# Prince Albert Municipality

**Water Use License Application**

# Fresh Water Report

**for expansion of the**

# Klaarstroom Wastewater Treatment Works

24 January 2019


bvi ENGINEERING PROCUREMENT MANAGEMENT

EnviroAfrica
Environmental Management and Impact Assessment
Omgewingsbestuur en Impakbeoordeling

WATSAN Africa

## Abbreviations

| | |
|---|---|
| Breede-Gouritz Catchment Management Agency | BGCMA |
| Critical Biodiversity Area | CBA |
| Department of Environmental Affairs and Development Planning | DEA&DP |
| Department of Water and Sanitation | DWA |
| Ecological Importance | EI |
| Ecological Sensitivity | ES |
| Ecological Support Area | ESA |
| Electronic Water Use License Application (on-line) | eWULAA |
| Environmental Control Officer | ECO |
| Environmental Impact Assessment | EIA |
| Government Notice | GN |
| Metres above sea level | masl |
| National Environmental Management Act (107 of 1998) | NEMA |
| National Freshwater Environment Priority Area | NFEPA |
| National Water Act (36 of 1998) | NWA |
| Present Ecological State | PES |
| South Africa National Biodiversity Institute | SANBI |
| Water Use License Application | WULA |

## List of Figures



## List of Tables

**Index**

# 1 Introduction

Klaarstroom is a small town in the southern Karoo to the south of Beaufort West. It has approximately 600 residents. The current Klaarstroom WWTW has now become too small for the growing load. The works must be re-designed and upgraded to meet the demands of the growing population.

The civil engineering firm BVi in Upington has been requested to draft a concept for the new WWTW. Mr. Gert Meiring is the consulting engineer and has designed the new works and has subsequently compiled a thorough report.

In terms of the National Environmental Management Act (NEMA, 107 of 1998), an environmental impact assessment (EIA) must be carried out for the renewal of the WWTW. The firm Enviro Africa of Somerset West has been appointed for the EIA. The EIA has already been advertised for the public participation process, in accordance with the provision of the act (see the notification if the Appendix).

Likewise, in terms of the National Water Act (NWA, 36 of 1998), a Water Use License Application (WULA) is called for. The firm WATSAN Africa has been appointed to lodge the application with the BGCMA. The WULA requires a Fresh Water Report (now dubbed the Technical Report). This report is to provide the decision-making authority, in this event the national Department of Water and Sanitation (DWS) and their local agency, the BGCMA, with adequate information to facilitate an informed decision. This then is the required report. It includes the Risk Matrix, as prescribed in GN276.

Once all of the required supporting documents have been collected, of which there are quite a number, the application will be submitted via the on-line eWULAA system. After this it remains for the DWS and the BGCMA to license the upgrade of the WWTW.

The current WWTW essentially is an anaerobic pond system and consists of only two ponds. The new WWTW will have five ponds, of which one will be a horizontal flow reed bed. This will be a larger, much improved system that will do much to deliver an effluent of an acceptable quality. The existing WWTW has a design capacity of 50m$^3$ per day and that of the new one will be 61m$^3$ per day. By all measures this remains a small plant.

# 2 Legal Framework

## 2.1 National Water Act

S21 (c) *Impeding of diverting the flow of a water course*

The proposed development will have a permanent effect on the flow of the drainage line.

*The WWTW is located in a faint drainage line.*

S21 (i) *Altering the bed, bank, course of characteristics of a water course.*

The proposed development will permanently change the characteristics of the drainage lines.

*The WWTW is located in a faint drainage line.*

Government Notice 509 of 26 August 2016

An extensive set of regulations that apply to any development in a water course is listed in this government notice in terms of Section 24 of the NWA. Section (b) on p4 stipulates that any development within 100m of a water course is in the regulated area and will have to be authorised.

*The Klaarstroom WWTW is located in a faint drainage line and therefore subject to GN509.*

S37 (1) (a). The irrigation of land with water containing waste by a water works is a controlled activity, for which authorisation is required.

*The Klaarstroom WWTW already irrigates its treated effluent. To continue this practice, official authorisation is required.*

Government Notice 267 of March 2017 in terms of S46 of the NWA. A comprehensive and exhaustive schedule is provided for the technical report that is required for the registration of WWTW's.

*The Klaarstroom WWTW and its proposed upgrading requires that such a technical report is to be produced.*

S21 (b). A license is required for the storage of water.

*The volume of water that is to be stored for the irrigation would be small. For such a small volume a license would not be required.*

S40 and S41. A license is required for a water use.

*The Klaarstroom WWTW does neither abstract water from a source, nor does it release effluent is a water resource, but it is diverting the flow of water in a drainage line and impeding on the banks of a drainage line, for which such a license is required, according to the procedure set out in S41.*

### 2.2 Pipeline

A pipeline is to be constructed from the new WWTW to a sports field in the township. The pipeline can follow one of two routes. The one follows the river bank over private land and underneath the N12 road bridge that spans the drainage line. For this a S21 (i) WULA will be required.

The alternative is much shorter, on municipal land, underneath the N12 trunk road through an existing culvert and onto the sport field. For this a WULA is not required. It is assumed that this is the preferred option.

### 2.3 Storage of Water

The treated effluent stored for irrigation on the sport field would be small, a 200m$^3$ prefabricated round farm dam, for which a S21 (b) license would not be required.

### 2.4 Future Action

Since the Klaarstroom WWTW is located within a drainage line, albeit a very faint drainage line, a Fresh Water Report (now dubbed the Technical Report) is required in terms of GN509, together with the Risk Matrix and the motivation for the values that are to be allocated in the Risk Matrix. Subsequently the WULA is to be registered on the eWULAA system.

Mr Carlo Abrahams of the BGCMA made it clear that a GN267 technical report is required for the registration of the WWTW. The report is to include the irrigation of effluent. Mr Gert Meiring of the engineering firm BVi in Upington has already produced an in-depth report that could answer to the provisions of GN267.

## 3 Quaternary Catchment

Klaarstroom is in the J33C quaternary catchment.

## 4 Climate

http://www.saexplorer.co.za/south-africa/climate/prince_albert_climate.asp

The closest locality for which SA Explorer has weather information is Prince Albert some 45 km to the west.

Prince Albert normally receives about 204mm of rain per year, with most rainfall occurring mainly during mid-summer. The chart below (lower left) shows the average rainfall values for Prince Albert per month. It receives the lowest rainfall (10mm) in December and the highest (30mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Prince Albert range from 17.2°C in July to 31.2°C in January. The region is the coldest during July when the mercury drops to 3.3°C on average during the night.

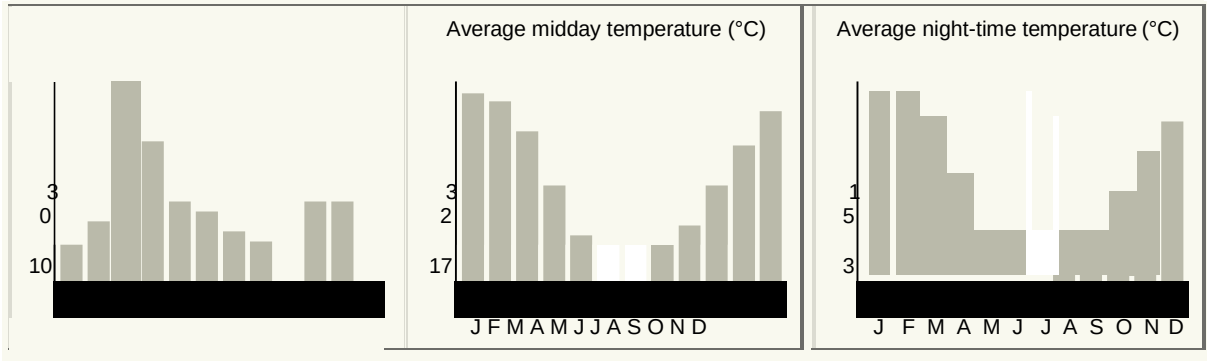



**Figure 1** Climate Prince Albert

With such a low rainfall, the area can be described as semi-arid.

The rainfall is most variable, with long periods of drought, lasting for 2 or 3 years, only to be interrupted by a high rainfall event, sudden and fierce, scouring out the dry river beds.

The evaporation rate in these semi-arid areas can be up to 1500mm per year, thereby outstripping the rainfall more than 7 times.

## 5 Vegetation

The vegetation is classified as Prince Albert Succulent Karoo on the SANBI BGIS vegetation map for South Africa. This veldt type is not endangered in any way.

## 6 Geology and Soils

The soils, according to the BVi technical report, have a high clay content. Underneath is Karoo shale, which is for the most part impermeable. This is advantageous to the operation of the WWTW, as penetration of moist from the ponds down into the ground water is prevented. Ground water is deep down, small in volume and mostly salty and with limited use.

## 7 Location

The Klaarstroom hamlet is located on the N12 trunk road from George past Oudshoorn to Beaufort West (Figure 2). It is located on the entrance to Meiringspoort, the picturesque passage through the Swartberg Mountains. Klaarstroom is on the southern verge of the Great Karoo.

