

BASIC ASSESSMENT REPORT



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:

Waste Management Licence Application -
12/9/11/L1096/8
NEM:WA Application

Application Number:

Date Received:

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

LICENSING AND UPGRADE OF THE EXISTING KWV UPINGTON EFFLUENT MANAGEMENT FACILITY AND ASSOCIATED INFRASTRUCTURE, ERF 5410 (UPINGTON), NORTHERN CAPE PROVINCE

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, 2010 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 **1 September 2012**. 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 on the electronic copy of the report submitted to the competent authority.

SECTION A: ACTIVITY INFORMATION

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

YES

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

1. PROJECT DESCRIPTION

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

Background history

This is an application for the licensing and upgrade of an existing effluent management facility in Upington, Northern Cape Province (Siyanda Municipality). The KWV Upington Distillery is situated on Erf 5412 (Upington), right next to OWK Wines. Note that OWK Wines bought the KWV grape juice concentrate facility in 2009, which is still located on a portion of Erf 5412. The KWV / OWK complex in Upington now comprises a brandy distillery owned by KWV and a modern wine cellar and grape juice concentrate plant owned by OWK. All effluent from both KWV and OWK (hereafter referred to as the KWV / OWK Complex) are treated / disposed (through evaporation) at the Effluent facility on Erf 5410.

Introduction

During 1980's KWV made a capital investment and purchased a piece of land (Erf 5410) from the local authority with the aim of providing evaporation ponds for the treatment of effluent. This was required, as the local authority declined to accept their effluent into the municipal sewage system as it could be detrimental to the activated sludge process at the municipal wastewater treatment plant. Since 1981 KWV and OWK has been disposing their industrial effluent into large evaporation ponds on Erf 5410 in accordance with the conditions set out in Exemption 838 B, issued by the Department of Water Affairs in terms of section 21(4)(e) of the Water Act (Act 54 of 1956). Recently the volumes of industrial effluent that are disposed at Erf 5410 had increased significantly. These ponds were never formally lined and the possibility exists that it might have led to soil contamination. In addition, solid waste (e.g. coal ash) is also now temporarily stored on this site, before final reuse/disposal. KWV / OWK therefore committed themselves to the upgrade of the treatment system.

In accordance with the NEM: WA (Act 59 of 2008) and the "List of Waste Management activities that have, or are likely to have, a detrimental effect on the environment", it was determined that any upgrade to the facility will trigger activities listed under category A of the listed activities (Please note that in the original application it was still believed that this will be a Category B application. However, it has since been determined that because the facility is an existing facility which was operated under an existing Authorisation from the Department of Water Affairs it will trigger Activity 19 of Category A).

The Applicant had appointed BVi Engineers to investigate options for effluent treatment with the aim of future treatment of the effluent to beneficial irrigation standards (as opposed to evaporation). BVi Engineers looked at various scenarios to upgrade the treatment system and

proposed the following as the most viable and cost effective upgrade:

Pre-treatment (solid separation and pH correction)

- The existing pre-treatment (solid separation) system will be improved.
- Please note that pre-treatment is already done at Erf 5412 and will remain on Erf 5412 (not located on Erf 5410), since it needs constant monitoring and management.

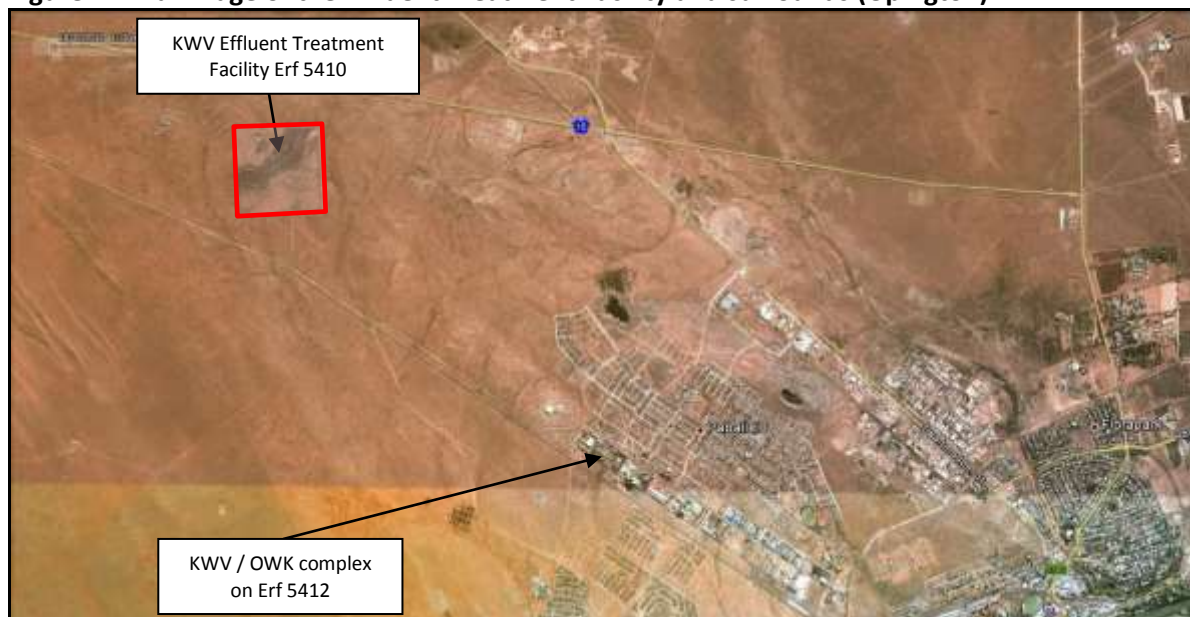
Reed bed Effluent Treatment

- The evaporation pond system will be de-commissioned and replaced by a reed bed treatment system (note that the reed bed treatment system is expected to have a much smaller footprint (<10ha) than the current evaporation pond system (>22ha);
- The reed bed system will be placed within the footprint of the current evaporation pond system (the exact size and location to be advised by the results from the results of the pilot treatment project currently being conducted);
- The remaining evaporation pond system will decommissioned and remediated;
- The reed bed treatment system will be lined (prevention of soil contamination);
- Treated effluent from the reed bed treatment will be available for re-use (which is a significant improvement from evaporation).

Treated effluent (re-use)

- Treated effluent from the reed bed will be used for washwater or garden irrigation in the OWK / KWV complex, with overflow (if any) going into the Upington Sewage system – thus conserving water).
- The possibility for re-using this water for other irrigation purposes (e.g. small farming projects) also remains.

Figure 1: Aerial image of the Effluent Treatment Facility and surrounds (Upington)



Erf 5410 is approximately 60.0197 ha in size of which approximately 60-70% have been utilised for the construction of the evaporation ponds and associated infrastructure.

Project description

The applicant is KWV SA (PTY) Ltd who will undertake the activity should it be approved. Consideration is been given to the upgrading of the existing effluent management system, which

will also change the end-use from evaporation to re-use of the treated effluent. The upgrading will entail the following:

- Replacing the current evaporation pond system with a suitable treatment system.
- Construction of a suitable treatment system in order to treat the effluent from the various facilities to such an extent that it can be considered for beneficial irrigation (SA being a water scarce land).
- Remediation of possible contaminated soils (the current evaporation pond system).

Please note that the existing infrastructure (pipeline and pumping facilities) will be used to transfer the pre-treated wastewater from the KWV / OWK complex to the Effluent Treatment Facility (ETF), but than a new pipeline will have to be constructed from the treatment works back to the KWV / OWK complex in order to re-use the treated effluent. Treated effluent will be re-used as washwater within the complex and for garden irrigation. Any surplus treated effluent (if any) will be re-directed into the Uppington Sewerage system.

Figure 2: Close-up of the existing Effluent Treatment Facility (Erf 5410)



Some 90% of the effluents that will be treated at the proposed effluent facility are generated by the Orange River Wine Cellars (OWK) and grape juice concentrate facility. Only approximately 10% of the effluent comes from the KWV distillery. OWK is a cooperative wine cellar established in Uppington in 1965. Over the years the intake tonnage has increased from a meagre 5000 tons per annum to some 180 000 tons per annum. The KWV / OWK complex in Uppington now comprises a brandy distillery owned by KWV and a modern wine cellar and grape juice concentrate plant owned by OWK. All wastewater from both KWV and OWK are disposed on Erf 5410 (Uppington).

