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# DRAFT PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT (POSEIA)

## PROPOSED UNIVERSITY PRECINCT DEVELOPMENT AT THE GARDEN ROUTE DAM AND ASSOCIATED INFRASTRUCTURE ON A PORTION OF ERF 464, GEORGE

APPLICATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998  
 (ACT NO. 107 OF 1998), AS AMENDED, AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS,  
 2014 (AS AMENDED)



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<b>ENVIRONMENTAL CONSULTANT:</b>	Sharples Environmental Services cc Betsy Ditcham (EAPASA: 1480)
<b>DEA &amp; DP PROJECT REFERENCE:</b>	TBC
<b>SES REFERENCE NUMBER:</b>	21/GRD/PREAPP/DSR/03/2020
<b>DATE:</b>	June 2020

- Environmental Impact Assessments • Basic Assessments • Environmental Management Planning
- Environmental Control & Monitoring • Public Participation • Broad scale Environmental Planning



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## 1. Introduction

This Plan of Study for EIA has been compiled in terms of the content requirements listed in Appendix 2 of the National Environmental Management Act (NEMA) Environmental Impact Assessment Regulations. The **Plan of Study for EIA (POSEIA) describes how the EIA Phase will proceed** and includes details of the specialist studies already undertaken and those still proposed.

This **ANNEXURE** must be read alongside the Draft Scoping Report compiled for the Proposed University Precinct Development at the Garden Route Dam on a Portion of the Remainder of Erf 464, George.

The 2014 EIA Regulations were promulgated in December 2014 and amended in April 2017. These new Regulations pose time restrictions on the submission of the EIA Report to the Department of Environmental Affairs and Development Planning (DEA&DP). As a direct result of these time restrictions most of the specialist environmental impact assessments are now required to take place upfront, prior to the submission of the Application Form and Final Scoping Report to the Department of Environmental Affairs and Development Planning (DEA&DP). Another reason why the impact assessment specialist studies are required prior to the submission of the Final Scoping Report is because the content requirements of the Scoping Report now require the EAP to describe the impacts of the proposed development, including the nature, extent, significance, duration and possible mitigation measures.

Scoping Phase Specialist input has therefore already been obtained to inform the findings of the Draft Scoping Report.

## 2. Objectives of the Environmental Impact Assessment Process

The objective of the **environmental impact assessment process** is to, through a consultative process,:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted Scoping Report;
- Identify the location of the development footprint within the approved site as contemplated in the accepted Scoping Report, based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the--
  - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - degree to which these impacts-
    - (aa) can be reversed;
    - (bb) may cause irreplaceable loss of resources, and
    - (cc) can be avoided, managed or mitigated;

- Identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted Scoping Report based on the lowest level of environmental sensitivity identified during the assessment.
- Identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted Scoping Report through the life cycle of the activity.
- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored.

The EIA Phase of the EIA Process will **further address potential environmental impacts** and benefits (direct, indirect and cumulative) associated with all of the life cycle stages of the project, including pre-construction, construction and operational stages of the life-cycle of the development. The EIA Phase will also effectively **respond to all input received from interested and affected parties and key Authorities** that provide comment on the Scoping Report and Plan of Study for EIA. The EIA will **provide the Authorities with sufficient information to make an informed decision** on whether or not the development should be authorized.

### 3. Description of Alternatives Considered & Assessed

#### 3.1 Site and Layout Alternatives

Two layout alternatives will be comparatively assessed during the EIA Phase. The preferred layout has responded to identified freshwater, terrestrial and visual constraints to the development and the comments received by the various specialists on the original layout. However, further revisions to the layout proposed may occur as the layout must also respond to potential further comments from I&APs and Authorities. The two proposed layouts for the development (**Alternative 1 and Alternative 2**) will be comparatively assessed against the NO-GO Alternative, **Alternative 3**.

#### Alternative 1 and Alternative 2

Table 1 below identifies the site layout differences between the two Alternatives.