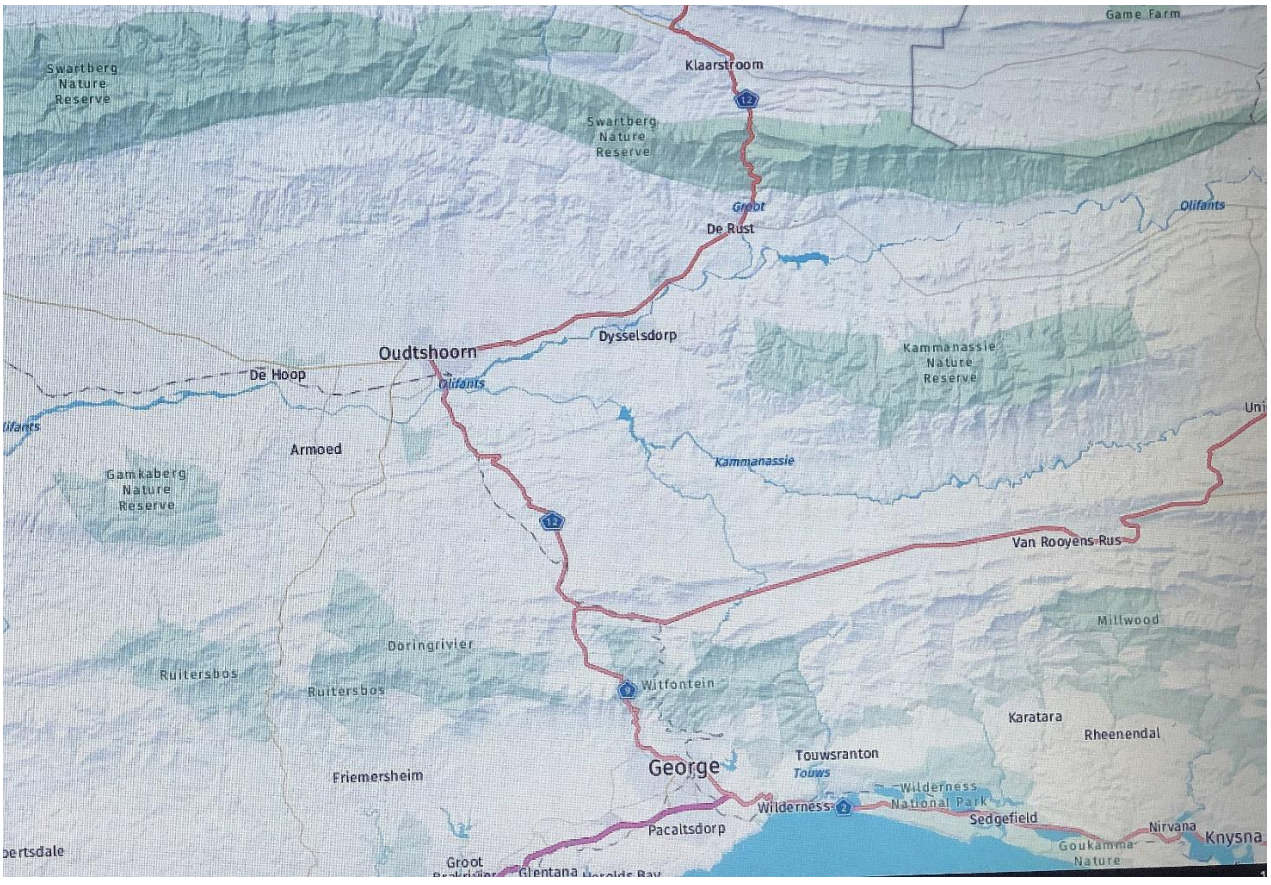



**Figure 2** Location Klaarstroom

**Figure 3** Current Pond

## 8 Drainage Line

The existing WWTW (Figure 3) straddles a drainage line (Figure 4).

The drainage line is faint.

The highest point of the hill to the north is 792m above sea level. The WWTW is at 737masl and the point where the drainage line connects to the Groot River is 730 masl. This is a drop of 62 m over a distance of 950m, as the crow flies, a mean slope of 6.5 m in every 100m, which is steep. During a very high rainfall event, the flow of water can be expected to be fast, with a high erosion potential, as is evident from the deeply incised Groot River and most drainage lines.

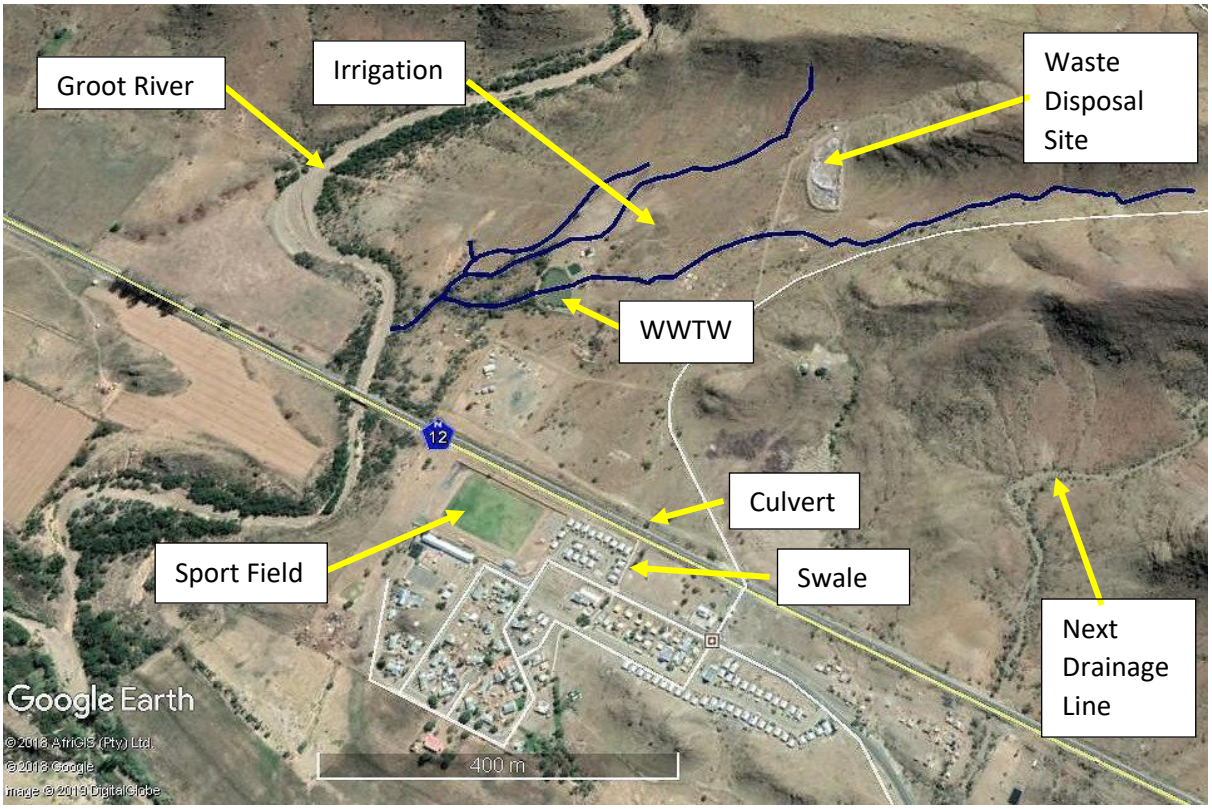



**Figure 4** Drainage Line

## 9 Sub-Catchment

The reason why the drainage line is faint is because the sub-catchment is small, only 41 hectares, with a circumference of only 3 km (Figure 5). In the event of a high rainfall event, say 30mm in 24 hours, the sub-catchment can produce 12 300$m^3$ of storm water, of which 30% would sink into the ground, leaving 8 610$m^3$. Even though this water would not pass the WWTW all at once, perhaps spread out over 2 days of more, it is still a lot of water, for which storm water management provision must be made. Even though the conditions are semi-arid, the rainfall is variable, with high rainfall events, such as floods with a recurrence of once in 50 or 100 years.

The drainage line is separated from the next drainage line towards the east with a low ridge (Figure 4). The next drainage line is emphasised and clear.