As is commonly known, wineries and distilleries are notorious for the quality of their effluent and at this complex it is no different. Typically, the combined effluent from the three processing plants equates to an average volume of 1 350m³ per day or some 40 000m³ per month. An analysis of the effluent has indicated that it has a chemical oxygen demand varying between 8 000mg/l to 10 000mg/l with high concentrations of Total Suspended Solids and Total Dissolved Solids. Typically the

COD of winery effluent comprises some 91% of ethanol and other organic components such as acetic acid and phenols.

These constituents are notoriously difficult to treat and the analysis results indicate that the effluent is at the upper limit for aerobic process treatment and at the lower limit of anaerobic process treatment, making it extremely difficult to select a suitable process train for this effluent. Given the above, BVi, in consultation with the client have investigated several options which are described under alternatives in this document.

Existing Effluent Treatment Facility

Based on the projected flows and the net average daily evaporation rates, a series of evaporation ponds were developed on this piece of land (Erf 5410) located approximately 4km west of the KWV / OWK Complex. The evaporation ponds cover an area of 22ha and were designed so that a single day's effluent is discharged onto a pan. Some 36 evaporation pans were provided which are then used sequentially. Evaporation in the Upington area is high and averages at about 120mm per month. This system worked fairly well in that the evaporation has exceeded the effluent volume for almost 20 years. The problem with this system is that it produces odour. Twenty years ago, this was not problematic, as the evaporation ponds were far from any residential areas. This has, however, changed and residential development has extended considerably the last 10 years to an extent that the residential area is now within 2km of the evaporation ponds. In addition, the reigning winds are either north or north-west which now blows the odours directly to the residential areas. This has led to complaints and subsequently, the OWK / KWV have decided to investigate other possibilities. In addition to the above, legislation has changed to such an extent that this practice is now no longer acceptable for disposing of this effluent.

Although this practice is currently still being used, OWK/KWV has committed themselves to find a solution to legalize and improve their current practice. They have also started dosing Lime into the effluent in an effort to increase the pH. In addition, they have started dosing Effective Microorganisms in an effort to abate the odour problem. Both these actions are considered of interim nature, but have had a positive, if not permanent effect on the problem.

Proposed Effluent Treatment Facility

Reed beds or constructed wetlands are large areas of land inundated with water typically not deeper than 600 mm that support the growth of emergent plants such as cattail, bulrush, reeds and sedges. The most popular of these plants being the common reed or *Phragmites australis* hence the name "reed bed treatment system". The plants or more specifically their roots in combination with the growth media they are planted in act as natural biological filters. The aerobic zones around their roots are the habitat for a multitude of microorganisms that utilize the nutrients found in wastewater as food.

Typically reed beds are shallow basins filled with a growth medium such as soil, sand or gravel which has an impervious layer that retains the water and prevents contamination of the natural ground below. The media is then planted with distinct plant communities such as reeds, sedges, bulrushes, etc.

Constructed wetlands have distinct advantages over other means of treating wastewater in that they are not dependent on external energy or chemical inputs and require very little maintenance. Their lifespan can reach anything up to 80 years and in addition they are scenically attractive and provide a habitat for a wide variety of plants, birds, reptiles and invertebrates. Reed beds generally provide an effluent much better than an oxidation pond system, and better or similar to that of a conventional treatment system and are especially suited to fluctuating flows. Reed beds can be constructed with unskilled labour and are devoid of high tech equipment and therefore can be considered a low maintenance option. The water purification function of reed beds is dependent on four principle components: the vegetation, the water column, substrate and the associated microbial populations. The only function of the vegetation is to provide additional environments/habitat for the microbial populations. The stems of the plants and the falling leaves in the water column obstruct flow and facilitate sedimentation and increase surface area. Therefore the choice of vegetation is critical as most terrestrial plants cannot survive in waterlogged soils due to the depletion of oxygen which is normally associated with flooding. Aquatic plants have specialized stems, which enable them to conduct atmospheric gases such as oxygen down into their roots. The oxygen is exuded out of their root hairs forming an aerobic rhizosphere around every root hair while the rest of the surface volume remains anaerobic. Within the rhizosphere large populations of common aerobic and anaerobic bacteria thrive and aid the biological breakdown of the organic compounds found in wastewater.

The vegetation only take up a fraction of the available nutrients found in the wastewater, their primary role being to increase the amount of aerobic environment for the microbial populations found in the water column and below the water/substrate interface. Suspended solids in the wastewater are aerobically composted in the above substrate layer of straw and plant debris formed by the dead leaves and stems. By this means, constructed wetlands are able to remove organic compounds (measured as Chemical Oxygen Demand), suspended solids and nitrogen. The removal of phosphorous is possible through adsorption by the substrate. The selection of specialized substrate is however important to remove significant amounts of this element.

There are **two basic types of reed beds**. The first being the Vertical Flow System. In this system, the water is applied on the surface of the reed bed with a pipe distribution system and flows vertically through the substrate where it is collected in a drainage system on the floor of the reed bed. This type of reed bed is typically utilized for the first stage of treatment and usually planted with the common reed *Phragmites australis*. The second type of wetland is named the Horizontal Flow System and the wastewater flows horizontally through the substrate below the surface. The horizontal flow reed beds are utilized as a secondary treatment and at least two or more such beds are recommended in series. For both types, pre-treatment (i.e. solids have to be removed from the wastewater stream) is essential to prevent clogging of the substrate surface and also the distribution piping. This is typically done using either septic tanks or anaerobic ponds.

With conventional treatment (anaerobic or aerobic digesters) not being cost-effective for the wine industry, effluent treatment is the exception rather than the rule. Winery effluent is normally irrigated on pastures or, in some cases, dumped directly into the nearest river. Since most wine cellars are small, the individual effect of effluent disposal practices on the environment is negligible.

Collectively, however, the industry does contribute to environmental degradation in drainage basins where wineries operate.

As a low-cost alternative treatment method, use of constructed wetlands may prove acceptable for winery effluents. Additional benefits may add to their attractiveness. These include minimal labour requirements, no chemical usage, very little maintenance, potential recreational use and provision of habitat for wildlife species (especially birds and indigenous flora) through the creation of an environment suited to them. Research has been conducted by the CSIR, the Water Research Commission and Winetech. All the research has indicated that positive results are achievable that can comply with the General Limit Values for effluent as required by the Department of Water Affairs.

BVi Consulting Engineers were commissioned in 2012 by the OWC Board of Directors to design and construct a pilot-scale reed bed treatment system to evaluate the potential for the treatment of the Upton cellar complex effluent. Said pilot-scale plant was completed in November 2012 and the plants are now being cultivated and established before commencement of treating of the effluent. The pilot plant has a design capacity to treat 2 000 liters of cellar effluent per day.

Photo 1: A photo of the pilot-scale plant being constructed at Erf 5412



The pilot plant consists of 2 above ground horizontal polypropylene tanks with a volume of 8000 liters each. They are to act as anaerobic reactors. The effluent from the tanks is periodically discharged by means of a siphon system on three number vertical flow reed beds. Each of the beds was filled with a different media combination to allow evaluation of the various media grading. The

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vertical flow beds are operated sequentially in parallel and their effluent is discharged to 3 number horizontal subsurface flow reed beds which are operated in series.

It is envisaged that this treatment plant will now be monitored on a two weekly basis by analysing both influent and effluent as well as changing the inlet flow to determine the optimum design for the proposed full scale plant. Once an optimum size has been derived, it is the intention of Orange River Wine Cellars to replace the existing evaporation ponds with a reed bed treatment system which will firstly not cause the current odour nuisance and secondly, allow a large portion of the treated effluent to be re-used for either wash water or the irrigation of the cellar gardens with overflow going into the Uppington sewage system.

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- a) Provide a detailed description of the listed activities associated with the project as applied for

NEMA Activities:

Listed activity as described in GN R.544, 545 and 546	Description of project activity
N/a	The proposed treatment system (reed bed) will have a much smaller footprint (<10ha) than the current evaporation pond system (±22 ha) and will be located within the current footprint of the evaporation ponds. A new return pipeline will have to be constructed, but the pipeline will be located next to the existing pipeline (feeding the treatment works) and the size (<0.2) and flow (much less than 120l/s) of this pipeline does not trigger any NEMA listed activities (2010).