**Table 1: Summary of Alternatives Assessed**

Development Proposed	ALTERNATIVE 1			ALTERNATIVE 2		
	No.	Size (ha)	%	No.	Size (ha)	%
<b>Community Zone 1: Campus – University / Research Institute / Academy</b>	9	22.15	19%	8	13.66	12%
<b>Business Zone 1: Waterfront Commercial Development</b>	1	4.31	4%	1	4.66	4%
<b>General Residential Zone 6: Hotel</b>	1	1.15	1%	1	1.55	1%
<b>General Residential Zone 2: Medium Density Residential / Group Housing</b>	3	4.97	4%	3	5.47	5%
<b>General Residential Zone 4: Apartments / Flats / Student Housing</b>	5	6.91	6%	4	4.84	4%
<b>Single Residential Zone 1: Free Standing Dwelling Houses</b>	126	9.32	8%	91	5.76	5%
<b>Open Space Zone 2: Recreation Spaces / Sports Fields</b>	4	8.22	7%	3	7.57	6%
<b>Open Space Zone 3: Parks / Natural Assets / Preservation Areas</b>	9	52.08	44%	5	67.39	57%

Development Proposed	ALTERNATIVE 1			ALTERNATIVE 2		
	No.	Size (ha)	%	No.	Size (ha)	%
<b>Transport Zone 2: Roads</b>	1	9.39	8%	1	7.60	6%
<b>TOTAL DEVELOPMENT FOOTPRINT</b>		118.5	100%		118.5	100%

In addition to the differences in the number of residential units and sizes of the land uses proposed, Alternative 2 has revised road layouts and placement of the land uses, taking into consideration the mapped ecological constraints and the visual impact on the scenic routes.