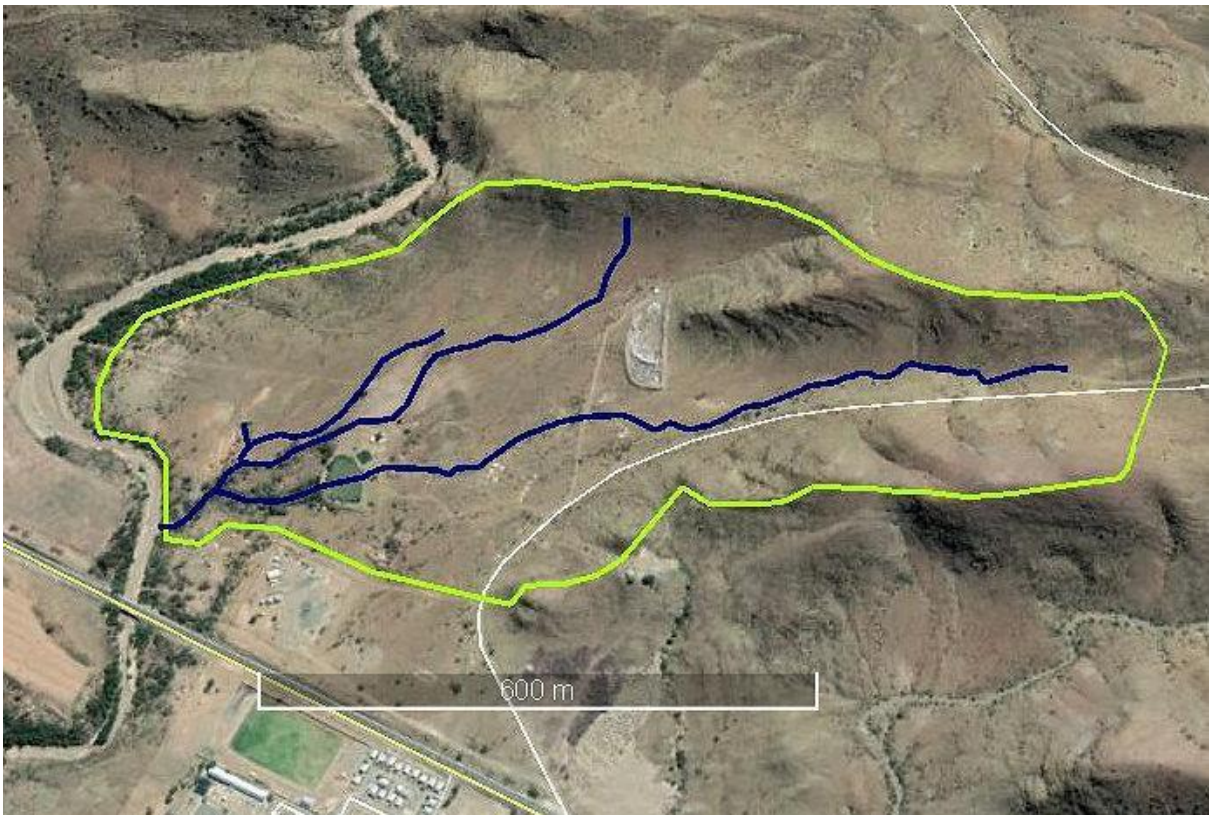



**Figure 5** Sub-catchment area

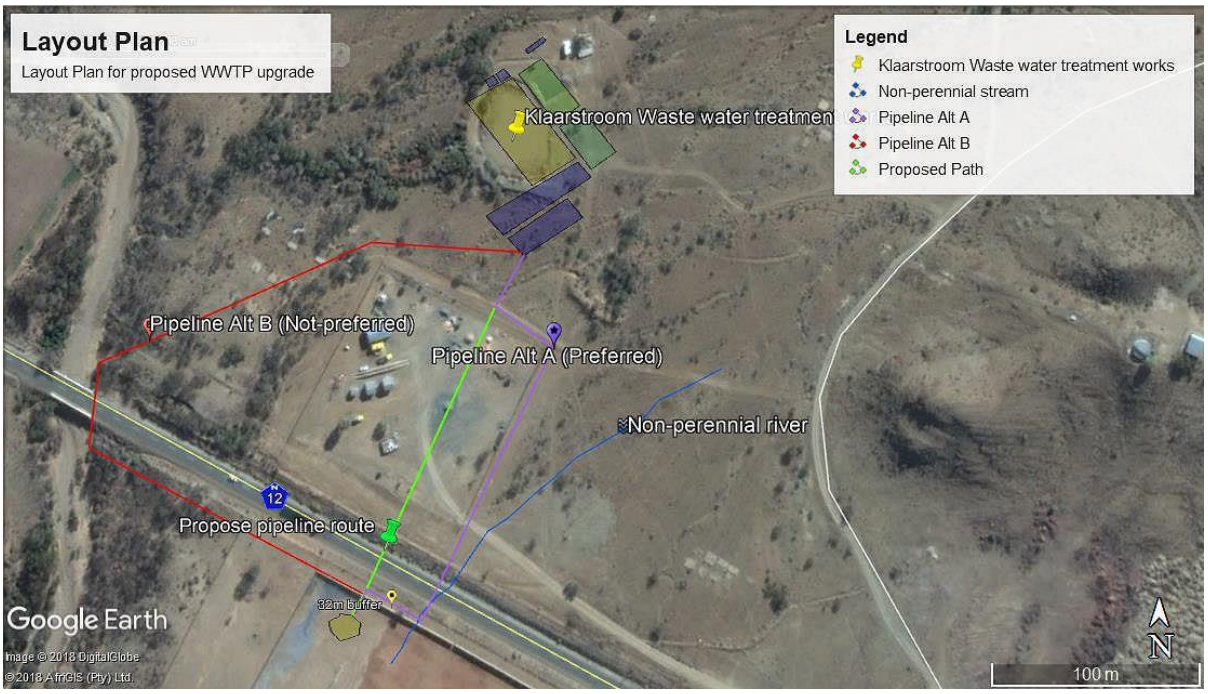



**Figure 6** BVi Site Plan

The site plan (Figure 6) indicates a non-perennial river, which was not observed during the site visit on 23 January 2019. This drainage line was originally indicated on the Cape Farm Mapper of the Western Cape Government. The ground here is very level, which leaves uncertainty to where storm water flows. Instead of the drainage line, a culvert (Figure 7) was observed under the N12, for letting through storm water that might accumulate against the northern shoulder of the road.

**Figure 7** Culvert

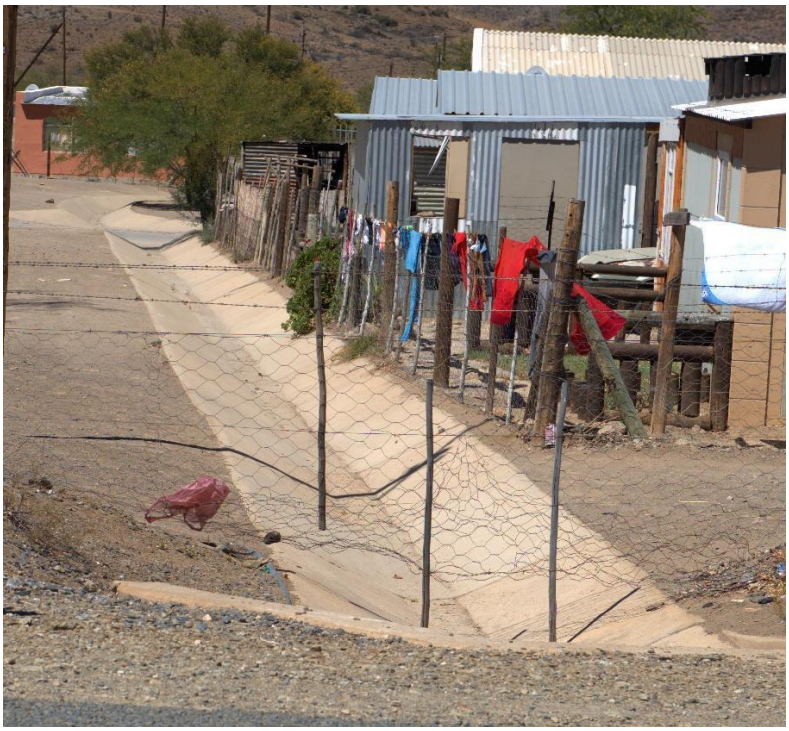


**Figure 8** Swale

The location of the culvert is indicated on Figure 4. It is to the east of the drainage line, as indicated on the Cape Farm Mapper.

An electrical power line is routed through the culvert underneath the N12 trunk road toward the WWTW.

A swale with a hard surface stretches from the culvert to the south into the Klaarstroom township (Figure 8). This is part of the storm water system that releases its water into the Groot River south of the township.

## 10 The Project

The existing WWTW is to be expanded from the current system as depicted in Figure 4 to an upgraded works as depicted in Figure 9. The surface area of the existing works will be incorporated in new works. The new works is fully described in the BVi report.


**Figure 9** New Klaarstroom WWTW (BVi)

The footprint of the new works would be small, less than 5000m$^2$. To visualise the area, it would be 50m wide and 100m long.

## 11 Irrigation

Currently the treated wastewater is irrigated on land adjacent and to the north east of the WWTW. Two sprinklers (Figure 10) are used, which are moved about to spread the wastewater over a larger area. The circles of irrigated areas can be seen on the Google Earth Image (Figure 4).

**Figure 10** Sprinkler

It is now planned that some of the treated sewage effluent be used for irrigation of the sports field in the township (Figure 11). Obviously, the treated effluent is going to be sanitized by chlorination to render it safe for humans.

**Figure 11** Sports Field

The sports field is planted with kikuyu lawn grass and was extremely dry and dying during the site visit. The Klaarstroom community stand to benefit from a well irrigated and green sports field. Already a significant investment has been made towards irrigation equipment (Figure 12), but so far water has been lacking for most part of the year.

**Figure 12** Irrigation Equipment

## 12 Irrigation Impact

The irrigated vegetation out in the veldt is visibly different from that in the surrounding dry and arid area. The plants are greener and some were even flowering (Figure 13), out of season. Since the irrigated area is inconspicuously small amidst a vast landscape, this unnatural situation is not much to worry about.

**Figure 13** Irrigated flowering vegetation

## 13 **Present Ecological State** (PES)

The PES and EIS are protocols that have been produced by Dr Neels Kleynhans (Table 1 and 2) in 1999 of the then DWAF to assess river reaches. The scores given are solely that of the practitioner and are based on expert opinion.

### 13.1 Drainage Line

The upper part of the drainage line, as depicted in Figure 4, is natural, apart from the odd farm animal, with no impacts. Lower down it is impacted by the municipal waste disposal site and the irrigated area. The WWTW straddles the drainage line. Downstream from the WWTW there is evidence of seepage, as there is ‘n dense stand of shrub and trees, more so than in the direct surroundings. The aim is to arrive at an overall score for the entire drainage line.

Both the in-stream habitat and the riparian zone both score a ‘C’ (Table 1). The habitat has been impacted, but the basic ecological functioning is still intact.

**Table 1** Present Ecological Status Aquatic Habitat Klaarstroom Drainage Line

| Instream | Score | Weight | Product | Maximum score |
|---|---|---|---|---|
| Water abstraction | 24 | 14 | 336 | 350 |
| Flow modification | 15 | 13 | 195 | 325 |
| Bed modification | 10 | 13 | 130 | 325 |
| Channel modification | 10 | 13 | 130 | 325 |
| Water quality | 12 | 14 | 168 | 350 |
| Inundation | 17 | 10 | 170 | 250 |
| Exotic macrophytes | 22 | 9 | 198 | 225 |
| Exotic fauna | 20 | 8 | 160 | 200 |
| Solid waste disposal | 3 | 6 | 18 | 150 |
| Total | | 100 | 1505 | 2500 |
| % of total | | | 60.2 | |
| Class | | | C | |
| | | | | |
| Riparian | | | | |
| | | | | |
| Water abstraction | 24 | 13 | 312 | 325 |
| Inundation | 12 | 11 | 132 | 275 |
| Flow modification | 10 | 12 | 120 | 300 |
| Water quality | 15 | 13 | 195 | 325 |
| Indigenous vegetation removal | 20 | 13 | 260 | 325 |
| Exotic vegetation encroachment | 22 | 12 | 264 | 300 |
| Bank erosion | 23 | 14 | 322 | 350 |
| Channel modification | 15 | 12 | 180 | 300 |
| Total | | | 1785 | 2500 |
| % of total | | | 71.4 | |
| Class | | | C | |

## 13.2 Groot River

The Groot River rises on the high ground between two ridges to the north and east of Klaarstroom on an elevation of 915masl (Figure 14). It receives a number of smaller tributaries from a low ridge to the south of which the highest point is 972masl. The valley is demarcated by a higher ridge to the north of which the highest point is 1270masl. Here the flow is towards the west. It then swings to the south towards Klaarstroom.

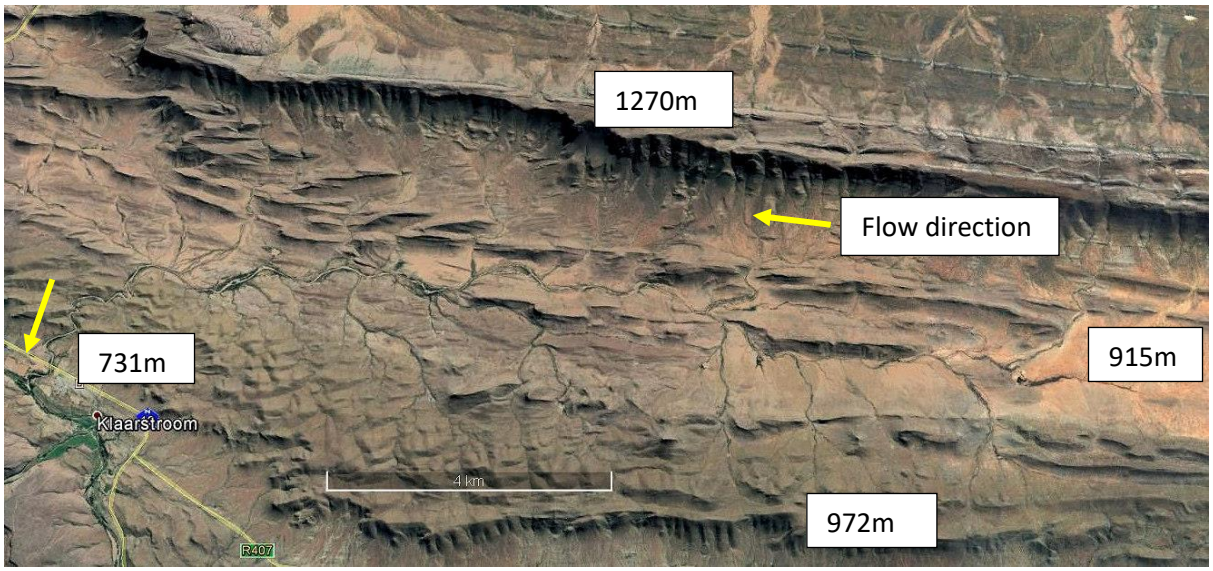



**Figure 14** Groot River reach

The river reach of interest is upstream from the N12 road bridge (Figure 15). This bridge is to the west just out of Klaarstroom on an elevation of 731m. This reach is 16 km long. The sub-catchment area is 1055 hectares.