NEM:WA Waste Licence Activities:

INDICATE THE NO. & DATE OF THE RELEVANT NOTICE:	ACTIVITY NUMBERS (AS LISTED IN THE WASTE MANAGEMENT ACTIVITY LIST) :	DESCRIBE EACH LISTED ACTIVITY:
Gazette No. 32368, Government Notice 718 (03 July 2009).	Category A – Activity Number 1	<p>The storage, including the temporary storage, of general waste at a facility that has the capacity to store in excess of 100m³ of general waste at any one time, excluding the storage of waste in lagoons.</p> <p>(Please note: This application is an application for the treatment of effluent. However, organic waste from the processes within the facilities, e.g. coal ash, is recycled but at times a temporary storage area is needed for ash which cannot be removed for recycling immediately.)</p>
Gazette No. 32368, Government Notice 718 (03 July 2009).	Category A – Activity Number 12	<p>The remediation of contaminated land.</p> <p>Note: The application is for the treatment of effluent. However, it might be determined that the evaporation practices had led to contamination of soil, which might then have to be remediated.</p>
Gazette No. 32368, Government Notice 718, (03 July 2009)	Category A – Activity Number 19	<p>The expansion of facilities of or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of pollution, effluent or waste.</p> <p>This application is for the licencing of technology upgrade in treatment, changing from evaporation ponds to a reed bed treatment system with a much smaller footprint, located within the existing footprint.</p>

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 Regulation 22(2)(h) of GN R.543. 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.

a) Site alternatives

No site alternatives were considered as this is the upgrade of an existing treatment system and the new treatment system (which will have a much smaller footprint) will be located within the existing evaporation pond footprint. The remainder of the evaporation pond treatment system might have to be remediated.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

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In the case of linear activities: (N/A)

Alternative:

Alternative S1 (preferred)

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

Latitude (S):

Longitude (E):

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 500m, 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.

b) Lay-out alternatives

Layout alternatives were not considered as it is related to each technology option. The technology option is being guided by the results from the pilot treatment study currently being done by BVi Engineers.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Alternative 1 (preferred alternative)
<p><u>Constructed wetlands (Reed beds)</u></p> <p>Reed beds or constructed wetlands are large areas of land inundated with water typically not deeper than 600 mm that support the growth of emergent plants such as cattail, bulrush, reeds and sedges. The most popular of these plants being the common reed or <i>Phragmites australis</i> hence the name "reed bed treatment system". The plants or more specifically their roots in combination with the growth media they are planted in act as natural biological filters. The aerobic zones around their roots are the habitat for a multitude of microorganisms that utilize the nutrients found in wastewater as food.</p>

Typically reed beds are shallow basins filled with a growth medium such as soil, sand or gravel which has an impervious layer that retains the water and prevents contamination of the natural ground below. The media is then planted with distinct plant communities such as reeds, sedges, bulrushes, etc.

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The vegetation only take up a fraction of the available nutrients found in the wastewater, their primary role being to increase the amount of aerobic environment for the microbial populations found in the water column and below the water/substrate interface. Suspended solids in the wastewater are aerobically composted in the above substrate layer of straw and plant debris formed by the dead leaves and stems. By this means, constructed wetlands are able to remove organic compounds (measured as Chemical Oxygen Demand), suspended solids and nitrogen. The removal of phosphorous is possible through adsorption by the substrate. The selection of specialized substrate is however important to remove significant amounts of this element.

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The second type of wetland is named the **Horizontal Flow System** and the wastewater flows horizontally through the substrate below the surface. The horizontal flow reed beds are utilized as a secondary treatment and at least two or more such beds are recommended in series.

For both types, pre-treatment (i.e. solids have to be removed from the wastewater stream) is essential to prevent clogging of the substrate surface and also the distribution piping. This is typically done using either septic tanks or anaerobic ponds.

With conventional treatment (anaerobic or aerobic digesters) not being cost-effective for the wine industry, effluent treatment is the exception rather than the rule. Winery effluent is normally irrigated on pastures or, in some cases, dumped directly into the nearest river. Since most wine cellars are small, the individual effect of effluent disposal practices on the environment is negligible. Collectively, however, the industry does contribute to environmental degradation in drainage basins where wineries operate.

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BVi Consulting Engineers were commissioned in 2012 by the OWC Board of Directors to design and construct a pilot-scale reed bed treatment system to evaluate the potential for the treatment of the Upington cellar complex effluent. Said pilot-scale plant was completed in November 2012 and the plants are now being cultivated and established before commencement of treating of the effluent. The pilot plant has a design capacity to treat 2 000 liters of cellar effluent per day.

The pilot plant consists of 2 above ground horizontal polypropylene tanks with a volume of 8000 liters each. They are to act as anaerobic reactors. The effluent from the tanks is periodically discharged by means of a siphon system on three number vertical flow reed beds. Each of the beds was filled with a different media combination to allow evaluation of the various media gradings. The vertical flow beds are operated sequentially in parallel and their effluent is discharged to 3 number horizontal subsurface flow reed beds which are operated in series.

It is envisaged that this treatment plant will now be monitored on a two weekly basis by analysing both influent and effluent as well as changing the inlet flow to determine the optimum design for the proposed full scale plant.

Once an optimum size has been derived, it is the intention of Orange River Wine Cellars to replace the existing evaporation ponds with a reed bed treatment system which will firstly not cause the current odour nuisance and secondly, allow a large portion of the treated effluent to be re-used for either washwater or the irrigation of the cellar gardens.

Alternative 2

Evaporation ponds (current treatment system)

Based on the projected flows and the net average daily evaporation rates, a series of evaporation ponds were developed on this piece of land located approximately 4km west of the wine cellar. The evaporation ponds cover an area of 22ha and were designed so that a single day's effluent is discharged onto a pan. Some 36 evaporation pans were provided which are then used sequentially. Evaporation in the Upington area is high and averages at about 120mm per month. This system worked fairly well in that the evaporation has exceeded the effluent volume for almost 20 years. The problem with this system is that it produces odour. Twenty years ago, this was not problematic, as the evaporation ponds were far from any residential areas. This has however changed and residential development has extended considerably the last 10 years to an extent that the residential area is now within 2km of the evaporation ponds. In addition, the reigning winds are

either north or north-west which now blows the odours directly to the residential areas. This has led to complaints and subsequently, the OWK / KWV have decided to investigate other possibilities. In addition to the above, legislation has changed to such an extent that this practice is now no longer acceptable for disposing of this effluent.

Although this practice is currently still being used, OWK/KWV has committed themselves to find a solution to legalize and improve their current practice. They have also started dosing Lime into the effluent in an effort to increase the pH. In addition, they have started dosing Effective Microorganisms in an effort to abate the odour problem. Both these actions are considered of interim nature, but have had a positive, if not permanent effect on the problem.

Alternative 3

Up-flow anaerobic sludge blanket reactor

Generally, when one has to deal with effluent which has a high organic load, the answer is to utilize an anaerobic process. Anaerobic bacteria utilize carbon based materials as food sources and produce methane, water and hydrogen sulphide as by-products. Investigations by BVi Consulting Engineers found that the UASB reactors have been used successfully at other large scale wineries/distilling plants in the Western Cape. A UASB reactor consists of a vertical tank into which the effluent is pumped. The UASB process uses an anaerobic process whilst forming a blanket of granular sludge which suspends in the tank. Wastewater flows upwards through the blanket and is processed (degraded) by the anaerobic microorganisms. The upward flow combined with the settling action of gravity suspends the blanket with the aid of flocculants. The blanket begins to reach maturity at around 3 months. Small sludge granules begin to form whose surface area is covered in aggregations of bacteria. In the absence of any support matrix, the flow conditions create a selective environment in which only those microorganisms, capable of attaching to each other, survive and proliferate. Eventually the aggregates form into dense compact biofilms referred to as "granules".

The UASB reactor is however very high level technology and requires a high initial capital investment and also a continued running operational expense. The technology needs constant monitoring when put into use to ensure that the sludge blanket is maintained, and not washed out (thereby losing the effect). The heat produced as a by-product of electricity generation can be reused to heat the digestion tanks rendering them more effective.

