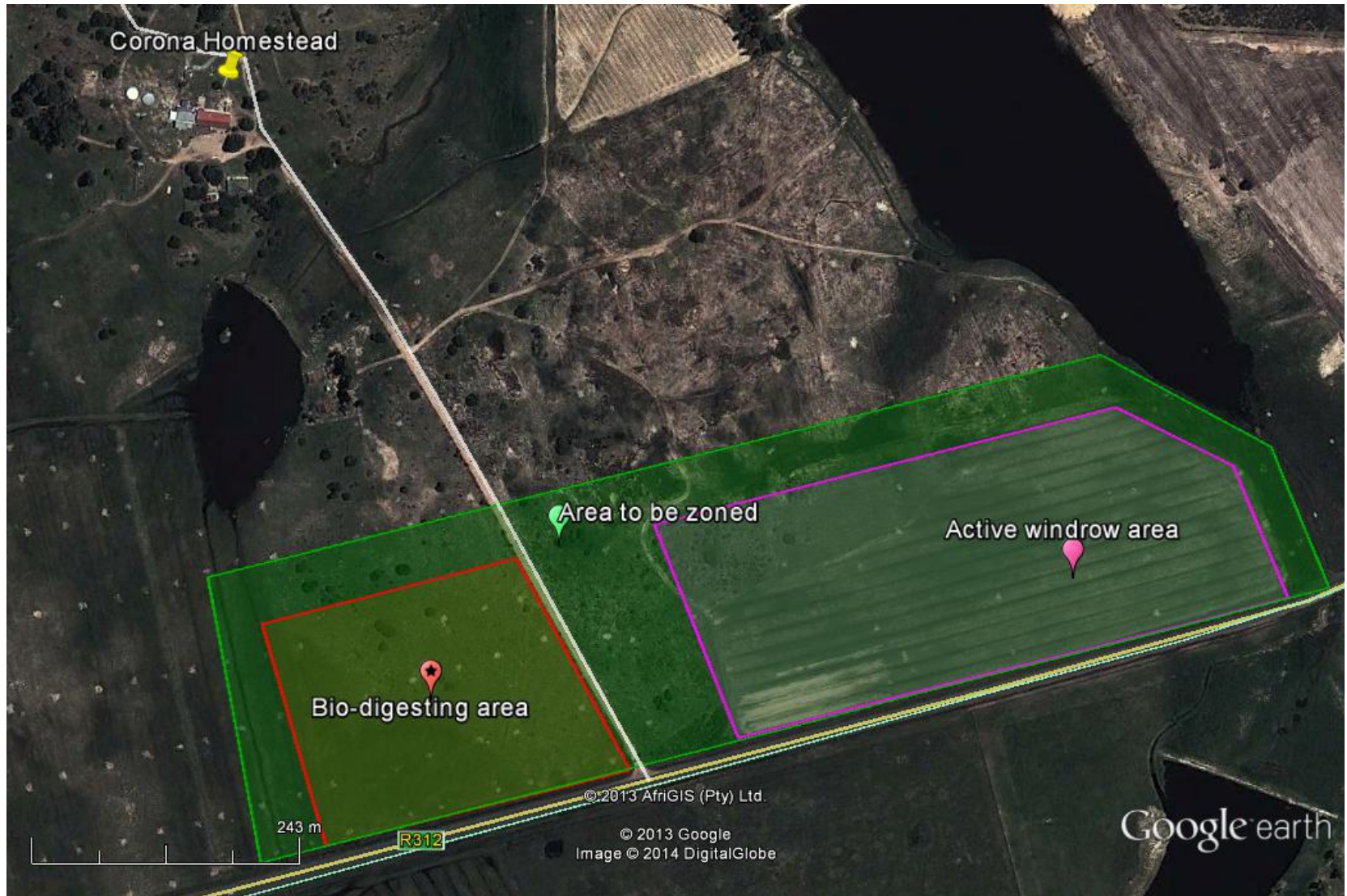
LAYOUT ALTERNATIVE 1