The Groot River receives a larger tributary from the west adjacent and to the south of Klaarstroom, then swings east towards Meiringspoort, passes through Meiringspoort and through the Swartberg Mountains and after receiving many tributaries, becomes the Gouritz River that flows into the Indian Ocean near Mossel Bay.

The Groot River reach upstream from the N12 road bridge is near-pristine, albeit dry. The only impacts are farm roads and 4 small farm dams. The river is incised and well demarcated at the N12 road bridge (Figure 15). The banks are steep and overgrown with *Vachelia karoo* (soetdoring) trees, which were just starting to flower at the time of the site visit. A patch of *Phragmitis australis* reeds, then very dry, indicated that there is water indeed, from time to time.

Downstream of the road bridge, where the western tributary joins the Groot River, the river is impacted by agriculture and probably return flow from Klaarstroom, as there was a small pond of water overgrown with bulrush *Typha capensis* (Figure 16). This river reach has not been included in the assessment, only upstream of the N12 road bridge. The Groot River further downstream was dry and water seeping out of the sandstones of the Swartberg Mountains halfway through Meiringspoort replenished the flow to a strong flow at the southern end of Meiringspoort.

**Figure 15** Groot River at the N12 road bridge.

**Figure 16** Groot River south of Klaarstroom

**Table 2** Present Ecological Status Aquatic Habitat of the Groot River reach

| Instream | Score | Weight | Product | Maximum score |
|---|---|---|---|---|
| Water abstraction | 24 | 14 | 336 | 350 |
| Flow modification | 24 | 13 | 312 | 325 |
| Bed modification | 24 | 13 | 312 | 325 |
| Channel modification | 24 | 13 | 312 | 325 |
| Water quality | 22 | 14 | 308 | 350 |
| Inundation | 24 | 10 | 240 | 250 |
| Exotic macrophytes | 22 | 9 | 198 | 225 |
| Exotic fauna | 22 | 8 | 176 | 200 |
| Solid waste disposal | 10 | 6 | 60 | 150 |
| Total | | 100 | 2254 | 2500 |
| % of total | | | 90.2 | |
| Class | | | A | |
| | | | | |
| Riparian | | | | |
| | | | | |
| Water abstraction | 24 | 13 | 312 | 325 |
| Inundation | 24 | 11 | 264 | 275 |
| Flow modification | 24 | 12 | 288 | 300 |
| Water quality | 24 | 13 | 312 | 325 |
| Indigenous vegetation removal | 24 | 13 | 312 | 325 |
| Exotic vegetation encroachment | 23 | 12 | 267 | 300 |
| Bank erosion | 23 | 14 | 322 | 350 |
| Channel modification | 24 | 12 | 288 | 300 |
| Total | | | 2388 | 2500 |
| % of total | | | 95.6 | |
| Class | | | A | |

The PES of the Groot River each has been classified as an ‘A’ (Table 2), unimpacted and pristine (Table 3).

The Klaarstroom drainage line is one of the smaller ones entering the Groot River and although it has been classified as C, it does not have any negative effect on the class A of the Groot River reach, if the WWTW is properly managed.

It can be expected that if there is a spill out of the Klaarstroom WWTW that this high classification would be lowered to a lesser class. It is not expected that the construction and operation of the new WWTW would affect the classification in any way, given that the works will be properly managed and maintained.

The PES of the river further downstream, adjacent and to the south of Klaarstroom, the Groot River has been impacted (Figure 16). The river bed was densely overgrown with bulrush *Typha capensis*. The riparian zone was densely overgrown with *Phragmitis* reeds. These were green and obviously not drought stricken like those upstream. There was a small pool of water, probably return flow out of Klaarstroom. Higher up the slope the land has been transformed into a lucerne field.

This river reach was not assessed, as it was away from the WWTW.

**Table 3** Habitat Integrity according to Kleynhans, 1999

| Category | Description | % of maximum score |
|---|---|---|
| A | Unmodified, natural | 90 – 100 |
| B | Largely natural with few modifications. A small change in natural habitats and biota, but the ecosystem function is unchanged | 80 – 89 |
| C | Moderately modified. A loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged | 60 – 79 |
| D | Largely modified. A significant loss of natural habitat, biota and ecosystem function. | 40 – 59 |
| E | Extensive modified with loss of habitat, biota and ecosystem function | 20 – 39 |
| F | Critically modified with almost complete loss of habitat, biota and ecosystem function. In worse cases ecosystem function has been destroyed and changes are irreversible | 0 - 19 |

## 14 Ecological Importance

The Ecological Importance (EI) is based on the presence of especially fish species that are endangered on a local, regional or national level (Kleynhans, 1999, Table 4).

There are no indigenous fish in the Groot River at Klaarstroom and its associated drainage lines, as there is no permanent water. According to this assessment, which is prescribed for WULA's, the site and surrounds are not ecologically important.

No other endangered species, either plant or animal, were detected in or near the drainage line.

**Table 4**. Ecological Importance according to endangered organisms.

| Category | Description |
|---|---|
| 1 | One species or taxon are endangered on a local scale |
| 2 | More than one species or taxon are rare or endangered on a local scale |
| 3 | More than one species or taxon are rare or endangered on a provincial or regional scale |
| 4 | One or more species or taxa are rare or endangered on a national scale (Red Data) |

## 15 Ecological Sensitivity

Ecological Sensitivity (ES) is often described as the ability of aquatic habitat to assimilate impacts. It is not sensitive if it remains the same despite of the onslaught of impacts. Put differently, sensitive habitat changes substantially, even under the pressure of slight impacts.

The Ecological Sensitivity also refers to the potential of aquatic habitat to bounce back to an ecological condition closer to the situation prior to human impact. If it recovers, it is not regarded as sensitive.

The question arises if the river south of Klaarstroom (Figure 1) will recover if the ongoing impacts are removed.

The DWS, through a number of their official notifications pertaining to WULA's have indicated that dry drainage lines are considered to be sensitive. This was in the Northern Cape, an arid region, where the landscape is dominated by these dry drainage lines, where the rainfall is 150mm per year and below, and where disturbed vegetation does easily not recover, not in contemporary recorded times. The dominant vegetation on the banks of the Groot River at Klaarstroom is *Vechelia karoo*, a tree that in many parts become invasive if land is disturbed or overgrazed. It can be expected that the riparian zone of the river south of Klaarstroom (Figure 1) will be re-colonised by these trees, if the area is left to its own devices and if the perpetual impacts are terminated. From this point of view the riparian zone here is not sensitive.

Likewise, the in-stream habitat would probably return to its original state, even though this may only take place after several large floods with a recurrence of once in 50 or 100 years, large enough to re-set the geomorphological status of the river.

However, these impacts are most unlikely to ever cease.

It can be estimated that the Groot River at Klaarstroom and its associated dry tributaries, such as the one that at the WWTW, are less sensitive than the ones in the Northern Cape, but still sensitive. If rated in classes of sensitivity from highly sensitive, moderately sensitive and unsensitive, the Groot River at Klaarstroom can probably be rated as moderately sensitive.

# 16 Mitigation Measures

## 16.1 Aims and Limitations

The main aim of the mitigation measures is to keep sewage, treated sewage effluent, treated sludge or any runoff from the site away and out of the Groot River.

Mitigation measures must be considered against the background that Klaarstroom is located in a semi-arid area with a low rainfall, that the Groot River and its drainage lines are dry most of the time and that the Klaarstroom WWTW is small.

However, it must be kept in mind that sudden floods of formidable size and with a strong scouring potential occur from time to time.

## 16.2 Planning

First and foremost, the WWTW should be re-designed and re-constructed in future before it runs out of capacity because of population growth and subsequent a larger volume of sewage production. This demands ongoing planning.

The berms of the ponds should be high enough, wide enough and structurally sound to withstand the onslaught of a sudden flood. These berms should answer to all the official provisions of dam safety.

## 16.3 Construction

An ECO should be appointed to oversee the construction of the new WWTW. This person should be independent and knowledgeable.

Construction of the new WWTW should commence in winter when the chances for flash floods are at its least. Construction should be completed prior to the onset of summer thunder storms.

Building rubble and scrapped equipment should be removed from the site and properly disposed of. None of this should be allowed to be washed down the drainage line and into the Groot River during thunder storms.

## 16.4 Operation

Anaerobic pond systems produce sludge only once in five years or more. According the national Green Drop WWTW performance scoring system, there should be a pond desludging schedule

http://www.dwa.gov.za/Dir_WS/DWQR/subscr/ViewComDoc.asp?Docid=4.

Ponds are usually allowed to dry and are then excavated. In this event removed sludge should be immediately removed from the site and composted or disposed of in a licensed waste disposal site. Sludge should be chemically analysed prior to excavation. Care should be taken that sludge that exceeds official quality requirements are disposed of appropriately and not end up in the environment.

For a rural community like Klaarstroom is financially and practically not feasible to fulfil these requirements. The closest licensed waste disposal site is very far away.

However, Klaarstroom WWTW is very small, with only a limited volume of sludge. It is estimated that the current primary pond will produce less than $30m^3$ of dry sludge when desludged for the pending construction of the new ponds. There are no industries in and around Klaarstroom that produces heavy metals or toxicants that could find their way into the sewage sludge. The underlying geology of Karoo shale usually only produces a little groundwater deep down of poor quality with limited use. The climate is arid, with land producing little runoff. It should be therefore in order to bury the sludge on the WWTW site, without any ill effects. To visualize the operation, a trench of 1m wide, 30m long and 1.5m deep should be more than adequate to do away with the sludge.

Likewise, the material that is scraped off the grid at the intake of the WWTW could be disposed off in a similar fashion. The volume could amount to a wheel burrow full of even less a day. It is imperative that the disposed material is covered every day.

Ponds should not be allowed to fill up and overflow. A free board of 500mm should be maintained.

Land should not be over-irrigated. Ponding of treated sewage effluent should be prevented. Sprinklers should be moved around according to a schedule.

Treated sewage effluent should be chemically and microbiologically analysed according to a schedule. Effluent that does not meet national quality guidelines should not be irrigated in urban areas. Should guidelines not be met, the operation of the WWTW should be adjusted in order to improve the quality.