The blanketing of the sludge enables a dual solid and hydraulic (liquid) retention time in the digesters. Solids requiring a high degree of digestion can remain in the reactors for periods up to 90 days.[2] Sugars dissolved in the liquid waste stream can be converted into gas quickly in the liquid phase which can exit the system in less than a day.

This high initial investment can be played off against the fact that the process generates substantial amounts of methane gas which could be utilized as an energy source. KWV currently uses coal fired boilers in their distillery which could be replaced with gas burners running off methane. In addition, by using a gas engine driving a generator, electricity could be produced.

A UASB plant capable of treating the quantities of effluent found at the OWK/KWV however has a capital cost in excess of R15 million. The management of OWK/KWV, indicating that a project of this extent cannot be funded by their shareholders who are farmers.

Subsequently, this option was abandoned due to excessive capital cost and high running cost.

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Alternative 4

Covered in-ground anaerobic reactor

This process is again based on the actions of anaerobic bacteria and was developed for treatment of large volumes of organic waste. The CIGAR process was developed in New Zealand by a company called Waste Solutions. The acronym CIGAR stands for Covered In Ground Anaerobic Reactor. Such a system effectively comprises a reactor constructed by making an excavation in the soil, lining it with HDPE sheeting and also covering the surface with a floating plastic roof which will serve as a gas collector for the methane produced. Low pressure Roots-type blowers are used to then extract the methane gas under vacuum from the floating roof and then pumped to a gas storage tank.

As with all anaerobic processes, they are not magic and always have by-products that need to be dealt with responsibly. Typically, there is always a highly enriched supernatant, stabilized sludge, etc. that still needs to be dealt with. In addition, this specific process requires large volumes of waste to be treated to make it cost effective. After telephonic and e-mail discussions with Waste Solutions, it was decided to abandon this option, again due to the economy thereof. Although it was considerably more economic than the UASB process, it still lacked sufficient economy of scale to make it worthwhile.

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

Alternative 1 (preferred alternative)

Alternative 2

Alternative 3

e) **No-go alternative**

This alternative is the “*no-development alternative*”. The no-go option will result in the status quo of the current evaporation pond system being maintained.

Evaporation in the Uppington area is high and averages at about 120mm per month. This system worked fairly well in that the evaporation has exceeded the effluent volume for almost 20 years. The problem with this system is that it produces odor. Twenty years ago, this was not problematic, as the evaporation ponds were far from any residential areas.

This has however changed and residential development has extended considerably the last 10 years to an extent that the residential area is now within 2km of the evaporation ponds. In addition, the reigning winds are either north or north-west which now blows the odours directly to the residential areas. This has led to complaints and subsequently, the OWK / KWV have decided to investigate other possibilities. In addition to the above, legislation has changed to such an extent that this practice is now no longer acceptable for disposing of this effluent. In addition the evaporation ponds were never formally lined and the possibility of soil and or water pollution are real.

The “no-go” alternative is therefore not considered the ‘best practical environmental option’.

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

3. PHYSICAL SIZE OF THE ACTIVITY

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

Alternative:

Alternative A1¹ (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Size of the activity:

<100 000 m ²
220 000 m ²
50 000 m ²

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:

600 000 m ²
600 000 m ²
600 000 m ²

4. SITE ACCESS

Does ready access to the site exist?

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

YES	
	N/A

Describe the type of access road planned:

There is an existing access road. No new roads need to be constructed.

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.

¹ "Alternative A.." refer to activity, process, technology or other alternatives.

5. 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).

6. 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.

7. 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 DWA);
- 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.

8. 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.

9. FACILITY ILLUSTRATION

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.

10. ACTIVITY MOTIVATION

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

1. Is the activity permitted in terms of the property's existing land use rights?	YES	<input checked="" type="checkbox"/>	Please explain
The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES	<input checked="" type="checkbox"/>	Please explain
The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years and is considered to be in line with the provincial SDF.			
(b) Urban edge / Edge of Built environment for the area		<input checked="" type="checkbox"/>	NO Please explain
The site is located outside the urban edge.			
(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 municipal IDP and SDF?).	YES	<input type="checkbox"/>	NO Please explain
The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years. The approval of this application will therefore not compromise the integrity of the municipal IDP and SDF.			

BASIC ASSESSMENT REPORT

(d) Approved Structure Plan of the Municipality	YES	<input checked="" type="checkbox"/>	Please explain
<p>The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years. The approval of this application will therefore not compromise the municipal structure plan.</p>			
(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?)	YES	NO	Please explain
<p>The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years. According to the Draft Siyanda Environmental management Framework, the property (Erf 5410) is mapped as transformed.</p> <p>The approval of this application will therefore not compromise the integrity of the Siyanda EMF.</p>			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
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)?	YES	<input checked="" type="checkbox"/>	Please explain
<p>The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years.</p>			
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.)	YES	<input checked="" type="checkbox"/>	Please explain
<p>Residential development has extended considerably in the last 10 years to an extent that the residential area is now within 2km of the evaporation ponds. In addition, the reigning winds are either north or north-west which now blows the odours directly to the residential areas. This has led to numerous complaints.</p>			
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.)	YES	NO	Please explain
<p>N/a</p>			

BASIC ASSESSMENT REPORT

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.)	YES	<div style="background-color: black; width: 20px; height: 20px; margin: 0 auto;"></div>	Please explain
<p>The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years. The approval of this application will therefore not compromise the integrity of the municipal infrastructure planning.</p>			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES	NO	Please explain
<p>Only in the sense that possible soil and water contamination is a national concern.</p>			
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.)	YES	<div style="background-color: black; width: 20px; height: 20px; margin: 0 auto;"></div>	Please explain
<p>The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years. The approval of this application will therefore not compromise the land use.</p>			
9. Is the development the best practicable environmental option for this land/site?	YES	<div style="background-color: black; width: 20px; height: 20px; margin: 0 auto;"></div>	Please explain
<p>Yes, the upgrade is expected to have the following positive impacts:</p> <ul style="list-style-type: none"> The actual disturbed footprint will be much reduced (less than half of the current evaporation ponds). Odour problems should be solved. Possible soil and water contamination will be much better managed and the risk for pollution will be almost negligible. Possible contaminated soils will be remediated. Treated water will be re-used as washwater or for garden irrigation (against current evaporation). 			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES	<div style="background-color: black; width: 20px; height: 20px; margin: 0 auto;"></div>	Please explain
<p>Yes, the upgrade is expected to have the following positive impacts:</p> <ul style="list-style-type: none"> The actual disturbed footprint will be much reduced (less than half of the current evaporation ponds). Odour problems should be solved. Possible soil and water contamination will be much better managed and the risk for pollution will be almost negligible. Possible contaminated soils will be remediated. <p>Treated water will be re-used as washwater or for garden irrigation (against current evaporation).</p>			

BASIC ASSESSMENT REPORT

11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO	Please explain
N/A. The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years. The approval of this application will therefore not compromise the land use			
12. Will any person's rights be negatively affected by the proposed activity/ies?		NO	Please explain
The proposed activity will be for the benefit of the community, and it is therefore not considered to negatively affect any person's rights.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?		NO	Please explain
The site is located outside the urban edge.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?		NO	Please explain
No. The activity is the upgrade and changing of the existing evaporation pond system into a reed bed treatment system, and will be located within the same footprint used for the current evaporation pond system on the same property (Erf 5410) purchased for this specific purpose and used for this purpose for more than 20 years. The activity is to localised and small to impact on any of the 17 Strategic Integrated Projects.			
15. What will the benefits be to society in general and to the local communities?			Please explain
The activity will not only improve the effluent treatment and quality of the existing works, but additional temporary employment opportunities could be created during the construction phase.			
16. Any other need and desirability considerations related to the proposed activity?			Please explain
17. How does the project fit into the National Development Plan for 2030?			Please explain
According to the National Development Plan for 2030, before 2030, all South Africans will have affordable access to sufficient safe water and hygienic sanitation to live healthy and dignified lives. The proposed activity will help ensure this for the community.			