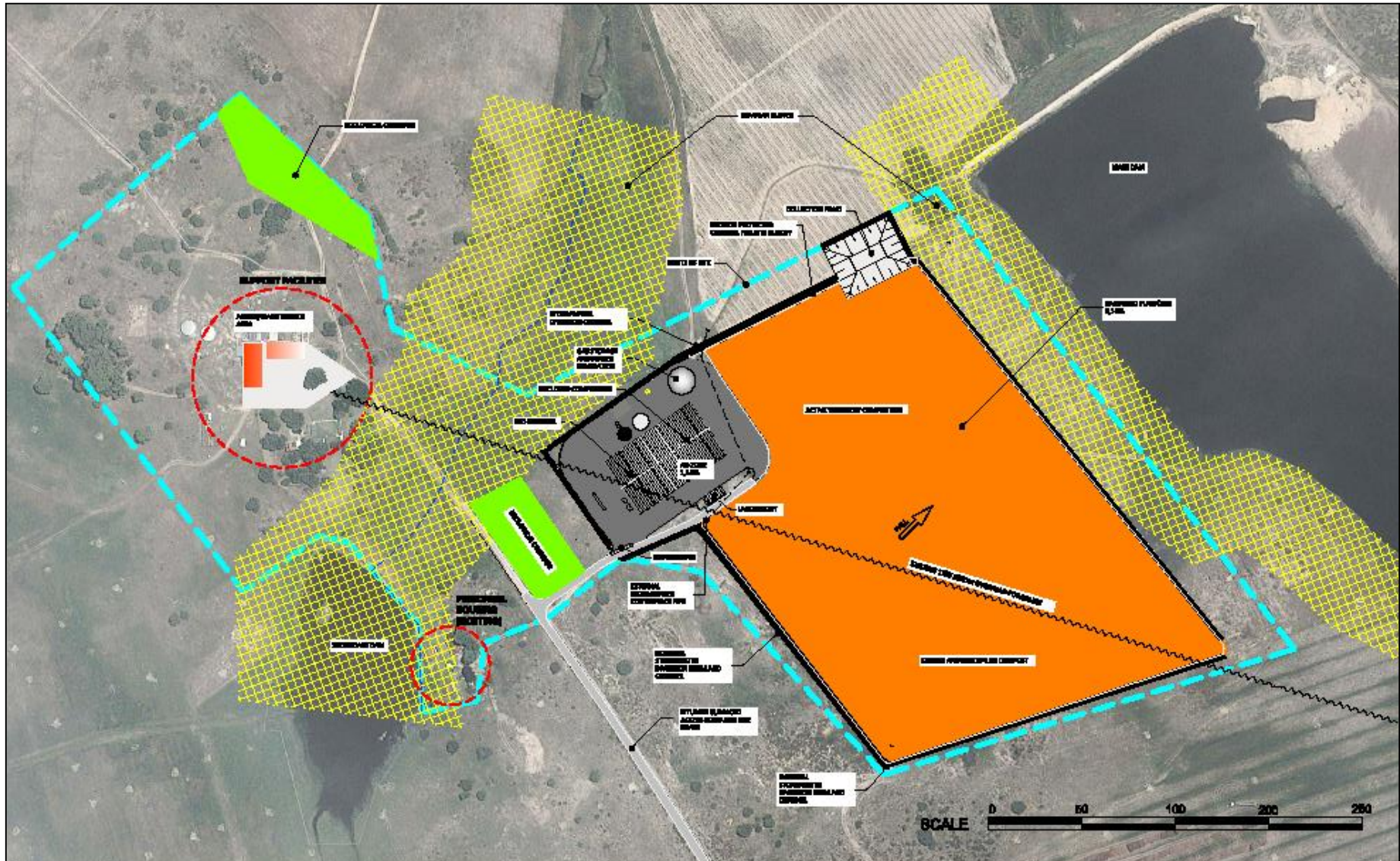
LAYOUT ALTERNATIVE 2



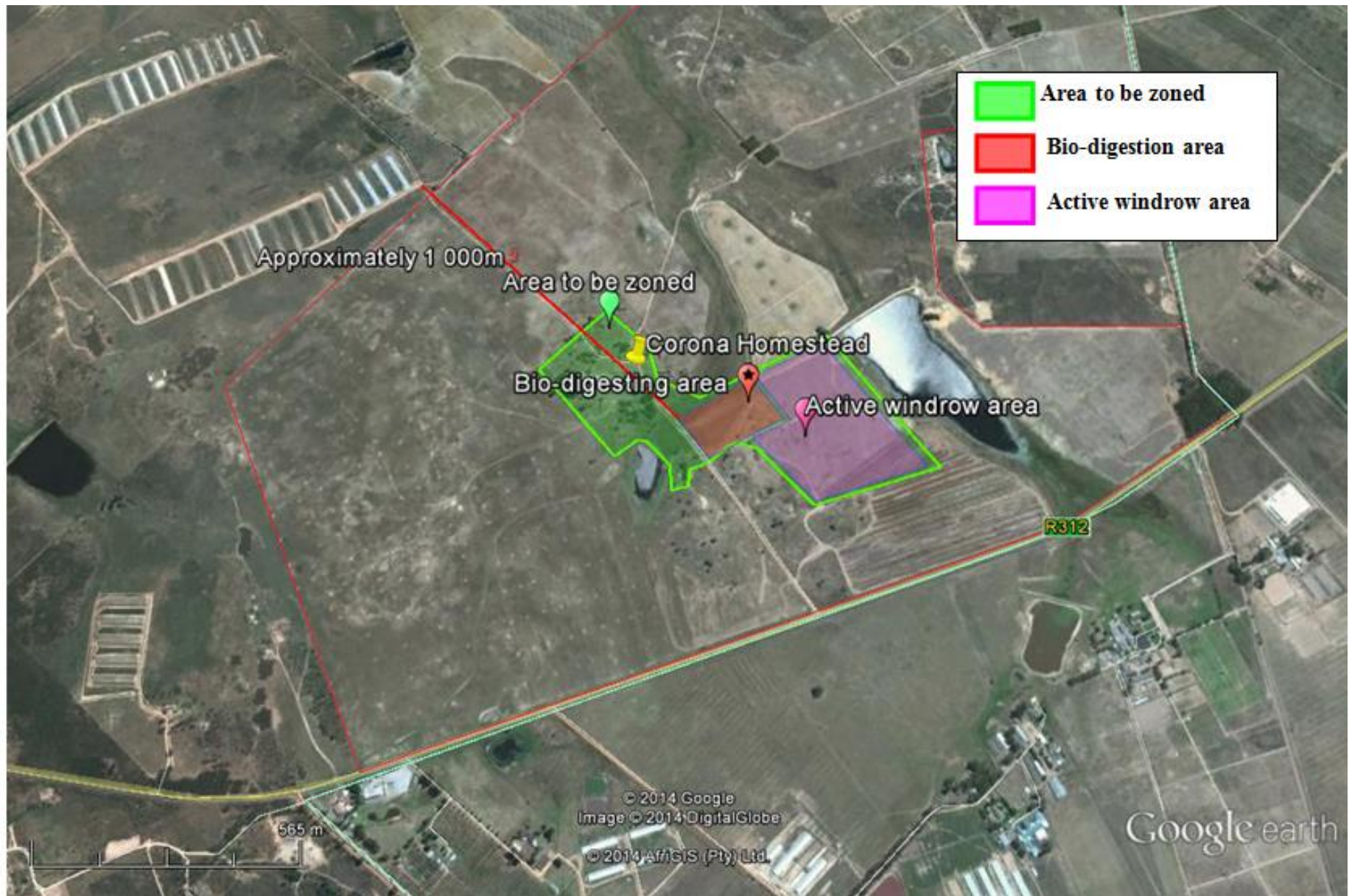