Pumps, pipelines and other equipment should be regularly inspected and maintained. Spare parts should be readily available. Downtime should be kept to a minimum in order to prevent spillages and adverse environmental impacts. Flow meters should be kept in working order and calibrated if necessary.

When reeds are harvested on the horizontal flow reed bed, harvested material should be removed for use or composting elsewhere and not be allowed to accumulate on the site or move down the drainage line.

The staff should be appropriately qualified. At the moment the WWTW is operated by a specialised and contracted company, Alveo (Figure 17). It is assumed that the company will have the experience to do justice to the new WWTW.

Audits should be undertaken as officially prescribed for WWTW's in South Africa. The results should be made publicly available, should it be necessary.


**Figure 17** Alveo

## 17 Impact Assessment

The impact assessment is required for the EIA and will be included in the EIA documentation. The impact assessment follows a predetermined methodology (Table 5). The criteria and the description for scoring the impacts during the successive phases of the WWTW are listed in the appendix (Table 8).

The impact assessment is solely focussed in the aquatic environment. Some of the criteria had to be re-defined to fit the aquatic environment, as explained in the appendix.

**Table 5** Impact Assessment

| **Description of impact**<br><br>Decommission existing ponds<br><br>**Mitigation measures**<br><br>Keep fluids and sludge out of the drainage line and the river.<br>Bury sludge on site<br>Bury grid scrapings on site, cover daily. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type Nature | Spatial Extent | Severity | Duration | Significance | Probability | Confidence | Reversibility | Irreplaceability |
| Without mitigation | | | | | | | | |
| Direct | Local | High | Short term | High | Probable | Certain | Reversable | Replaceable |
| With mitigation measures | | | | | | | | |
| Direct | Local | Low | Short term | Very Low | Unlikely | Certain | Reversible | Replaceable |

**Description of impact**

Construction of new WWTW
Excavation of new ponds

**Mitigation measures**

Keep soil, construction material and rubble from drainage line and the river
Allow only one access route, keep vehicles away from sensitive areas
Landscape area after construction
Complete construction prior to the rainy season

| Type Nature | Spatial Extent | Severity | Duration | Significance | Probability | Confidence | Reversibility | Irreplaceability |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | | | | | | | | |
| Direct | Local | High | Permanent | High | Probable | Certain | Reversable | Replaceable |
| With mitigation measures | | | | | | | | |
| Direct | Site specific | Low | Short term | Very Low | Unlikely | Certain | Reversible | Replaceable |

**Description of impact**

Operation of WWTW
Fluids and sludge in drainage line and the river

**Mitigation measures**

Keep fluids and sludge out of the drainage line and the river
Remove sludge periodically and dispose of properly
Prevent overflows and maintain freeboard
Maintain pipelines, pumps, instrumentation and all other equipment and infrastructure.
Execute scheduled audits
Train staff
Monitor and chemically analyse to gauge operation of the WWTW
Harvest reeds annually and remove harvested reeds

| Type Nature | Spatial Extent | Severity | Duration | Significance | Probability | Confidence | Reversibility | Irreplaceability |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | | | | | | | | |
| Direct | Regional | High | Permanent | High | Probable | Certain | Reversable | Replaceable |
| With mitigation measures | | | | | | | | |
| Direct | Site specific | Low | Permanent | Very Low | Unlikely | Certain | Reversible | Replaceable |

| **Description of impact**<br><br>Irrigation of treated effluent<br>Keep treated effluent out of drainage line and the river<br><br>**Mitigation measures**<br><br>Prevent ponding<br>Move sprayers around<br>Do not over irrigate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type<br>Nature | Spatial Extent | Severity | Duration | Significance | Probability | Confidence | Reversibility | Irreplaceability |
| Without mitigation | | | | | | | | |
| Direct | Regional | High | Permanent | High | Probable | Certain | Reversable | Replaceable |
| With mitigation measures | | | | | | | | |
| Direct | Site specific | Low | Permanent | Very Low | Unlikely | Certain | Reversible | Replaceable |

From the impact assessment is clear that, should the mitigation measures be properly applied, impacts can be entirely prevented. This can be achieved through proper management and vigilance. The mitigation measures can readily be implemented and are part of best WWTW practice and standard operating procedures.

## 18 Risk Matrix

The assessment was carried out according to the interactive Excel table that is available on the DWS webpage. Table 6 is a replica of the Excel spreadsheet that has been adapted to fit the format of this report. The numbers in Table 6 (continued) represent the same activities as in Table 5, with sub-activities added.

The original risk assessment as on the DWS webpage has been submitted on the eWULAA on-line system of the BGCMA.

This assessment has been designed to assist in the decision if a General Authorisation or a License is required, should the development be allowed.

The risk assessment covers the same impacts as that of the Impact Assessment.

For the risk assessment it is assumed that all mitigation measures are in place.

**Table 6** Risk Matrix

| No. | Activity | Aspect | Impact | Significance | Risk Rating |
|---|---|---|---|---|---|
| 1 | Decommission existing ponds | Sludge removal | Sludge in aquatic habitat | 38 | Low |
| 2 | Construction of new WWTW | Excavation of new ponds | Soil in aquatic habitat | 28 | Low |
| | | Landscape new WWTW | Sediments in aquatic habitat | 24 | Low |
| 3.1 | Operation of WWTW | Fluid & sludge in drainage line and river | Pollute aquatic habitat | 62.5 | Medium |
| 3.2 | | Harvest reeds | Pollutants in aquatic habitat | 24 | Low |
| 3.3 | | De-sludge ponds | Pollutants in aquatic habitat | 45 | Low |
| 4 | Irrigate treated effluent | Ponding and runoff | Pollutants in aquatic habitat | 55 | Low |

**Table 6** Continued Risk Rating

| No | Flow | Water Quality | Habitat | Biota | Severity | Spatial scale | Duration | Conse-quence |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 2 | 1 | 2 | 1.75 | 2 | 1 | 4.75 |
| 2.1 | 1 | 2 | 1 | 2 | 1.5 | 1 | 1 | 3.5 |
| 2.2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 3.1 | 2 | 3 | 1 | 3 | 2.25 | 2 | 2 | 6.25 |
| 3.2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 3.3 | 1 | 2 | 1 | 2 | 1.5 | 2 | 1 | 4 |
| 4 | 1 | 2 | 1 | 2 | 1.5 | 2 | 2 | 5.5 |

| No | Frequency of activity | Frequency of impact | Legal issues | Detection | Likelihood | Significance | Risk Rating |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 5 | 1 | 8 | 38 | Low |
| 2.1 | 1 | 1 | 5 | 1 | 8 | 28 | Low |
| 2.2 | 1 | 1 | 5 | 1 | 8 | 24 | Low |
| 3.1 | 2 | 2 | 5 | 1 | 10 | 62.5 | Medium |
| 3.2 | 2 | 2 | 5 | 1 | 8 | 24 | Low |
| 3.3 | 2 | 2 | 5 | 1 | 10 | 45 | Low |
| 4 | 2 | 2 | 5 | 1 | 10 | 55 | Low |

A WWTW is an ongoing operation. Likewise, the possibility of an impact is an ongoing risk as well. However, the Klaarstroom WWTW is small and 170m away from the Groot River. The 'medium' score for the ongoing operation is perhaps too high, given the circumstances. Nevertheless, this is how the Risk Matrix works. The drainage line is more at risk, since the WWTW is located right in its flow path.

General Authorisations for WWTW's has recently been revoked. Even though the risks are low, with only one "medium", which probably can be down-scored to a "low", if properly motivated, with the result that a General Authorisation would be in order, a License will have to be applied for.

## 19 Resource Economics

The goods and services delivered by the environment, in this case the Klaarstroom drainage line and the Groot River reach, is a Resource Economics concept as adapted by Kotze *et al* (2009). The methodology was designed for the assessments of wetlands, but in the case of the drainage line the goods and services delivered are particularly applicable and important, hence it was decided to include it in the report.

The diagram (Figure 19) is an accepted manner to visually illustrate the resource economic footprint the drainage line, from the data in Table 7.

**Table 7**. Goods and Services

| Goods & Services | Score |
|---|---|
| Flood attenuation | 5 |
| Stream flow regulation | 5 |
| Sediment trapping | 5 |
| Phosphate trapping | 2 |
| Nitrate removal | 2 |
| Toxicant removal | 2 |
| Erosion control | 5 |
| Carbon storage | 2 |
| Biodiversity maintenance | 3 |
| Water supply for human use | 0 |
| Natural resources | 0 |
| Cultivated food | 1 |
| Cultural significance | 1 |
| Tourism and recreation | 1 |
| Education and research | 1 |