BASIC ASSESSMENT REPORT

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

The general objectives of Integrated Environmental Management have been taken into account through the following:

- The actual and potential impacts of the activity on the environment, socio-economic conditions and cultural heritage have been identified, predicted and evaluated, as well as the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impact, maximizing benefits and promoting compliance with the principles of environmental management.
- The effects of the activity on the environment have been considered before actions taken in connection with them.
- Adequate and appropriate opportunity for public participation was ensured through the public participation process.
- The environmental attributes have been considered in the management and decision-making of the activity

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

- People and their needs have been placed at the forefront while serving their physical, psychological, developmental, cultural and social interests.
- Development must be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. Although the activity has little to no impact on these, they have been considered, and mitigation measures have been put in place. This is dealt with in the EMP (**Appendix G**)
- Where waste cannot be avoided, it is minimised and remedied through the implementation and adherence of EMP.
- The use of non-renewable natural resources is responsible and equitable.
- The negative impacts on the environment and on people's environmental rights have been anticipated and prevented, and where they cannot be prevented, are minimised and remedied.
- The interests, needs and values of all interested and affected parties have been taken into account in any decisions through the Public Participation Process.
- The social, economic and environmental impacts of the activity have been considered, assessed and evaluated, including the disadvantages and benefits.
- The effects of decisions on all aspects of the environment and all people in the environment have been taken into account, by pursuing what is considered the best practicable environmental option.

11. 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 Water Act (Act 36 of 1998)	Section 21(e): engaging in a controlled activity	Department of Water Affairs	In Progress

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

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

YES

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

m³

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

Minimal amounts of construction waste are expected. Excavated soil will be used as fill and remediation. Any excess construction waste will be disposed of at the nearest licenced waste disposal site in Uppington

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

At the nearest licenced waste disposal site.

Will the activity produce solid waste during its operational phase?

YES

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

2-4 m³

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

Sedimentation sludge from the pre-treatment works are pumped and disposed by the Municipality (a service for which KWV/OWK pay and which is already in place to service the current pre-treatment works). This practice will continue.

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

Uppington Waste Disposal site

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?

NO

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?

NO

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

N/A. This application is for the upgrade of an existing effluent treatment facility

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

YES

NO

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

m³

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

YES

NO

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

NO

If YES, provide the particulars of the facility:

Facility name:

Contact

person:

Postal

address:

Postal code:

Telephone:

E-mail:

Cell:

Fax:

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

The proposed activity is the upgrade of the existing effluent treatment facility, which will ensure more optimal treatment of waste water, better pollution control and re-use of treated wastewater.

c) Emissions into the atmosphere

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

NO

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

YES

NO

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:

N/A

d) Waste permit

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

YES

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

BASIC ASSESSMENT REPORT

e) Generation of noise

Will the activity generate noise?

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

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.

If NO, describe the noise in terms of type and level:

N/A

	NO
YES	NO

13. WATER USE

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

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
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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:

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

Licence application for Section 21(e) – engaging in a controlled activity

N/A litres

YES

If YES, please provide proof that the application has been submitted to the Department of Water Affairs (**Application will be made once the final treat works design is finalised**).

14. ENERGY EFFICIENCY

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

Constructed wetlands have distinct advantages over other means of treating wastewater in that they are not dependent on external energy or chemical inputs and require very little maintenance. Their lifespan can reach anything up to 80 years and in addition they are scenically attractive and provide a habitat for a wide variety of plants, birds, reptiles and invertebrates.

Reed beds generally provide an effluent much better than an oxidation pond system, and better or similar to that of a conventional treatment system and are especially suited to fluctuating flows. Reed beds can be constructed with unskilled labour and are devoid of high tech equipment and therefore can be considered a low maintenance option.

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

Constructed wetlands have distinct advantages over other means of treating wastewater in that they are not dependent on external energy or chemical inputs and require very little maintenance.

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

NO

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:

Province	Northern Cape
District Municipality	Siyanda District Municipality
Local Municipality	//Khara Hais Local Municipality
Ward Number(s)	
Farm name and number	Erf 5410 Upington
Portion number	
SG Code	C02800070000541000000

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:

Industrial Zone III (Refer to Appendix J1).

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?

NO

BASIC ASSESSMENT REPORT

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

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
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Alternative S2 (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
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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
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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 checked="" 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"/>	2.6 Plain	<input type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>

3. GROUNDWATER, 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)	NO	NO	NO
Dolomite, sinkhole or doline areas	NO	NO	NO
Seasonally wet soils (often close to water bodies)	NO	NO	NO
Unstable rocky slopes or steep slopes with loose soil	NO	NO	NO
Dispersive soils (soils that dissolve in water)	NO	NO	NO
Soils with high clay content (clay fraction more than 40%)	NO	NO	NO
Any other unstable soil or geological feature	NO	NO	NO
An area sensitive to erosion	NO	NO	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.

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 ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E “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.

Summary of Biodiversity Assessment

Please refer to the Biodiversity assessment of Erf 5410 (PB Consult, 10 March 2013) for a full description of the biodiversity features encountered.

In accordance with the 2006 Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006) only one broad vegetation types is expected on the sites, namely Kalahari Karroid Shrubland, which has been classified as Least Threatened according to the *National list of ecosystems that are threatened and in need of protection* (GN 1002, December 2011). The Erf which is approximately 60 ha in size have been bought by KWV to establish their wastewater treatment facility (or evaporation ponds). Off the site approximately 65 – 70% can be described as transformed (evaporation ponds). The remaining natural veld can also be divided into two units depending on the condition of the veld. To the northwest (on the small kopje or butt) the vegetation is still relatively undisturbed and in good condition, while to the south and southeast (lower lying areas) the remaining natural veld has been impacted to a much larger degree, some of which was originally disturbed during the development of the evaporation ponds (refer to Figure 3 underneath).

Figure 3: Google image demonstrating the extent of the evaporation ponds and the remaining natural veld



No species protected in terms of the National Forests Act (NFA) of 1998 (Act 84 of 1998), which provides for the protection of forests as well as specific tree species (GN 71 6 of 7 September 2012), have been encountered.

BASIC ASSESSMENT REPORT

However, 7 species protected in terms of the Northern Cape Nature Conservation Act 9 of 2009 (NCNCA), which also provides for the sustainable utilization of wild animals, aquatic biota and plants, were observed. The most notable species under these are a number of *Boscia foetida* (False Sheppard's Tree) which are marked with blue reference points on Figure 3 above.

It is important to note that none of the protected species needs to be impacted and that none of the remaining natural veld needs to be impacted. It is proposed that the new treatment works are located within the existing highly disturbed or transformed area marked in Figure 3 above. The footprint of the new works (<10ha) are expected to be much smaller than that of the current site (>22ha).

Draft Siyanda EMP

According to the Draft Siyanda Environmental Management Framework the proposed site falls within the following categories according to the various maps.

- **Conservation priority areas:** According to Map 12a the site falls within an area (vegetation type) regarded as having a High (3) conservation priority, but according to Map 12b, the site does not fall within a proposed conservation area.
- **Landcover:** According to Map 13 of the Draft EMF, it would seem as if the proposed site falls within the area marked as shrubland.
- **Sensitivity Index:** According to Map 14 of the Draft EMF, the proposed site falls within an area identified as of low environmental sensitivity (2) in an index which starts at Transformed and then are given values of 0-8 (8 being of high environmental sensitivity).
- **Control Zones:** According to Map 15, the proposed site location falls within a control zone 3 area, which is regarded as areas of potential high to very high vegetation conservation areas.

THUS ACCORDING THE SIYANDA EMF, KALAHARI KARROID SHRUBLAND IS CONSIDERED A VEGETATION TYPE WITH HIGH CONSERVATION VALUE; HOWEVER, THIS SPECIFIC LOCATION IS NOT PRESENTLY SEEN AS A SENSITIVE SITE.

5. SURFACE WATER

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

Perennial River		NO	UNSURE
Non-Perennial River		NO	UNSURE
Permanent Wetland		NO	UNSURE
Seasonal Wetland		NO	UNSURE
Artificial Wetland		NO	UNSURE
Estuarine / Lagoonal wetland		NO	UNSURE

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

BASIC ASSESSMENT REPORT

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:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station ^H
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential ^A	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard ^N	Mountain, koppie or ridge
Heavy industrial ^{AN}	Railway line ^N	Museum
Power station	Major road (4 lanes or more) ^N	Historical building
Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam ^A	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?