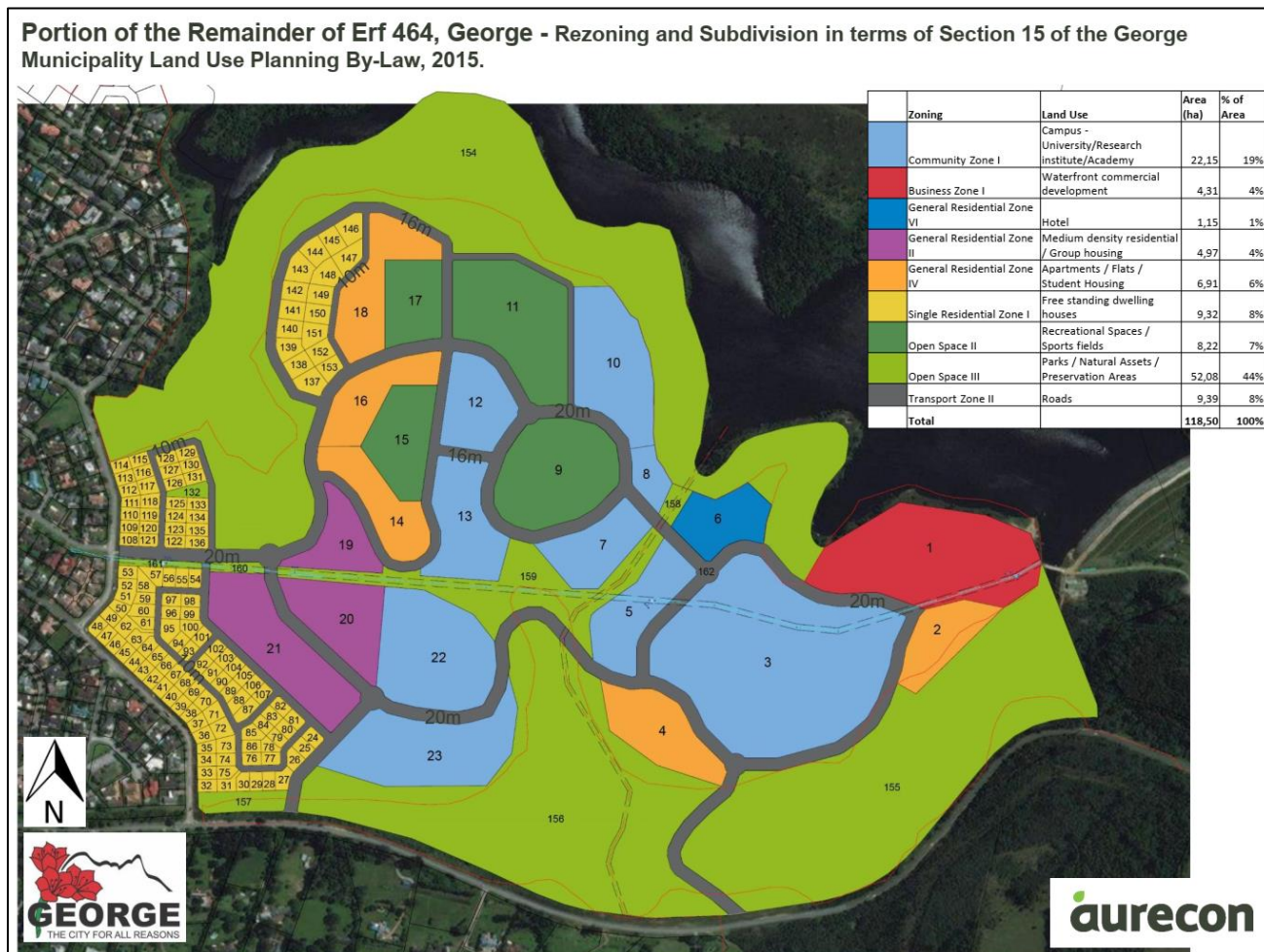


Figure 1: Original Conceptual Site Layout Plan (Alternative 1).