| | |
|---|---|
| 0 | Low |
| 5 | High |

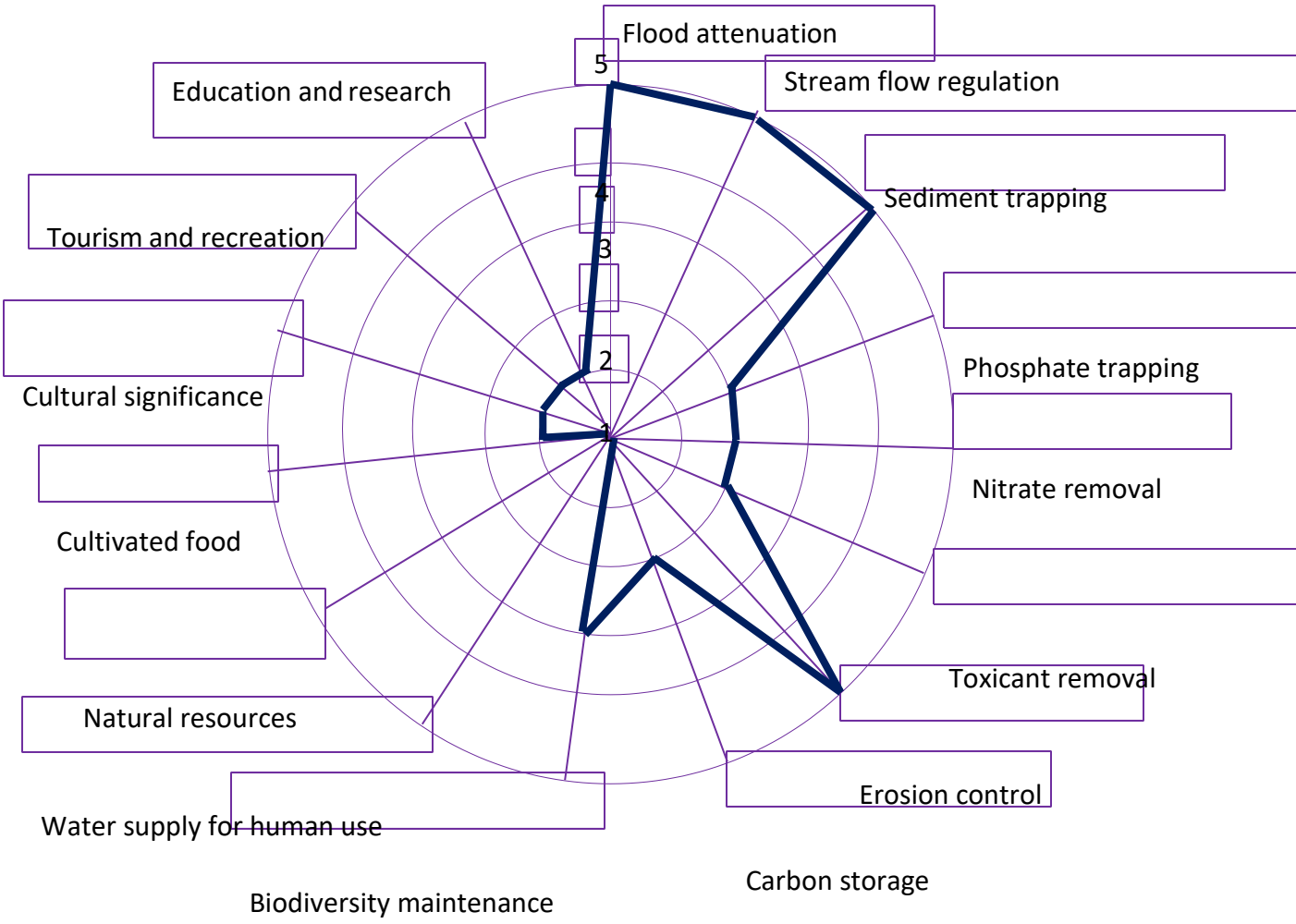



**Figure 18**. Resource Economics Footprint Klaarstroom Drainage Line and the Groot River Reach

The size of the star shape attracts the attention of the decision-makers. This star shape is rather small and is therefore not likely to raise concern. The drainage line and the river are important to attenuate floods and stream flow. It traps sediments, as the sediment production of the Karoo is large. It may help to curb erosion. The role for habitat provision and biodiversity should be related to the harsh Karoo environment with long droughts and intense summer heat. The vegetation in around the river and its drainage line is higher and denser than that of the surrounding landscape. This provides habitat to birds, mammals and a variety of organisms that would not have been there, if it was not for the presence of these lines of sweet thorn trees. This is a sparse land with not many life forms adjusted to survive. This renders at least some importance to the mostly dry rivers.

## 20 Conclusions

Figure 20 has been adapted from one of the most recent DWS policy documents.

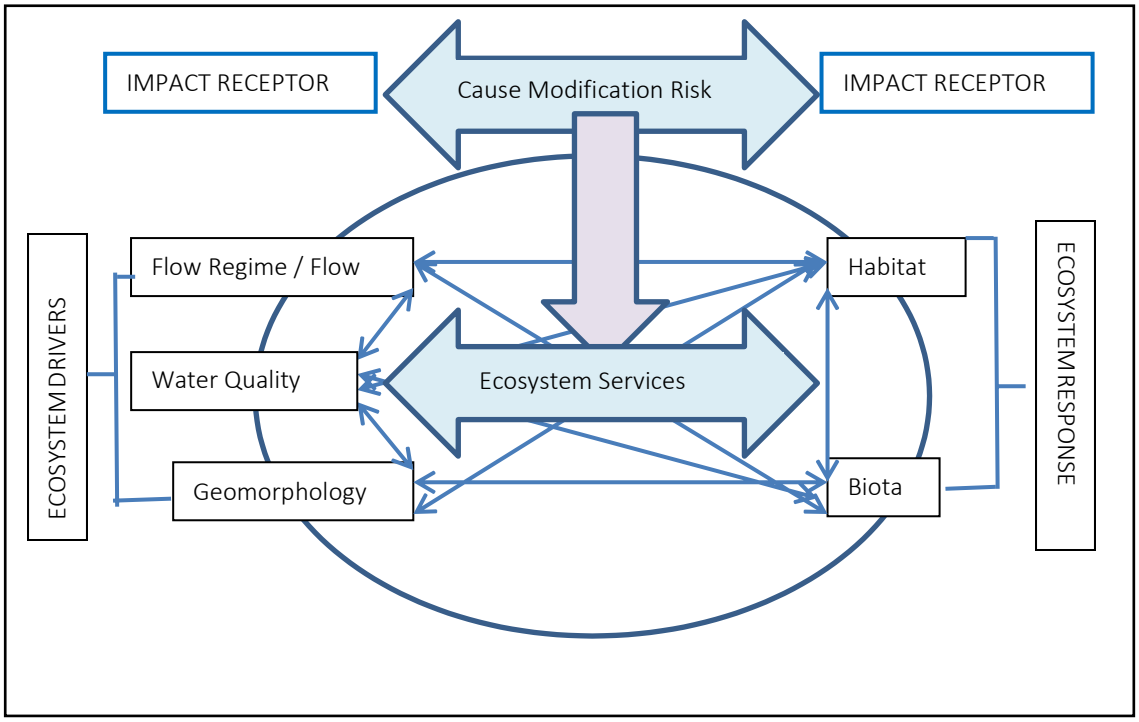



**Figure 19** Minimum Requirements for a S21(c) and (i) Application

An anthropogenic activity can impact on any of the ecosystem drivers or responses and this can have a knock-on effect on all of the other drivers and responses. This, in turn, will predictably impact on the ecosystem services. The WULA and the EAI must provide mitigation measured for these impacts.

The conclusions can be structured along the outline that is provided by Figure 22.

The main driver of these dry rivers in the Karoo is the occasional thunder storm that may result in flow, sometimes for a day, perhaps for a few weeks. After that the river returns to its dormant state, devoid of surface water. The sub-surface flow lingers on and sustains the stand of trees on the riparian zone. The next driver is the drought itself, which is responsible for much of the river's characteristics.

Occasionally, once in many years, a really big flood resets the river system, assures that its geomorphological characteristics are maintained and even sometimes changed.

Ecosystem services are limited, but without these farming in the area would have been even less rewarding, as the lines of trees criss-crossing the landscape provides fodder and cover.

The Klaarstroom WWTW is not about detract from any of these services, provided it is properly managed. At most but unlikely the impacted conditions south of Klaarstroom may creep upstream to the confluence of the Klaarstroom drainage line. Moreover, a small anaerobic pond system is unlikely to overflow into the adjacent river, given that planning for the next upgrade is done well in time.

It is therefore recommended that the Klaarstroom WWTW expansion is approved. A General Authorisation would probably have been in order, if it was not that these privileges have been revoked and that a License is now required.

## 21 References

Kleynhans, C.J. 1999. *Assessment of Ecological Importance and Sensitivity*. Department of Water Affairs and Forestry. Pretoria.

Kotze, G., G. Marneweck, A. Batchelor, D. Lindley & Nacelle Collins. 2009. *A technique for rapidly assessing ecosystem services supplied by wetlands.* Water Research Commission, Pretoria.

Meiring, GH. 2018. *Technical report for the upgrade of the Klaarstroom oxidation pond wastewater treatment system.* BVi, Upington.

## 22 Declaration of Independence

I, Dirk van Driel, as the appointed independent specialist hereby declare that I:

- Act/ed as the independent specialist in this application
- Regard the information contained in this report as it relates to my specialist input/study to be true and correct and;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management act;
- Have and will not have vested interest in the proposed activity;
- Have disclosed to the applicant, EAP and competent authority any material information have or may have to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the environmental Impact Assessment Regulations, 2010 and any specific environmental management act.
- Am fully aware and meet the responsibilities in terms of the NEMA, the Environmental Impacts Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R543) and any specific environmental management act and that failure to comply with these requirements may constitute and result in disqualification;
- Have ensured that information containing all relevant facts on respect of the specialist input / study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties facilitated in such a manner that all interested and affected parties were provided with reasonable opportunity to participate and to provide comments on the specialist input / study;
- Have ensured that all the comments of all the interested and affected parties on the specialist input were considered, recorded and submitted to the competent authority in respect of the application;
- Have ensured that the names of all the interested and affected parties that participated in terms of the specialist input / study were recorded in the register of interested and affected parties who participated in the public participation process;
- Have provided the competent authority with access to all information at my disposal regarding the application, weather such information is favourable or not and;
- Am aware that a false declaration is an offence in terms of regulation 71 of GN No. R543.

Signature of the specialist:  28 January 2019

## 23 Résumé

**Dr Dirk van Driel**
PhD, MBA, PrSciNat, MWISA
**Water Scientist**

PO Box 681
Melkbosstrand 7437
saligna2030@gmail.com
079 333 5800 / 022 492 2102

### Experience

**WATSAN Africa,** Cape Town. Scientist **2011 - present**

**USAID/RTI, ICMA & Chemonics.** Iraq & Afghanistan **2007 -2011**
Program manager.

**City of Cape Town** **1999-2007**
Acting Head: Scientific Services, Manager: Hydrobiology.

**Department of Water & Sanitation, South Africa** **1989 – 1999**
Senior Scientist

**Tshwane University of Technology, Pretoria** **1979 – 1998**
Head of Department

**University of Western Cape and Stellenbosch University 1994- 1998** part-time

- Lectured post-graduate courses in Water Management and Environmental Management to under-graduate civil engineering students
- Served as external dissertation and thesis examiner

**Service Positions**

- Project Leader, initiator, member and participator: Water Research Commission (WRC), Pretoria.
- Director: UNESCO West Coast Biosphere, South Africa
- Director (Deputy Chairperson): Grotto Bay Home Owner's Association
- Member Dassen Island Protected Area Association (PAAC)