A railway line runs approximately 250 m to the south of the current treatment works, but the proposed activity will have no additional impact on the operation of the railway. In fact the smaller footprint and better odour control is expected to have a positive impact.

The N10 to Namibia runs approximately 250 m north of the current treatment works, but the proposed activity will have no additional impact on the operation of this road. In fact the smaller footprint and better odour control is expected to have a positive impact.

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)		NO
Core area of a protected area?		NO
Buffer area of a protected area?		NO
Planned expansion area of an existing protected area?		NO
Existing offset area associated with a previous Environmental Authorisation?		NO
Buffer area of the SKA?		NO

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

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

Uncertain

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:

According to the Heritage Assessment (**Appendix D3**), in terms of the built environment, the area has no significance, as there are no old buildings, structures, or features, old equipment, public memorial or monuments in the proposed footprint area.

The proposed upgrading will take place within an existing footprint area covering about 40ha in extent. It is estimated that more than 90% of the site is already very severely degraded and has been dramatically transformed.

In terms of Section 38 (1) (c) (iii) of the National Heritage Resources Act 1999 (Act 25 of 1999), an AIA of the proposed project is required if the footprint area of the development is more than 5000m².

The aim of the study is to identify and map archaeological heritage that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate the impacts.

Twenty-two artefacts were counted and mapped with a hand held GPS unit. These, comprised three Early Stone Age implements, including two large cores, and nine Middle Stone Age flakes, blades, cores and flaked chunks. One double sided hammerstone was also found, while the remainder of the lithics comprised chunks and retouched and/or utilized flakes, of which some may be Later Stone Age. No formal tools such as handaxes, points, scrapers or adzes, and no organic remains such as pottery or ostrich eggshell were found.

The very small numbers and isolated context in which they were encountered means that the archaeological remains on Erf 5410 have been rated as having low (Grade 3C) significance.

The results of the study indicate that the proposed development will not have an impact of great significance on these and potentially other archaeological remains.

The following recommendations are made:

1. No further archaeological mitigation is required.
2. In the unlikely event of any unmarked human burials/remains or ostrich eggshell water flask caches being exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (Att Ms Katie Smuts 021 462 4502). Burials, etc. must not be removed or disturbed until inspected by the archaeologist

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

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

NO

NO

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

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:

According to the //Khara Hais Spatial Development Framework 2009, it is recognized that poverty remains the core obstacle to a stable and prosperous future in South Africa. This applies to //Khara Hais as well. Despite commendable efforts of government, and state-supported efforts, poverty continues to be a chronic problem for much of South Africa's population. There problems are also evident in //Khara Hais.

The Labour Market²⁷ constitutes 63% of the total population of //Khara Hais (47 843). Only 24% of the Labour Market is employed, with the unemployment rate at 13%. The *not economically active*²⁸ people constitute 26% of the Labour Market. The unemployment rate of 13% could therefore be somewhat misleading due to the fact that people not seeking work, which can be classified as unemployed people, are not included.

Economic profile of local municipality:

According to the //Khara Hais Spatial Development Framework 2009, according to the 2001 Census data the Tertiary Sector provides more than 50% of the job opportunities in //Khara Hais. The Community, Social and Personal Services employs most people in the Municipality (i.e. 23%) followed closely by the Wholesale and Retail Trade sector, which employs 18% of the employed people.

Agriculture and mining account for 14% and the secondary sector (construction, manufacturing etc.) account for 13% of employment opportunities in the municipality

Level of education:

According to the //Khara Hais Spatial Development Framework 2009, it is imperative that the illiteracy and functional level of communities be addressed. Functional illiteracy is indicative of an inability to understand abstract information and usually occurs when a person has completed less than seven years of formal education and at least passed grade seven. 16% of the population of the Municipality is functionally illiterate while 7% are completely illiterate. This is directly connected to low income levels and will push the HDI further down if this is not attended to. A total of 19.31% of the population has some secondary education, while only 11.65% have completed Grade 12.

A third of the population in //Khara Hais is under the age of 15 years. This section of the population will become economically active within the next 5 to 10 years and education will be a key requirement to ensure a good quality of life. The 2008 Socio-Economic Survey indicates that approximately 25% of the population has an educational level of between Grades 8–10, while 24% has between Grades 11-12 and only about 4% has any form of tertiary education. These percentages, especially those that have completed Grade 12 have increased significantly since 2005, indicating a growth in the average educational level.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?

To be determined from results from the pilot study.

What is the expected yearly income that will be generated by or as a result of the activity?

N/A. No direct income expected but savings on Municipal water use is expected.

Will the activity contribute to service infrastructure?

YES

Is the activity a public amenity?

NO

How many new employment opportunities will be created in the development and construction phase of the activity/ies?

To be determined

What is the expected value of the employment opportunities during the development and construction phase?

Will be determined from the design.

What percentage of this will accrue to previously disadvantaged individuals?

To be determined

How many permanent new employment opportunities will be created during the operational phase of the activity?

0

What is the expected current value of the employment opportunities during the first 10 years?

N/a

What percentage of this will accrue to previously disadvantaged individuals?

N/a

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. 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)

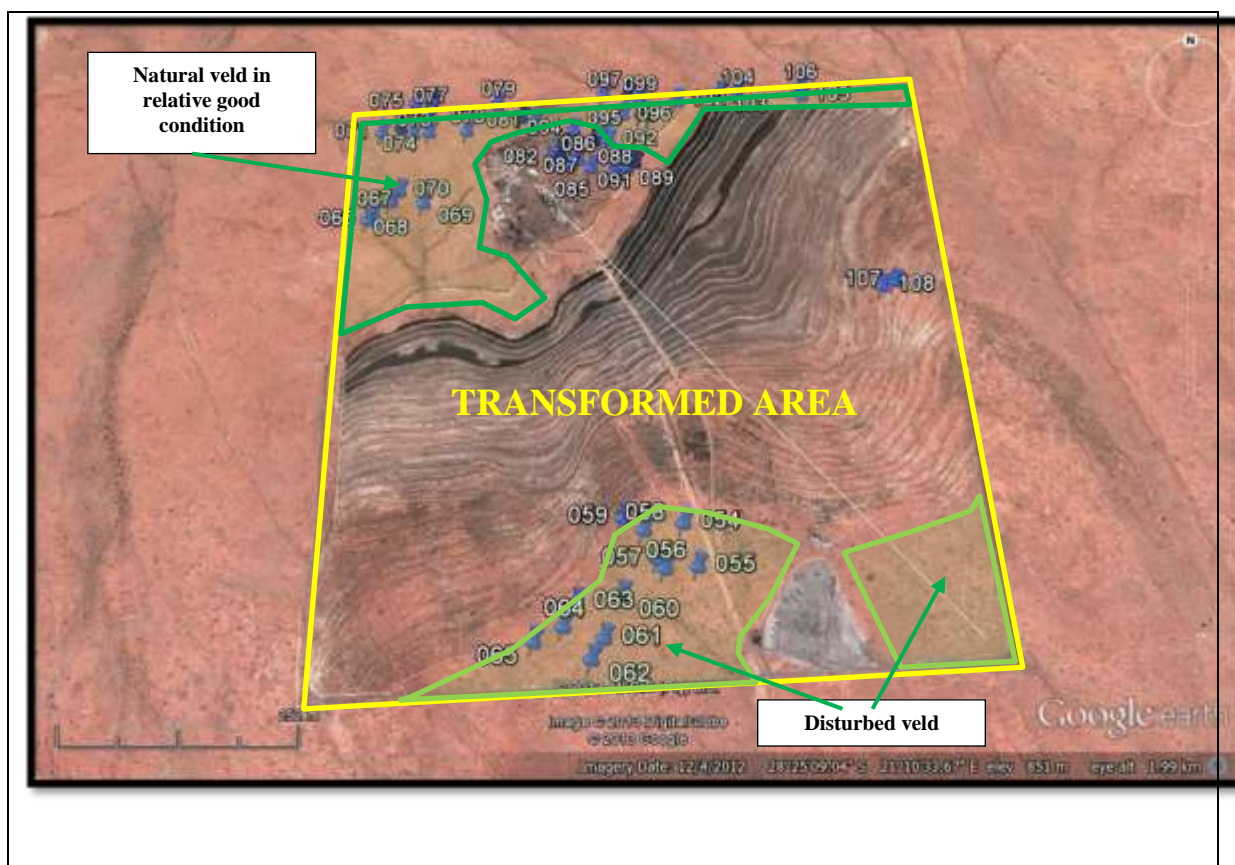
Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	No fine-scale mapping is as yet available for this area and as a result no critical biodiversity areas or biodiversity support areas has been promulgated for this area. Refer to the biodiversity assessment, Appendix D2