LAYOUT ALTERNATIVE 3

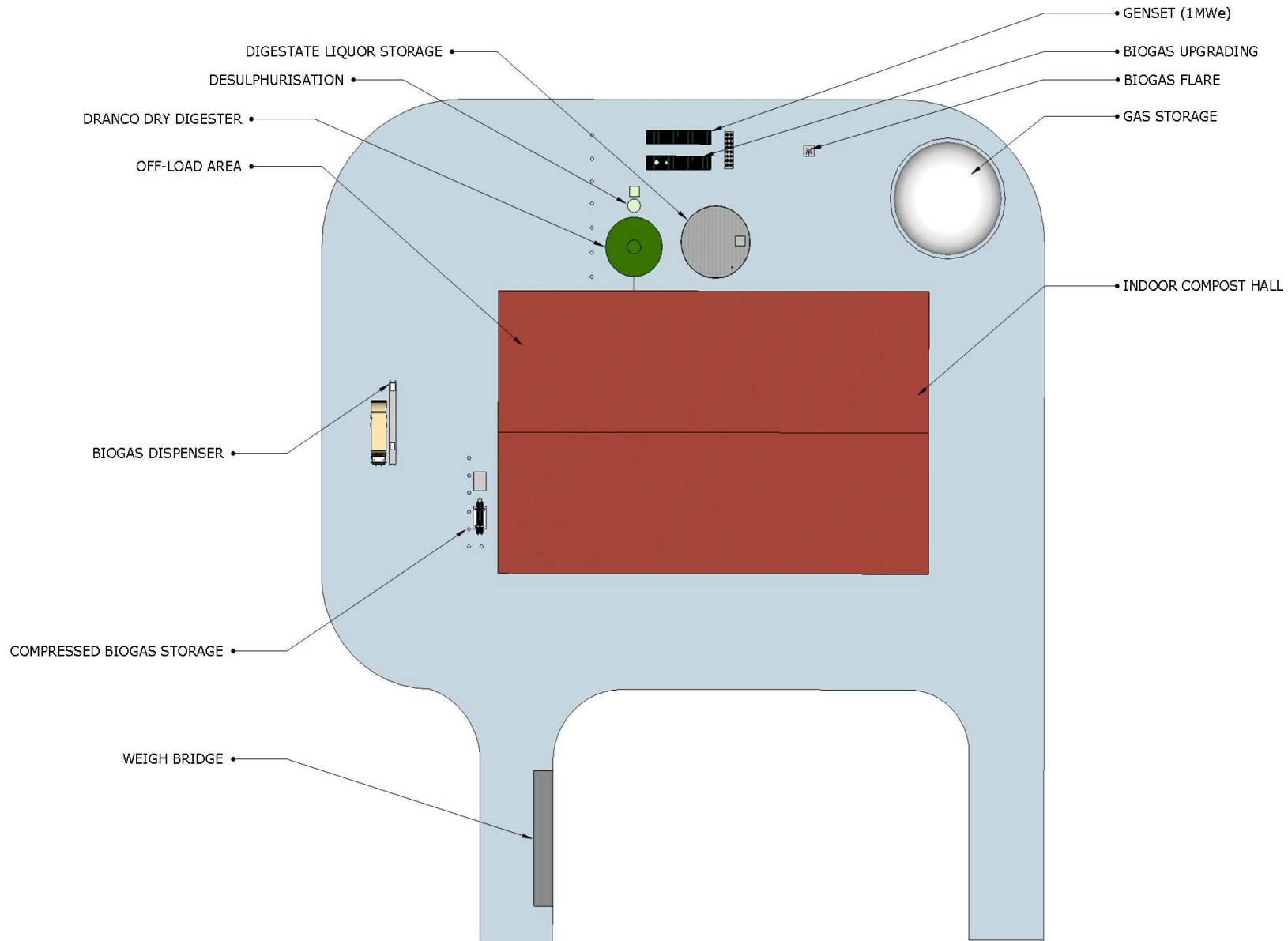