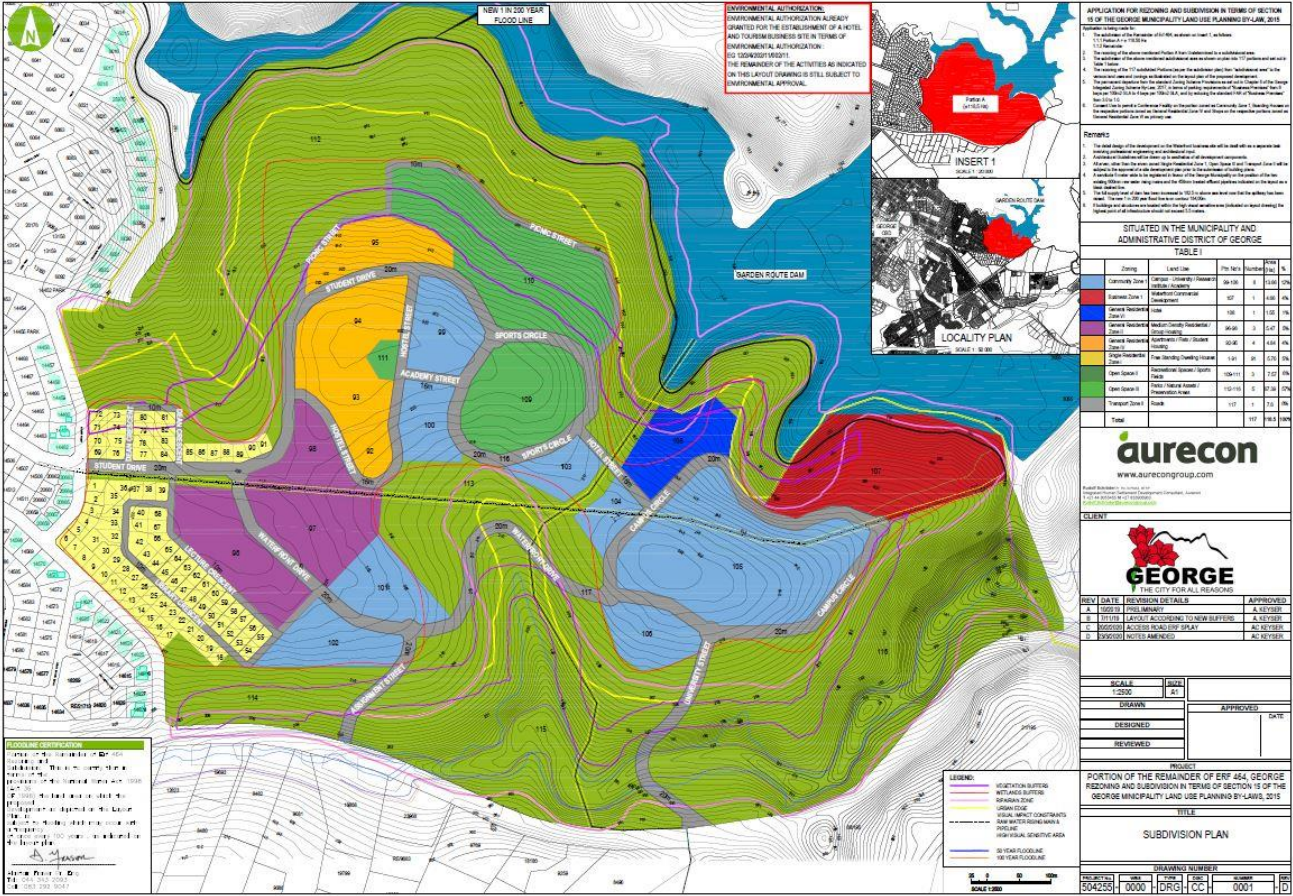


Figure 2: Revised Conceptual Site Layout Plan (Alternative 2) (Preferred).

**Alternative C: No-Go Alternative**

The “No Go” alternative is the option of not developing the proposed development and associated infrastructure. The no-development option would result in a lost opportunity in terms of the employment opportunities associated with the construction and operation phase as well as the benefits associated with the provision of a tertiary education facility, residences and social facilities.

The “no-go” alternative will result in the visual environment staying the same with the natural character of the area contributing to the “sense of place”.

# 4. Description of Aspects to be Further Assessed by Specialists in the EIA Phase

## 4.1 Description of Identified Aspects (Impacts)

### 4.1.1 Construction Phase

The following potential environmental impacts have been identified by the EAP, and by initial input from Botanical and Freshwater specialists, as impacts that may occur during the construction phase that need to firstly be avoided and if unavoidable, mitigated to an acceptable level of impact significance.

- **Agricultural Potential Impact - Loss of agricultural land** that has the potential to be used for cultivation of crops or other agricultural purposes (opportunity cost) is not really relevant for this property because it would require an environmental process to be undertaken to establish crops on this property. In the past, the area was used for pine plantations but due to it not being profitable this practice no longer takes place.
- **Botanical Impact - Permanent or temporary loss of vegetation cover as a result of site clearing:** Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.
- **Botanical Impact - Loss of Species of Conservation Concern during pre-construction site clearing activities:** A number of Species of Conservation Concern, such as the *Gladiolus fourcadei*, are present within the affected area, which may be destroyed during site preparation if there is no effective management and control of the construction process.
- **Botanical Impact - Susceptibility of some areas to erosion as a result of construction related disturbance:** Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.
- **Dust & Noise Impact:** Limited dust and noise impacts may result due to construction activities on the site. Excavations and associated earth-moving activities may generate noise and vibration which may pose a nuisance to surrounding residents and other land users. Movement of heavy vehicles to & from the site may generate noise, which may affect surrounding residents.
- **Faunal Impact - Loss of Faunal Habitat:** Activity will result in the loss of habitat for faunal species.
- **Faunal Impact - Loss of faunal species due to construction activities:** Activities associated with vegetation clearing and killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.
- **Freshwater Resources Impact – Disturbance/Loss of aquatic vegetation and habitat:** The project will require the majority of vegetation on the property to be cleared resulting in land cover changes in the catchments. The machinery, vehicles and workers (i.e. turning areas and crossings) needed to construct the roads and stormwater infrastructure will transform areas of riparian habitat. The remaining wetland habitat on the Klein Swart watercourse may, if construction is not strictly controlled, be either replaced or at least compromised by the construction of infrastructure.
- **Freshwater Resources Impact – Erosion of the banks and sedimentation of the watercourses:** Vegetation clearing and exposure of bare soils within and upslope of the aquatic habitat during construction will decrease the soil binding capacity and cohesion of the upslope soils and thus increase the risk of erosion and sedimentation downslope. This may cause the burying of aquatic habitat and also cause aquatic faunal fatalities. It may lead to the wetland ceasing to function. Ineffective site stormwater management, particularly in periods of high runoff, can lead to soil erosion from confined flows. Formation of rills and gullies from increased concentrated runoff. This increase in volume and velocity of runoff increases the particle carrying capacity of the water flowing over the surface. If this is allowed to occur, it is likely to be one of the most significant impacts upon the wetland. Any development on the steeply sloped areas, including roads, magnifies the potential for the watercourses to be impacted upon.
- **Freshwater Resources Impact – Water Pollution:** During construction there are a number of potential pollution inputs into the aquatic systems (such as hydrocarbons and raw cement). These pollutants alter the water quality parameters such as turbidity, nutrient levels, chemical oxygen demand and pH.
- **Freshwater Resources Impact – Flow Modification:** Land clearing and earth works upslope of the watercourses will reduce infiltration rates and increase the surface runoff volume and velocity. Such changes in surface roughness and runoff rates may lead to some rill and gully erosion. Altered water inputs from upslope disturbances as well as modified water distribution and retention patterns will ultimately