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	10-15%	According to the Biodiversity Assessment (Appendix D2) the remaining natural veld can also be divided into two units depending on the condition of the veld. To the northwest (on the small kopje or butt) the vegetation is still relatively undisturbed and in good condition, while to the south and southeast (lower lying areas) the remaining natural veld has been impacted to a much larger degree, some of which was originally disturbed during the development of the evaporation ponds (refer to Figure 3 underneath).)
Near Natural (includes areas with low to moderate level of alien invasive plants)	%	
Degraded (includes areas heavily invaded by alien plants)	15-20%	The remaining natural veld can also be divided into two units depending on the condition of the veld. To the northwest (on the small kopje or butt) the vegetation is still relatively undisturbed and in good condition, while to the south and southeast (lower lying areas) the remaining natural veld has been impacted to a much larger degree, some of which was originally disturbed during the development of the evaporation ponds (refer to Figure 3 underneath).
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	60-70%	Off the site approximately 65 – 70% can be described as transformed (evaporation ponds).

The Erf which is approximately 60 ha in size have been bought by KVV to establish their wastewater treatment facility (or evaporation ponds). Off the site approximately 65 – 70% can be described as transformed (evaporation ponds). The remaining natural veld can also be divided into two units depending on the condition of the veld. To the northwest (on the small kopje or butt) the vegetation is still relatively undisturbed and in good condition, while to the south and southeast (lower lying areas) the remaining natural veld has been impacted to a much larger degree, some of which was originally disturbed during the development of the evaporation ponds (refer to Figure 3 underneath).

Figure 4: Google image demonstrating the extent of the evaporation ponds and the remaining natural veld



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 unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline		
	Endangered								
	Vulnerable								
	Least Threatened	YES	NO	UNSURE	YES	NO	YES	NO	

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)

According to the Biodiversity Assessment (**Appendix D2**), and in accordance with the 2006 Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006) only one broad vegetation types is expected on the sites, namely Kalahari Karroid Shrubland, which has been classified as Least Threatened according to the *National list of ecosystems that are threatened and in need of protection* (GN 1002, December 2011). The Erf which is approximately 60 ha in size have been bought by KWV to establish their wastewater treatment facility (or evaporation ponds). Off the site approximately 65 – 70% can be described as transformed (evaporation ponds). The remaining natural veld can also be divided into two units depending on the condition of the veld. To the northwest (on the small kopje or butt) the vegetation is still relatively undisturbed and in good condition, while to the south and southeast (lower lying areas) the remaining natural veld has been impacted to a much larger degree, some of which was originally disturbed during the development of the evaporation ponds (refer to Figure

3 underneath).

Figure 5: Google image demonstrating the extent of the evaporation ponds and the remaining natural veld



No species protected in terms of the National Forests Act (NFA) of 1998 (Act 84 of 1998), which provides for the protection of forests as well as specific tree species (GN 71 6 of 7 September 2012), have been encountered.

Photo 2: Overview of the relatively undisturbed vegetation encountered on top of the small kopje to the north of the site



However, 7 species protected in terms of the Northern Cape Nature Conservation Act 9 of 2009 (NCNCA), which also provides for the sustainable utilization of wild animals, aquatic biota and plants, were observed. The most notable species under these are a number of *Boscia foetida* (False Sheppard's Tree) which are marked with blue reference points on Figure 3 above.

It is important to note that none of the protected species needs to be impacted and that none of the remaining natural veld needs to be impacted. It is proposed that the new treatment works are located within the existing highly disturbed or transformed area marked in Figure 3 above. The footprint of the new works (<10ha) are expected to be much smaller than that of the current site (>22ha).

Photo 3: Overview of the more disturbed vegetation encountered along the southern portion of the site



Draft Siyanda EMP

According to the Draft Siyanda Environmental Management Framework the proposed site falls within the following categories according to the various maps.

- **Conservation priority areas:** According to Map 12a the site falls within an area (vegetation type) regarded as having a High (3) conservation priority, but according to Map 12b, the site does not fall within a proposed conservation area.
- **Landcover:** According to Map 13 of the Draft EMF, it would seem as if the proposed site falls within the area marked as shrubland.
- **Sensitivity Index:** According to Map 14 of the Draft EMF, the proposed site falls within an area identified as of low environmental sensitivity (2) in an index which starts at Transformed and then are given values of 0-8 (8 being of high environmental sensitivity).
- **Control Zones:** According to Map 15, the proposed site location falls within a control zone 3 area, which is regarded as areas of potential high to very high vegetation conservation areas.

THUS ACCORDING THE SIYANDA EMF, KALAHARI KARROID SHRUBLAND IS CONSIDERED A VEGETATION TYPE WITH HIGH CONSERVATION VALUE; HOWEVER, THIS SPECIFIC LOCATION IS NOT PRESENTLY SEEN AS A SENSITIVE SITE.

The following mitigation measures were proposed:

General

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must be developed by a suitably experienced Environmental Assessment Practitioner.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and the Biodiversity study recommendations as well as any other conditions which might be required by the Department of Environmental Affairs.

- An integrated waste management system must be implemented during the construction phase.
- All rubble and rubbish (if applicable) must be collected and removed from the site to a suitable registered waste disposal site.
- All alien vegetation should be removed from the larger property.

Other site specific mitigation recommendations

- The proposed treatment works should utilise the existing footprint and thus the existing disturbed areas as much as possible. In doing this the impact on natural veld and protected species is minimised (Refer to Figure 3 above).
- Permits must be obtained for the removal of any protected species which cannot be avoided.
- Only existing access roads should be used for access to the terrain. Access roads must be clearly demarcated and access must be tightly controlled (deviations may not be allowed).
- Indiscriminate clearing of areas must be avoided (all remaining areas to remain as natural as possible).
- Soils contaminated as a result of the current evaporation pond treatment system must be rehabilitated and used as base material for the construction of the new treatment work (especially if constructed wetland treatment is implemented).
- All topsoil (in areas with natural veld) must be removed and stored separately for re-use for rehabilitation purposes. The topsoil and vegetation should be replaced over the disturbed soil to provide a source of seed and a seed bed to encourage re-growth of the species removed during construction.
- Once the construction is completed all further movement must be confined to the access tracks to allow the vegetation to re-establish over the excavated areas.
- Adequate measures must be implemented to ensure against erosion.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Die Volksblad – 12 December 2012 Die Gembok – 14 December 2012	
Date published	Die Volksblad – 12 December 2012 Die Gembok – 14 December 2012	
Site notice position Entrance to Erf 5410 Erf 5412 Pearl Asa Kafee Khulumani Cash store	Latitude	Longitude
	28° 25' 20.4"	21° 10' 34.4"
	28° 26' 21.6"	21° 12' 16.8"
	28° 26' 11.7"	21° 12' 34.1"
	28° 26' 03.6"	21° 12' 29.6"
Date placed	05 December 2012	

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

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2)(e) and 54(7) of GN R.543.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Mr. Ernest Oliver	KWV (Landowner) & Applicant	olivere@kwv.co.za
Mr. Altus Theron	OWK (in control of land)	altus@owk.co.za
Mr. P.J. Viviers	!!Khara Hais Local Municipality	054 – 337 7021
Mr. D Ngxanga	Siyanda District Municipality	054 – 337 2800
Mr. M Andreas	Municipal Ward Councillor	054 – 337 7021

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.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
One comment was received from the !!Khara Hais Municipality: Various complaints were received by the municipality regarding odour problems associated with the current treatment facility. The upgrade should look at methods to address odour control.	Apart from the legal status of the facility, water conservation and odour problems are the other main reason for looking at alternative treatment methods.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft 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**.