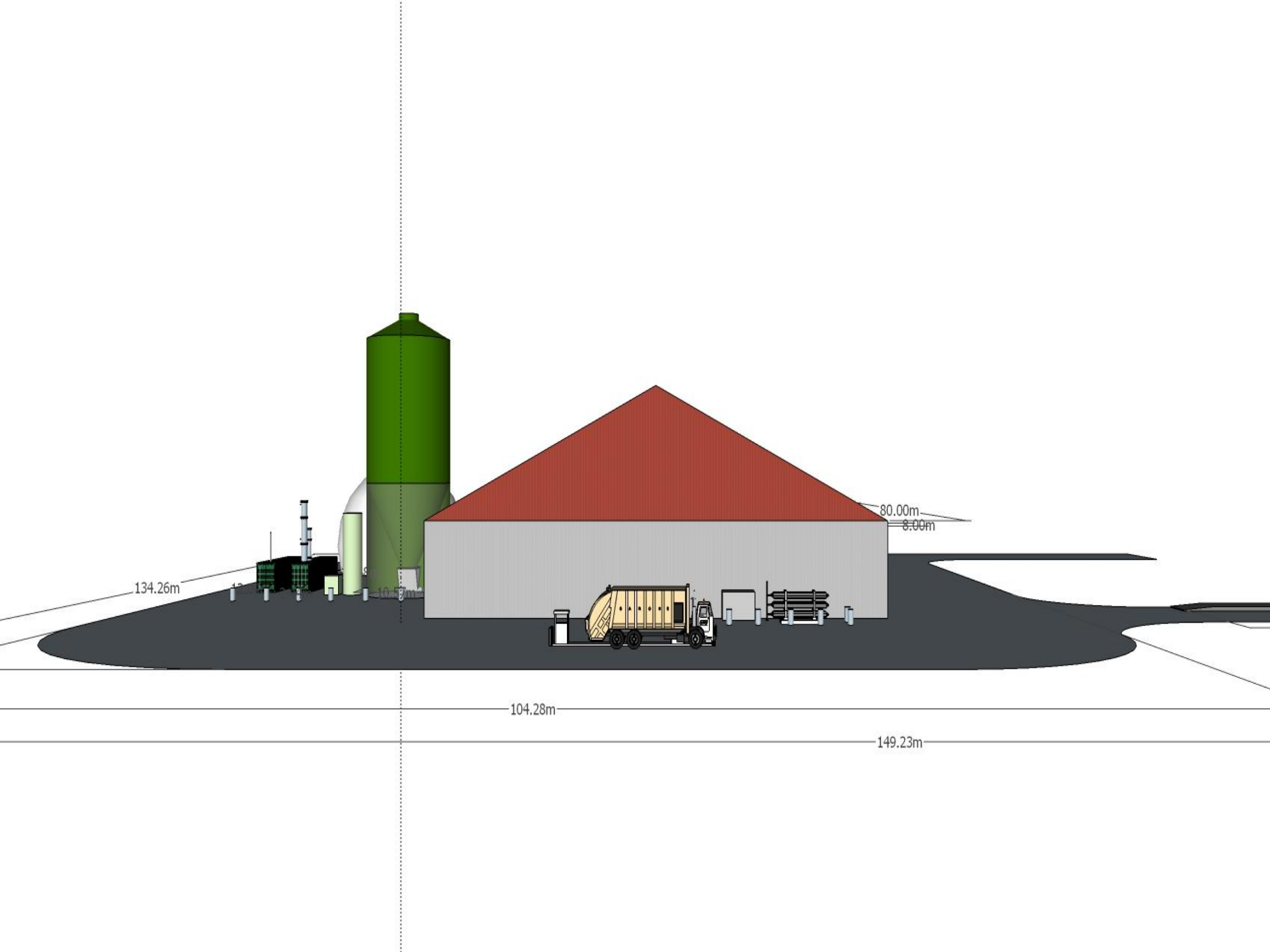
LAYOUT ALTERNATIVE 4 (preferred)