**Membership of Professional Societies**

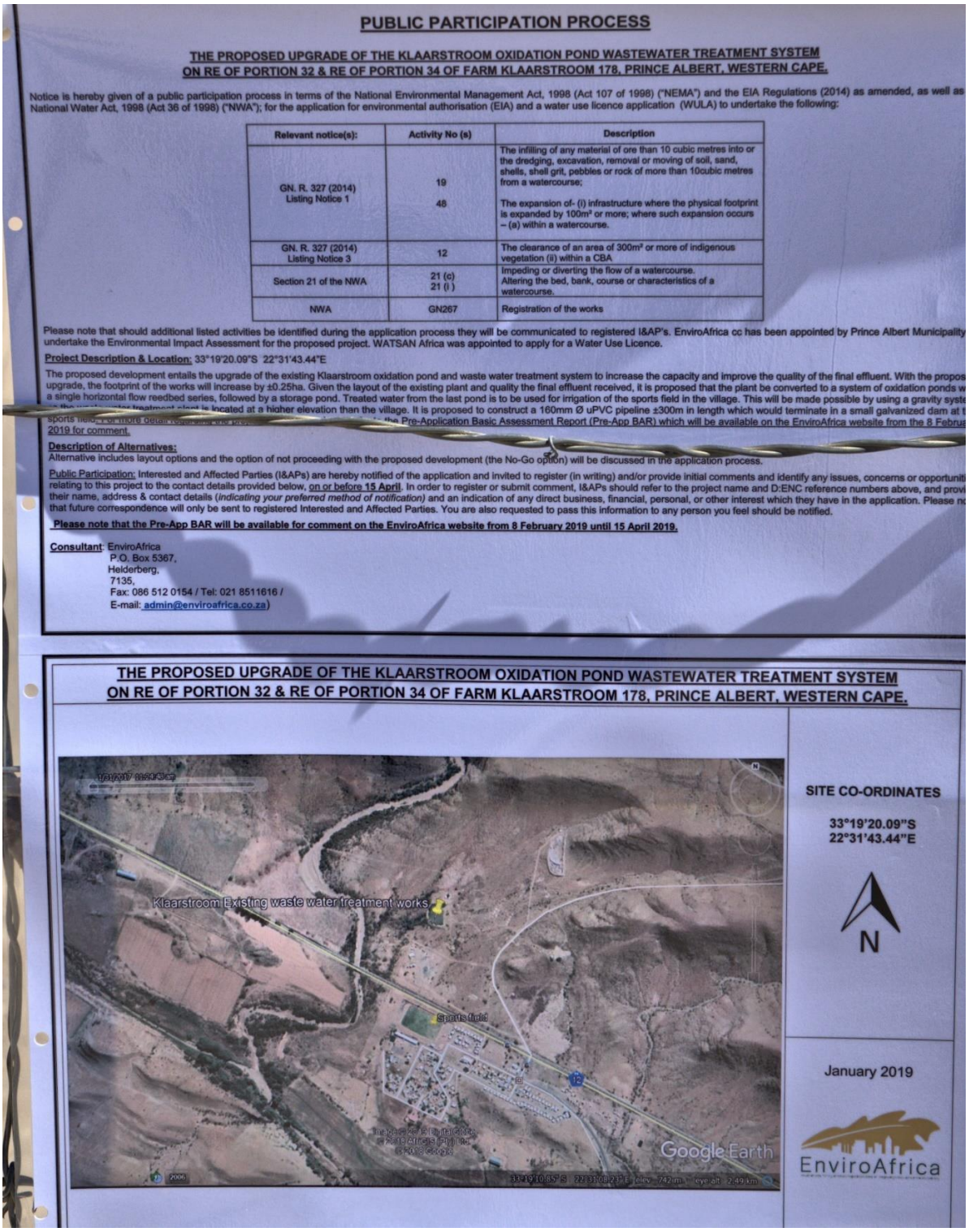
- South African Council for Scientific Professions. Registered Scientist No. 400041/96
- Water Institute of South Africa. Member

## Reports &
## Water Use License Applications

- Process Review Kathu Wastewater Treatment Works
- Effluent Irrigation Report Tydstroom Abattoir Durbanville
- River Rehabilitation Report Slangkop Farm, Yzerfontein
- Fresh Water and Estuary Report Erf 77 Elands Bay
- Ground Water Revision, Moorreesburg Cemetery
- Fresh Water Report Delaire Graff Estate, Stellenbosch
- Fresh Water Report Quantum Foods (Pty) Ltd. Moredou Poultry Farm, Tulbagh
- Fresh Water Report Revision, De Hoop Development, Malmesbury
- Fresh Water Report, Idas Valley Development Erf 10866, Stellenbosch
- Wetland Delineation Idas Valley Development Erf 10866, Stellenbosch
- Fresh Water Report, Idas Valley Development Erf 11330, Stellenbosch
- Fresh Water Report, La Motte Development, Franschhoek
- Ground Water Peer Review, Elandsfontein Exploration & Mining
- Fresh Water Report Woodlands Sand Mine Malmesbury
- Fresh Water Report Brakke Kuyl Sand Mine, Cape Town
- Wetland Delineation, Ingwe Housing Development, Somerset West
- Fresh Water Report, Suurbraak Wastewater Treatment Works, Swellendam
- Wetland Delineation, Zandbergfontein Sand Mine, Robertson
- Storm Water Management Plan, Smalblaar Quarry, Rawsonville
- Storm Water Management Plan, Riverside Quarry
- Water Quality Irrigation Dams Report, Langebaan Country Estate
- Wetland Delineation Farm Eenzaamheid, Langebaan
- Wetland Delineation Erf 599, Betty's Bay
- Technical Report Bloodhound Land Speed Record, Hakskeenpan
- Technical Report Harkerville Sand Mine, Plettenberg Bay
- Technical Report Doring Rivier Sand Mine, Vanrhynsdorp
- Rehabilitation Plan Roodefontein Dam, Plettenberg Bay
- Technical Report Groenvlei Crusher, Worcester
- Technical Report Wiedouw Sand Mine, Vanrhynsdorp
- Technical Report Lair Trust Farm, Augrabies
- Technical Report Schouwtoneel Sand Mine, Vredenburg
- Technical Report Waboomsrivier Weir Wolseley
- Technical Report Doornkraal Sand Mine Malmesbury
- Technical Report Berg-en-Dal Sand Mine Malmesbury
- Wetland Demarcation, Osdrif Farm, Worcester
- Technical Report Driefontein Dam, Farm Agterfontein, Ceres
- Technical Report Oewerzicht Farm Dam, Greyton
- Technical Report Glen Lossie Sand Mine, Malmesbury
- Preliminary Report Stellenbosch Cemeteries
- Technical Report Toeka & Harmony Dams, Houdenbek Farm, Koue Bokkeveld
- Technical Report Kluitjieskraal Sand & Gravel Mine, Swellendam
- Fresh Water Report Urban Development Witteklip Vredenburg
- Fresh Water Report Groblershoop Resort, Northern Cape
- Fresh Water Report CA Bruwer Quarry Kakamas, Northern Cape
- Fresh Water Report, CA Bruwer Sand Mine, Kakamas, Northern Cape
- Fresh Water Report, Triple D Farms, Agri Development, Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Hopetown
- Fresh Water Report Hopetown Sewer
- Fresh Water Report Hoogland Farm Agricultural Development, Touws River

# 24 Appendix

## 24.1 Public Participation



**PUBLIC PARTICIPATION PROCESS**

**THE PROPOSED UPGRADE OF THE KLAARSTROOM OXIDATION POND WASTEWATER TREATMENT SYSTEM ON RE OF PORTION 32 & RE OF PORTION 34 OF FARM KLAARSTROOM 178, PRINCE ALBERT, WESTERN CAPE.**

Notice is hereby given of a public participation process in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) ("NEMA") and the EIA Regulations (2014) as amended, as well as National Water Act, 1998 (Act 36 of 1998) ("NWA"); for the application for environmental authorisation (EIA) and a water use licence application (WULA) to undertake the following:

| Relevant notice(s): | Activity No (s) | Description |
|---|---|---|
| GN. R. 327 (2014) Listing Notice 1 | 19<br>48 | The infilling of any material of ore than 10 cubic metres into or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10cubic metres from a watercourse;<br>The expansion of- (i) infrastructure where the physical footprint is expanded by 100m² or more; where such expansion occurs – (a) within a watercourse. |
| GN. R. 327 (2014) Listing Notice 3 | 12 | The clearance of an area of 300m² or more of indigenous vegetation (ii) within a CBA |
| Section 21 of the NWA | 21 (c)<br>21 (i ) | Impeding or diverting the flow of a watercourse.<br>Altering the bed, bank, course or characteristics of a watercourse. |
| NWA | GN267 | Registration of the works |

Please note that should additional listed activities be identified during the application process they will be communicated to registered I&AP's. EnviroAfrica cc has been appointed by Prince Albert Municipality undertake the Environmental Impact Assessment for the proposed project. WATSAN Africa was appointed to apply for a Water Use Licence.

**Project Description & Location:** 33°19'20.09"S 22°31'43.44"E

The proposed development entails the upgrade of the existing Klaarstroom oxidation pond and waste water treatment system to increase the capacity and improve the quality of the final effluent. With the propos upgrade, the footprint of the works will increase by ±0.25ha. Given the layout of the existing plant and quality the final effluent received, it is proposed that the plant be converted to a system of oxidation ponds w a single horizontal flow reedbed series, followed by a storage pond. Treated water from the last pond is to be used for irrigation of the sports field in the village. This will be made possible by using a gravity syste the works to the sports field. The treatment plant is located at a higher elevation than the village. It is proposed to construct a 160mm Ø uPVC pipeline ±300m in length which would terminate in a small galvanized dam at t sports field. [illegible] the Pre-Application Basic Assessment Report (Pre-App BAR) which will be available on the EnviroAfrica website from the 8 Februa 2019 for comment.

**Description of Alternatives:**
Alternative includes layout options and the option of not proceeding with the proposed development (the No-Go option) will be discussed in the application process.

Public Participation: Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportuniti relating to this project to the contact details provided below, on or before 15 April. In order to register or submit comment, I&APs should refer to the project name and D:ENC reference numbers above, and provi their name, address & contact details (*indicating your preferred method of notification)* and an indication of any direct business, financial, personal, or other interest which they have in the application. Please n that future correspondence will only be sent to registered Interested and Affected Parties. You are also requested to pass this information to any person you feel should be notified.

**Please note that the Pre-App BAR will be available for comment on the EnviroAfrica website from 8 February 2019 until 15 April 2019.**

**Consultant**: EnviroAfrica
P.O. Box 5367,
Helderberg,
7135,
Fax: 086 512 0154 / Tel: 021 8511616 /
E-mail: admin@enviroafrica.co.za)

**THE PROPOSED UPGRADE OF THE KLAARSTROOM OXIDATION POND WASTEWATER TREATMENT SYSTEM ON RE OF PORTION 32 & RE OF PORTION 34 OF FARM KLAARSTROOM 178, PRINCE ALBERT, WESTERN CAPE.**



**SITE CO-ORDINATES**

**33°19'20.09"S**
**22°31'43.44"E**

N

January 2019

EnviroAfrica

## 24.2 Correspondence Western Cape Government

Western Cape Government
Environmental Affairs and Development Planning
BETTER TOGETHER.