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
Department of Water Affairs	Me. Nozi Mazwi	+27 (053) 836 7600		MazwiR@dwa.gov.za	Private Bag X6101 Kimberley 8300
Department of Roads and Public Works	Mr K Nogwili	(053)839 2241	(053)839 2291		P O Box 3132 Kimberley 8300
Department of Agriculture and Land Reform	Mr W Mothibi	(053)838 9102			Private Bag X5018 Kimberley 8300
Department of Environment and Nature Conservation	Me. Anga Yaphi	+27 (54) 3322885		ayaphi@ncpg.gov.za	206 Umbra Building Upington 8801
Department of Agriculture, Forestry and Fisheries	Ms Jacoline Mans	+27 (54) 338 5909	+27 (54) 334 0030	jacolinema@daff.gov.za	P.O. Box 2782 Upington 8800
SAHRA	Kathryn Smuts	021 462 4502	021 462 4509	ksmuts@sahra.org.za	PO Box 4637, Cape Town 8000

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.

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.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, 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.

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.

Activity	Impact summary	Significance	Proposed mitigation
Alternative 1 (preferred alternative)			
Construction and operation	Direct impacts: <ul style="list-style-type: none"> Impact on threatened or protected ecosystems. Impact on threatened or protected species. Impact on loss of ecological processes, ecosystem connectivity and local biodiversity. 	<i>Very low to positive</i> <i>Very low to positive</i> <i>Very low to positive</i>	<ul style="list-style-type: none"> The vegetation type has been classified as Least Threatened during the latest National Spatial Biodiversity Assessment. According to the draft Siyanda EMF, Kalahari Karroid Shrubland is considered a vegetation type with high conservation value; however, this specific site is not considered to be located within a sensitive area or considered for future conservation. The proposed upgraded should be placed within the footprint of the existing evaporation pond system, but placed to avoid any of the identified protected species. In doing this the impact might even be positive, since the footprint should be much reduced. Indiscriminate clearing of areas must be avoided (all construction related activities must be contained within the existing footprint). All efforts must be made avoid protected species (there is no reason that any protected species should be impacted). Only existing access roads should be used for access to the terrain. Access roads must be clearly demarcated and access must be tightly controlled (deviations may not be allowed). The remaining evaporation pond footprint (not used for the construction of the new reed bed treatment system must be remediated and rehabilitated).

BASIC ASSESSMENT REPORT

Activity	Impact summary	Significance	Proposed mitigation
	Indirect impacts: <ul style="list-style-type: none"> Soil contamination as a result of the new treatment method Pollution as a result of poorly treated effluent and waste. Soil contamination as a result of poor remediation of the existing evaporation pond system. 	<p><i>Low</i></p> <p><i>Low</i></p> <p><i>Medium</i></p>	<ul style="list-style-type: none"> The reed bed treatment systems must be suitably lined to prevent soil and water contamination. The proposed upgraded should be placed within the footprint of the existing evaporation pond system, but placed to avoid any of the identified protected species. In doing this the impact might even be positive, since the footprint should be much reduced. Indiscriminate clearing of areas must be avoided (all construction related activities must be contained within the existing footprint). The remaining evaporation pond footprint (not used for the construction of the new reed bed treatment system must be remediated and rehabilitated.
	Cumulative impacts: <ul style="list-style-type: none"> Cumulative 	<p><i>Considered to be positive</i></p>	<ul style="list-style-type: none"> The suspected soil and possible water pollution resulting from the using of unlined evaporation ponds will be negated in future. SA is a water scarce country and the re-use of treated effluent will be a significant better option than evaporation and will have a reduction of water usage within the KWV/OWK complex.
Alternative 2 The impacts associated with all of the remainder impacts will be very similar to that described above. <ul style="list-style-type: none"> However, the direct impact may be even lower since the footprint will most likely be even smaller. But, the construction cost and the operational and maintenance cost will be much higher; and It will have an added negative impact in that it will be dependent on electricity for its operation. 			
	Direct impacts:		<ul style="list-style-type: none">
	Indirect impacts:		
	Cumulative impacts:		
Alternative 3			
	Direct impacts:		
	Indirect impacts:		
	Cumulative impacts:		

BASIC ASSESSMENT REPORT

Activity	Impact summary	Significance	Proposed mitigation
No-go option			
Continue with the current treatment system without any upgrade	Direct impacts: <ul style="list-style-type: none"> Loss of water that can be re-used if suitably treated. Continual soil pollution as a result of using unlined evaporation ponds. Possible water pollution as a result of using unlined evaporation ponds. 	Medium Medium Low	<ul style="list-style-type: none"> A recent pilot soil study done by Dr. Raath (a soil scientist) showed that the soils are contaminated in the immediate vicinity of the current evaporation ponds. However, it also shows that the indications of pollutants have not spread very far in the surrounding soils and are most probably only associated with the direct footprint of the evaporation ponds and its immediate surroundings. The current evaporation pond system will continue to operate, which will lead to further soil pollution as a result of the ponds not being lined. This will lead to potential environmental pollution and may even lead to water pollution.
	Indirect impacts: <ul style="list-style-type: none"> Loss of water that can be re-used if suitably treated. Continual soil pollution as a result of using unlined evaporation ponds. Possible water pollution as a result of using unlined evaporation ponds. 	Same as above	Same as above
	Cumulative impacts: <ul style="list-style-type: none"> Continual soil and water pollution as a result of using an unlined facility. Continual waste of a scarce water resource (treated water) 		

A complete impact assessment in terms of Regulation 22(2)(i) of GN R.543 must be included as Appendix F.

2. 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.

Alternative A (preferred alternative)

[Refer to Appendix F](#)

Alternative B

Alternative C

No-go alternative (compulsory)

According to the biodiversity assessment (Appendix D2), the “No-Go alternative” does not signify significant biodiversity gain or loss especially on a regional basis. However, the proposed activity entails a better treatment system, better pollution prevention measures, a smaller physical footprint, the remediation of contaminated land and the re-use of a valuable resource (water).

The No-Go option will mean the current status quo will remain and there will be no possibility of improvement of treatment and the possible positive impact on the surrounding environment. The current effluent treatment practices will not be improved and continual pollution issues (which will further increase over time) will remain.

Over the short and long term the proposed project is likely to have a positive environmental impact, while the No-Go option will remain a continual source of environmental pollution.

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)?

YES

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).

The information contained in this study should be sufficient to advise that the proposed upgrade have all the possibilities of having a positive impact (improvement) on the environment in relation to the current practices.

- A pilot study was commissioned by the client in order to determine the possible soil pollution that may have resulted as a result of the 20 years of evaporation practice (Dr. P Raath, March 2013). This gives a very good indication of the possible remediation issues, but further chemical analysis of the soil and sludge within the existing evaporation ponds will be needed in order to advise positive remediation.

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.

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must be developed by a suitably experienced Environmental Assessment Practitioner.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and the Biodiversity study recommendations as well as any other conditions which might be required by the Department of Environmental Affairs.
- An integrated waste management system must be implemented during the construction phase.
- All rubble and rubbish (if applicable) must be collected and removed from the site to a suitable registered waste disposal site.
- All alien vegetation should be removed from the larger property.
- The reed bed treatment systems must be suitably lined to prevent soil and water contamination.
- The proposed upgraded should be placed within the footprint of the existing evaporation pond system, but placed to avoid any of the identified protected species. In doing this the impact might even be positive, since the footprint should be much reduced.
- Indiscriminate clearing of areas must be avoided (all construction related activities must be contained within the existing footprint).
- The remaining evaporation pond footprint (not used for the construction of the new reed bed treatment system must be remediated and rehabilitated.
- Permits must be obtained for the removal of any protected species which cannot be avoided.
- Only existing access roads should be used for access to the terrain. Access roads must be clearly demarcated and access must be tightly controlled (deviations may not be allowed).
- No additional areas with remaining natural veld (even disturbed natural veld) should be further impacted.
- The area used for the temporary storage of coal ash should be lined and shape to ensure that all possible leakage are contained.

Is an EMP attached?

YES

The EMP must be attached as Appendix G.

BASIC ASSESSMENT REPORT

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.

NAME OF EAP

SIGNATURE OF EAP

DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

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

Appendix J: Additional Information