BUFFER DISTANCES







134.26m

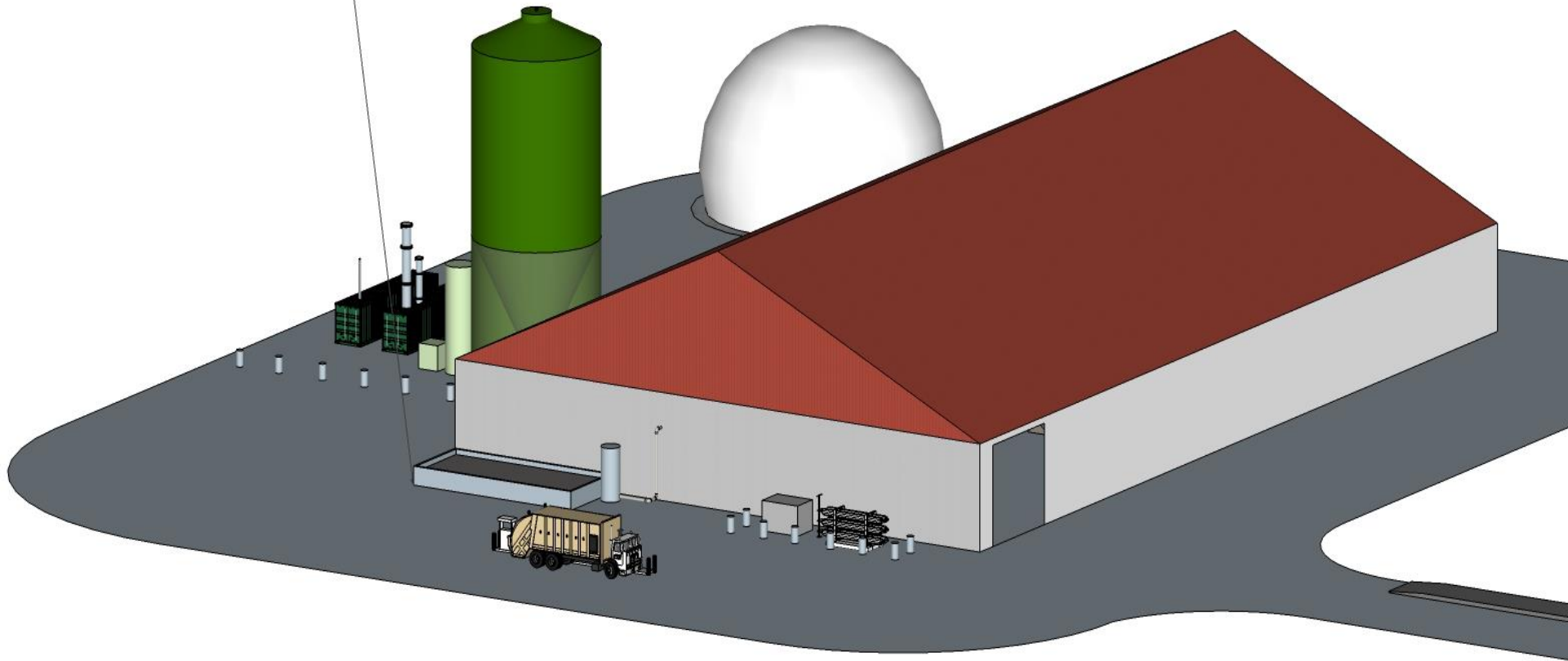
104.28m

149.23m

80.00m

8.00m

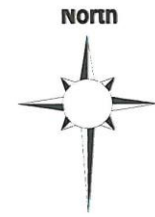
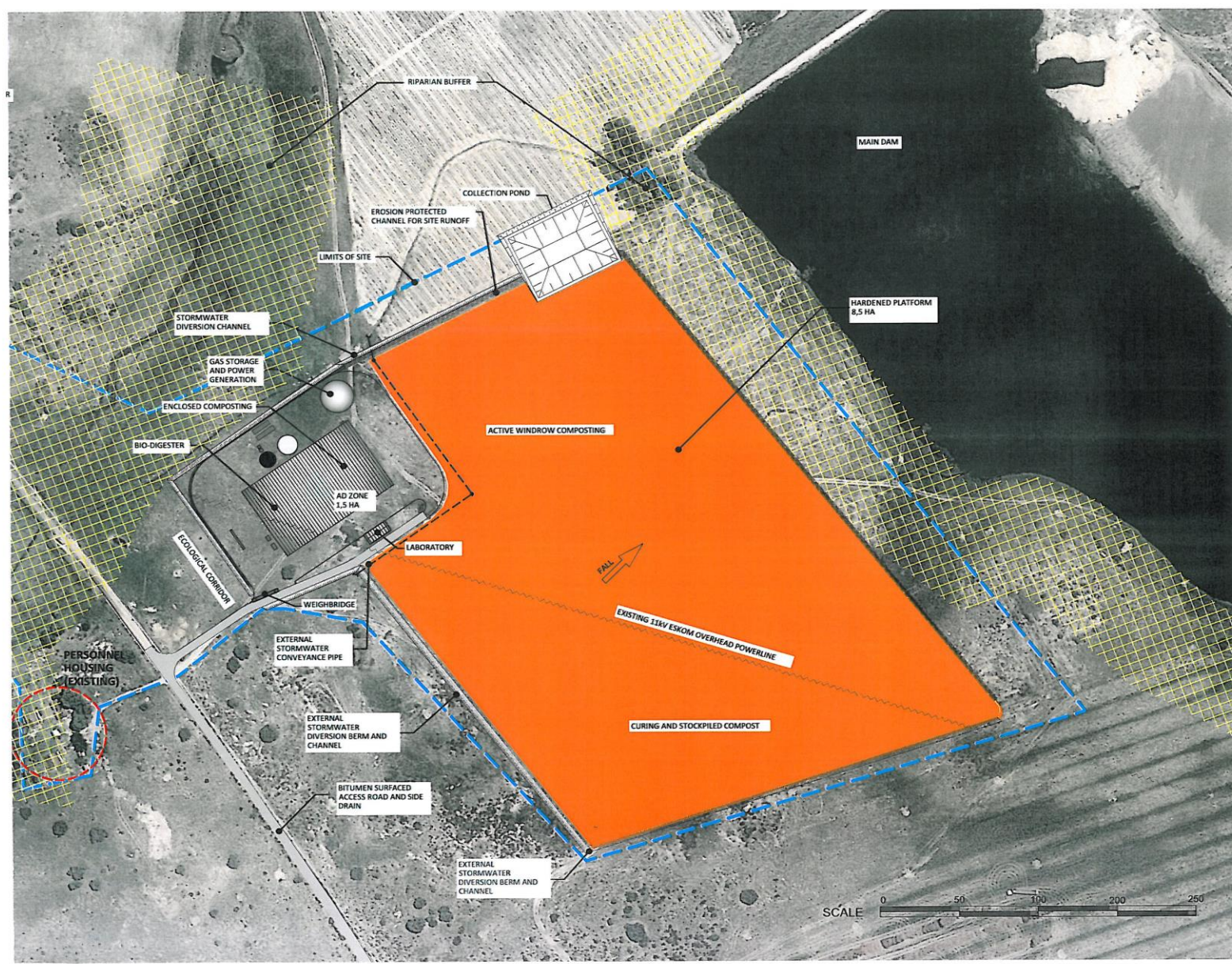
BIOFILTER



SPECIALIST STUDIES

- Botanical Impact Assessment
- Freshwater Assessment
- Agricultural Potential Evaluation
- Traffic Impact Statement
- Heritage Assessment –NID
- Geohydrological Desktop Evaluation
- Air Quality Impact Assessment
- Noise Impact Assessment
- Socio-Economic Impact Assessment
- Health Impact Assessment
- Major Hazardous Installation (MHI) Risk Assessment