Development Management
(Region 3)

**REFERENCE:** 16/3/3/6/6/C2/3/0174/18
**ENQUIRIES:** Jessica Christie
**DATE OF ISSUE:** 2018 -12- 12

The Municipal Manager
PRINCE ALBERT MUNICIPALITY
Private Bag X 53
**PRINCE ALBERT**
6930

Tel: 023 541 1320
Fax: 023 541 1321

Dear Sir

**RE: APPLICABILITY OF THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS 2014 TO THE PROPOSED UPGRADE OF THE PRINCE ALBERT MUNICIPALITY'S KLAARSTROOM OXIDATION POND WASTEWATER TREATMENT SYSTEM SITUATED ON REMAINDER OF PORTION 32 OF THE FARM KLAARSTROOM 178, PRINCE ALBERT, WESTERN CAPE**

1. The abovementioned proposal and the correspondence received by this Directorate from your environmental assessment practitioner, *EnviroAfrica*, on 17 October 2018, refers.

2. It is noted that the proposal entails the upgrade of the Klaarstroom Waste Water Treatment Works ("WWTW"). The existing WWTW comprises of two (2) ponds. One of the ponds is an aerobic pond and the other pond is a facultative pond; the latter being in a watercourse, (i.e. an instream dam).

   It is understood that the facility was constructed in 1970 and has a capacity of 50m³ per day and from records, the peak daily flow is 80m³ per day. The proposal is to increase the capacity to 61m³ per day. It is unclear why the facility will not be designed to accommodate the peak daily flow as the proposal is to increase the capacity to only 61m³ per day. Clarity is required on this matter.

   The current disposal of treated effluent takes place by means of overhead sprinklers discharging the treated effluent on an area north of the exiting treatment plant.

3. *Applicability of the Environmental Impact Assessment Regulations 2014*

   Based on the proposed activities, you are hereby informed that on the date of this response, the proposed development appears to constitute listed activities in terms of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, (GN No. R.984 of 4

4th Floor, York Park Building, 93 York Street, George, 6529
tel: +27 44 805 8600 fax: +27 44 805 8650
Private Bag X6509, George, 6530
www.westerncape.gov.za/eadp

December 2014 as amended 7 April 2017), as promulgated under Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), being:

| **Environmental Impact Assessment Regulations Listing Notice 1 of 2014 (Government Notice No. R. 983 of 04 December 2014) –** |
|---|
| ***Activity 19*** |
| *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;*<br><br>*but excluding where such infilling, depositing, dredging, excavation, removal or moving—*<br>*(a) will occur behind a development setback;*<br>*(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;*<br>*(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;*<br>*(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or*<br>*(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.* |
| ***Activity 48*** |
| *The expansion of—*<br>*(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or*<br>*(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;*<br><br>*where such expansion occurs—*<br>*(a) within a watercourse;*<br>*(b) in front of a development setback; or*<br>*(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;*<br><br>*excluding—*<br>*(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;*<br>*(bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;*<br>*(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;*<br>*(dd) where such expansion occurs within an urban area; or*<br>*(ee) where such expansion occurs within existing roads, road reserves or railway line reserves.* |

4. The above determination has been informed by the following:

   4.1 According to the information contained within the document, the facility was established in the 1970s and can be reasonably assumed that the facility is lawful. As such, the proposed upgrade constitutes the expansion of the facility.

   4.2 The existing facility is situated within a watercourse, as defined in the Environmental Impact Assessment Regulations Listing Notice 1 of 2014.

   4.3 More than 10 cubic metres of sand and / or soil will be excavated or moved within a watercourse.

4.4 The physical footprint of the existing facility, infrastructure or structures which are situated within a watercourse or within 32 metres from the edge of the water course, will be expanded by 100 square metres or more.

4.5 The expansion of the facility or infrastructure for the treatment of sewage will result in an increase of the capacity by less than 15 000 cubic metres per day (i.e. 11 cubic metres per day) and the development footprint will increase by 1 000 square meters or more (i.e. 2 450 square metres).

4.6 Based on the information received, it is not evident that the proposed development is for the provision of adequate water supply within the jurisdiction of the Prince Albert Municipality.

5. Written authorisation is therefore required from the relevant authority (as defined in GN. No R.982 of 4 December 2014), prior to the undertaking of the said activities.

   An application form must be completed and submitted to the Directorate: Development Management (Region 3) ("this Directorate") for consideration. This Directorate will only proceed with the consideration of the application upon receipt of this information.

6. Please note that the proposed expansion also includes activities which are subject to phased development which means any one phase of the activity may be below a threshold, but where a combination of the phases exceeds the threshold environmental authorisation must be obtained from the competent authority. In other words the first phase is below a threshold and should the proponent clear indigenous vegetation or construct any other infrastructure which in combination will exceed the threshold then he/she must apply to this Department for environmental authorisation prior to the threshold being exceeded, if not all structures will be regarded as unlawful.

   The onus is on the applicant to ensure that all the applicable listed activities are considered and environmental authorisation obtained from the competent authority, prior to the threshold being exceeded.

7. It is noted that no reference has been made to the National Water Act (Act No. 36 of 1998) and it is unclear as to whether the act is applicable because of the proposal to irrigate a sports field with the treated effluent. It is unknown whether a General Authorisation may be applied or a Water Use License application needs to be submitted to the relevant authority. Clarity needs to be obtained from the Breede Gouritz Catchment Management Agency (BGCMA) as soon as possible to determine the applicability thereof.

   Please be reminded of the required synchronisation of processes in terms of the National Environmental Management Act, 1998 and the National Water Act, 1998 that must be applied to applications of this nature. Please also refer to this Department's circular: One

9. Please be advised that by modifying the design and layout of the proposed expansion to avoid the relevant triggers (i.e. a development setback of at least 32-metres from the edge of a watercourse or less than 10-cubic meters sand/rock to be moved or excavated from a watercourse), it is unlikely that environmental authorisation will be required.

   It is also recommended that the effluent be treated to a drinking standard to improve water supply within the jurisdiction of the Prince Albert Municipality.

10. The Department reserves the right to revise its initial comments and request further information from you based on any new or revised information received.

Yours faithfully

**HEAD OF COMPONENT: EIMS (REGION 3)**
**DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING**

Copied to:

| | | |
|---|---|---|
| Ms. Inge Erasmus | (EAP) | E-mail: admin@enviroafrica.co.za |
| Ms. Anneleen Vorster | (Prince Albert Municipality) | E-mail: anneleen@pamun.gov.za |
| Ms. Keshni Rughoobeer | (DEA&DP: DDF) | E-mail: Keshni.Rughoobeer@westerncape.gov.za |

## 24.3 Methodology used in determining significance of impacts

The methodology to be used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives is provided in the following tables:

**Table 8** Impact Assessment Methodology

**Table 8.1** Nature and type of impact

| Nature and type of impact | Description |
|---|---|
| Positive | An impact that is considered to represent an improvement to the baseline conditions or represents a positive change |
| Negative | An impact that is considered to represent an adverse change from the baseline or introduces a new negative factor |
| Direct | Impacts that result from the direct interaction between a planned project activity and the receiving environment / receptors |
| Indirect | Impacts that result from other activities that could take place as a consequence of the project (e.g. an influx of work seekers) |
| Cumulative | Impacts that act together with other impacts (including those from concurrent or planned future activities) to affect the same resources and / or receptors as the project |

**Table 8.2** Criteria for the assessment of impacts

| Criteria | Rating | Description |
|---|---|---|
| Spatial extent of impact | National | Impacts that affect nationally important environmental resources or affect an area that is nationally important or have macro-economic consequences |
| | Regional | Impacts that affect regionally important environmental resources or are experienced on a regional scale as determined by administrative boundaries or habitat type / ecosystems |
| | Local | Within 2 km of the site |
| | Site specific | On site or within 100m of the site boundary |
| Consequence of impact/ Magnitude/ Severity | High | Natural and / or social functions and / or processes are severely altered |
| | Medium | Natural and / or social functions and / or processes are notably altered |
| | Low | Natural and / or social functions and / or processes are slightly altered |
| | Very Low | Natural and / or social functions and / or processes are negligibly altered |
| | Zero | Natural and / or social functions and / or processes remain unaltered |
| Duration of impact | Temporary | Impacts of short duration and /or occasional |
| | Short term | During the construction period |
| | Medium term | During part or all of the operational phase |
| | Long term | Beyond the operational phase, but not permanently |
| | Permanent | Mitigation will not occur in such a way or in such a time span that the impact can be considered transient (irreversible) |

**Table 8.3** Significance Rating

| Significance Rating | Description |
|---|---|
| High | High consequence with a regional extent and long-term duration<br><br>High consequence with either a regional extent and medium-term duration or a local extent and long-term duration<br><br>Medium consequence with a regional extent and a long-term duration |
| Medium | High with a local extent and medium-term duration<br><br>High consequence with a regional extent and short-term duration or a site-specific extent and long-term duration<br><br>High consequence with either local extent and short-term duration or a site-specific extent with a medium-term duration<br><br>Medium consequence with any combination of extent and duration except site-specific and short-term or regional and long term<br><br>Low consequence with a regional extent and long-term duration |
| Low | High consequence with a site-specific extent and short-term duration<br><br>Medium consequence with a site-specific extent and short-term duration<br><br>Low consequence with any combination of extent and duration except site-specific and short-term<br><br>Very low consequence with a regional extent and long-term duration |
| Very low | Low consequence with a site-specific extent and short-term duration<br><br>Very low consequence with any combination of extent and duration except regional and long term |
| Neutral | Zero consequence with any combination of extent and duration |

**Table 8.4** Probability, confidence, reversibility and irreplaceability

| Criteria | Rating | Description |
|---|---|---|
| Probability | Definite | >90% likelihood of the impact occurring |
| | Probable | 70 – 90% likelihood of the impact occurring |
| | Possible | 40 – 70% likelihood of the impact occurring |
| | Unlikely | <40% likelihood of the impact occurring |
| Confidence | Certain | Wealth of information on and sound understanding of the environmental factors potentially affecting the impact |
| | Sure | Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact |
| | Unsure | Limited useful information on and understanding of the environmental factors potentially influencing this impact |
| Reversibility | Reversible | The impact is reversible within 2 years after the cause or stress is removed |
| | Irreversible | The activity will lead to an impact that is in all practical terms permanent |
| Irreplaceability | Replaceable | The resources lost can be replaced to a certain degree |
| | Irreplaceable | The activity will lead to a permanent loss of resources. |

In the event of water courses, direct can mean that the impact is affected right on the water course, such as a structure or agriculture on the banks or in-stream.

Indirect can mean that the impact is away from the water course and its riparian zone, but that runoff from a development can reach the water course.

Local can mean in a water course or its riparian zone where the impact is taking place.

Site specific can mean 100m downstream of that impact.

Regional can mean further downstream and down the catchment past confluences into larger tributaries.