BUFFER AREAS



PROJECT
**OKRAN 38 (PTY) LTD
PROPOSED ORGANIC
RECYCLING
PROCESSING FACILITY**

DRAWING TITLE
**CONCEPTUAL
LAYOUT
BIODIGESTION AND
WINDROW COMPOSTING
SYSTEM**

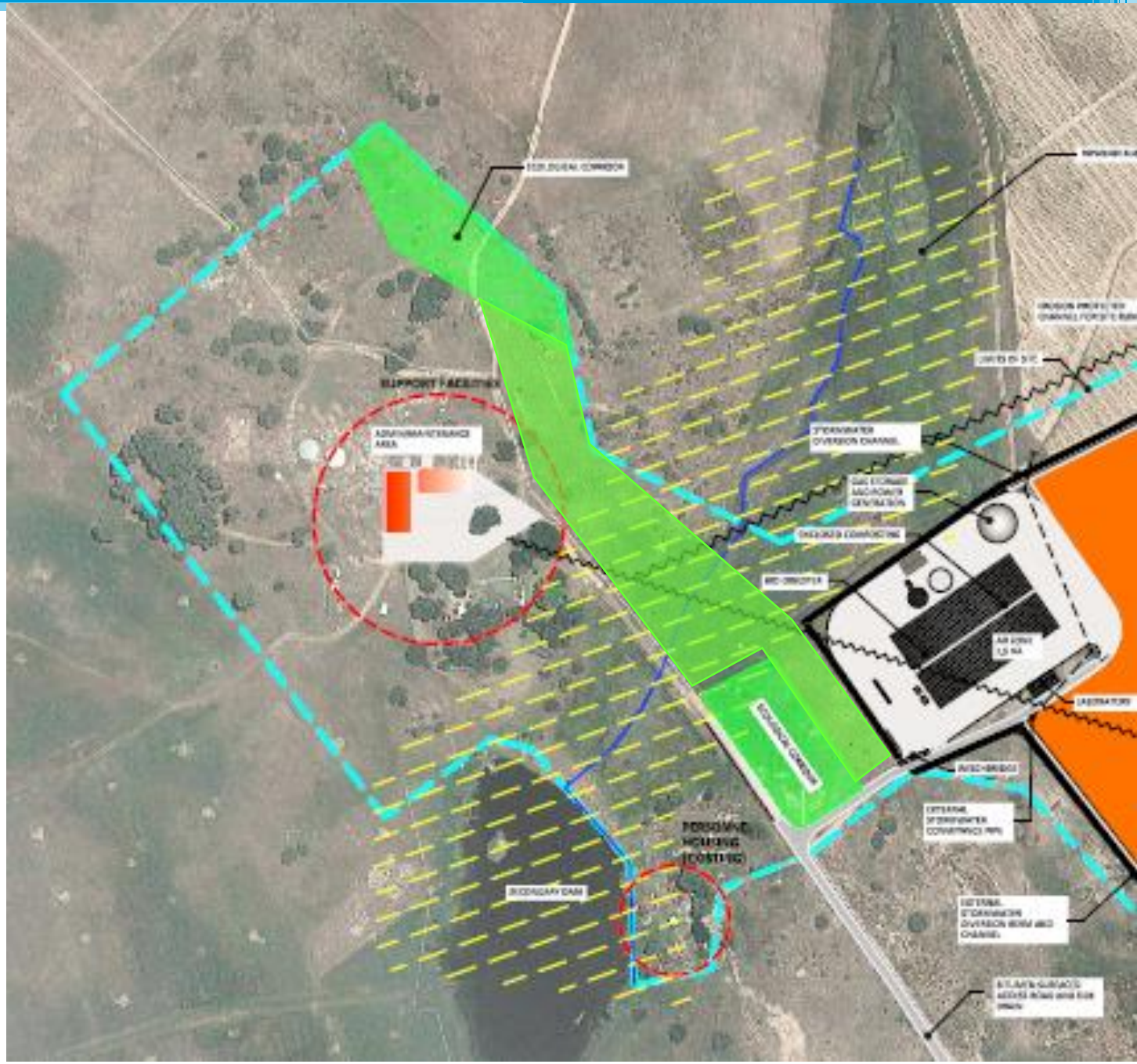


CONSULTING ENGINEERS AND PROJECT MANAGE
7TH FLOOR TEL: 021-424-5125
125 BUITENBOSCHT ST. FAX: 021-423-1821
CAPE TOWN e-MAIL: info@ingerop.co.za

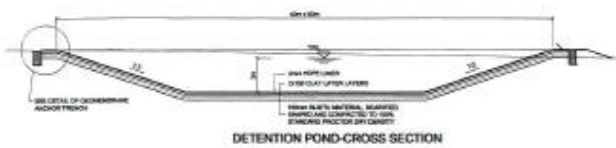
DATE
MAY 2015
DRAWN
PLAN No.
S.01

SCALE
NTS
PROJECT No.
CC126200
REV
02

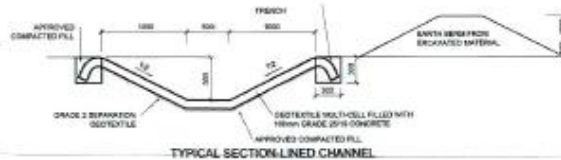
BUFFER AREAS



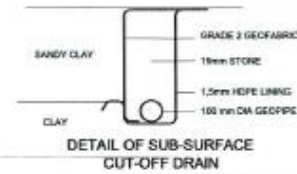
STORMWATER MANAGEMENT PLAN



DETENTION POND-CROSS SECTION



TYPICAL SECTION LINED CHANNEL



DETAIL OF SUB-SURFACE CUT-OFF DRAIN



OVERFLOW DETAILS

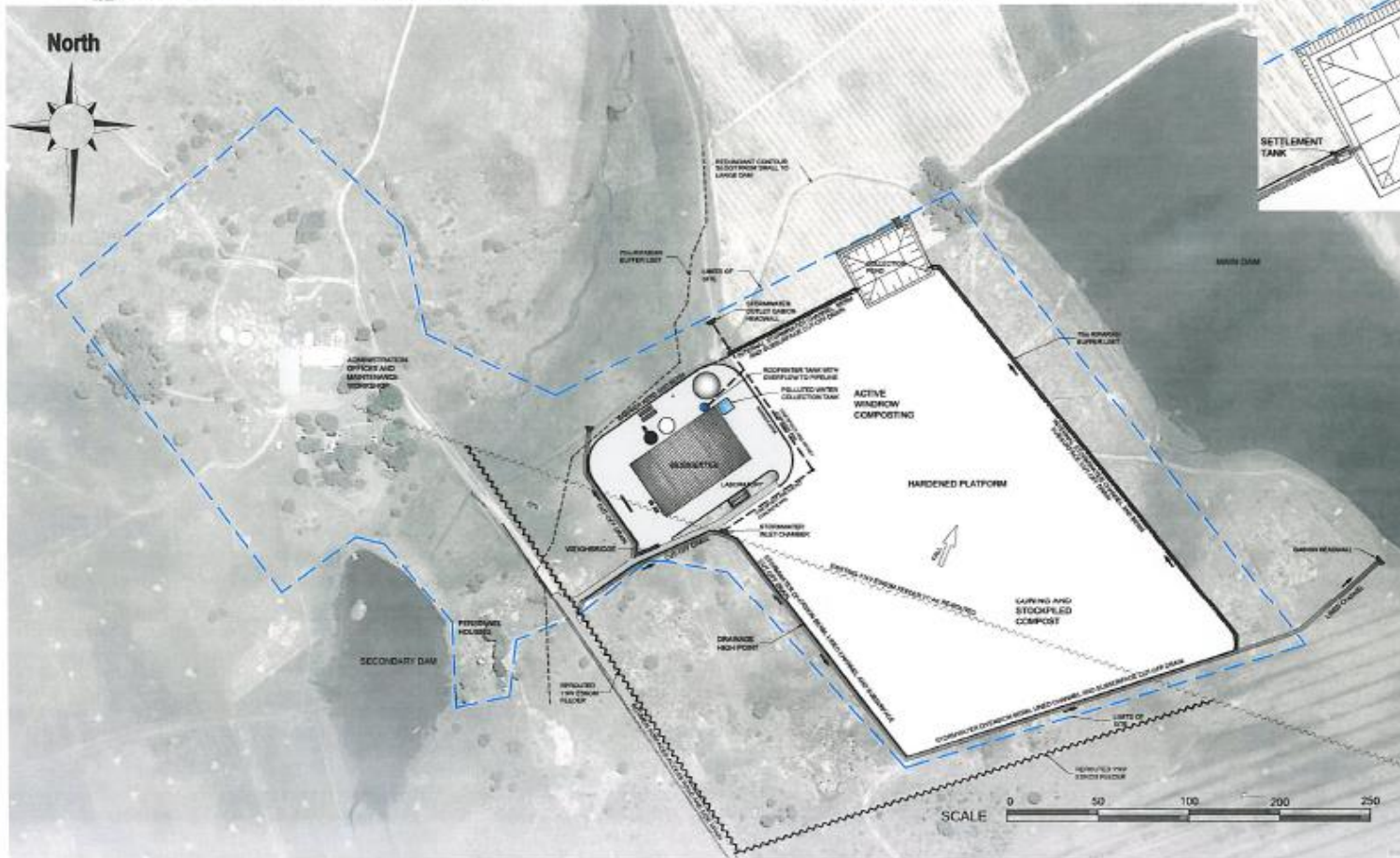


GEOMEMBRANE ANCHOR TRENCH
SCALE 1:20

LAYERWORK - DETENTION POND

200 - 300mm PROTECTION LAYER USING CRUSHED SOLID
420mm INDITU CLAY REWORKED IN 150mm LAYERS
COMPACTED TO 90% STANDARD PROCTOR AT
WATER CONTENT OPTIMUM + 2%

PLATFORM LAYERWORK



POND DETAILS

**OKRAN 38 (PTY) LTD
PROPOSED ORGANIC
RECYCLING
PROCESSING FACILITY**

DRAWING TITLE

STORMWATER
MANAGEMENT
PLAN

Proposed Layout



CONSULTING ENGINEERS AND PROJECT MANAGERS

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 CAVE TOWN e-MAIL: CH@Hymco-usa.com

DATE
APRIL 2015

SCALE
NTS

CORRUPTION

PROJECT No.
CC126200

PLAN No.
SMP.01

1987

Environmental Management Plan :

Construction - Operation - Maintenance & Monitoring

- Air Quality Emission Monitoring
- Internal and External Audits
- Waste Manifest
- Surface Water Quality Management & Monitoring
- Groundwater Monitoring – 3 boreholes
- Plant Maintenance Schedule
- Occupational Health and Safety Act

STAKEHOLDER/PROCESS CHALLENGES

- **County Fair Attorneys based on specialist advice** are opposed to the beneficiation process which relies on Pasteurisation and not Sterilisation due to animal disease risks – *likely to appeal a Positive Decision on the Project.*
- ***No Regulatory Authority*** identified during the EIA process who was in a position to comment on the pasteurisation vs sterilisation debate.
(not ideal stakeholder vs EIA specialist)







THE ROAD TO
ZERO WASTE
EASTERN CAPE
CONFERENCE 2015

Thank you for your attention.
Any questions?



Larry Eichstadt

Director, RMS

South Africa

BSc Hons Biochem