affect the hydrological integrity of water resources. The dam will however act as a type of buffer to changes downstream by regulating flow from the impoundment. The Klein Swart River is proposed to be crossed by roads and pipelines. The construction of such infrastructure will alter the flow pattern through dewatering and diversion activities. This may result in erosion and desiccation of wetland habitat that relies on prolonged flooding. Stormwater runoff outlets, if poorly planned/ designed, may concentrate surface flows and alter the manner in which flow enters the systems.

- **Heritage Impact** - The loss of Heritage resources, including Archaeological and Paleontological: Due to land clearing and excavations on the site but Heritage Western Cape will have an opportunity to comment.
- **Pollution & Contamination of Soil Resources:** Construction activities will generate waste. In addition, fuel, oil, lubricants and other pollutants may leak from vehicles/ machinery and contaminate the soil. Pollution and soil contamination could also occur from chemical toilets, cement mixing directly on the soil and storm water runoff may flow over the site camp area and carry contaminants off-site.
- **Socio-Economic Impact – Creation of business and employment opportunities:** The majority of work during the construction phase is likely to be undertaken by local contractors and builders. The proposed development will therefore represent a positive benefit for the local construction and building sector in the Eden District Municipality (EDM) and George Local Municipality (GLM). The majority of the building materials associated with the construction phase will be sourced from locally based suppliers from the EDM and GLM. A significant portion of the annual wage bill will be spent in the local EDM and GLM. The long term economic impacts will be massive given the scale and duration of the proposed development. Most of the labour will be made up of Historically Disadvantaged Individuals (HIDs).
- **Traffic & Safety Impact:** It is proposed to deliver a significant amount of materials and equipment to the site during the construction phase of the development. Numerous truck trips will be required every day that could cause a temporary disturbance to traffic in the area. Impacts are expected to occur to the traffic in the area due to increased truck and construction vehicle traffic expected during the construction phase. Construction vehicles may impact on the existing road conditions (road capacity and congestion). Vehicles may impact on road safety conditions due to an increase in construction phase vehicles entering and exiting the site and they may impact on the condition of the existing road network.
- **Visual Impact:** The construction phase is associated with temporary disturbance as a result of construction (trench excavations, vehicles, machinery, fencing & signage) that may have a negative visual impact to the area.

#### **4.1.2 Operation Phase**

- **Botanical Impact - Invasion by exotic and alien species:** Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
- **Botanical Impact - Disturbances to ecological processes:** Activity may result in disturbances to ecological processes.
- **Faunal Impact - Loss of faunal species due to operational activities:** Faunal species loss due to increased vehicle activity, noise and lighting.
- **Freshwater Resources Impact – Disturbance/Loss of aquatic vegetation and habitat:** Roads, pipelines, culverts and bridges create migration barriers to biota, resulting in reach to zone scale instream biological impacts. Localised scour around structures or flow impediments may result and alter the natural bank and channel, channel bank stability and floodplain processes. Road and pipeline crossings that concentrate

diffuse flows and can also inadvertently trigger gully formation. The stormwater infrastructure of the housing and associated road network will increase and concentrate flows into the watercourses. This may lead to erosion in the systems that compromises remaining habitat. The project will promote the establishment of disturbance-tolerant biota, including colonization by invasive alien species, weeds and pioneer plants within the remaining habitat. Although this impact is initiated during the construction phase it is likely to persist into the operational phase.

- **Freshwater Resources Impact – Erosion of the banks and sedimentation of the watercourses:** Where soil erosion problems and bank stability concerns initiated during the construction phase are not timeously and adequately addressed, these can persist into the operational phase of the development project and continue to have a negative impact downstream. The increase in hardened surface by development, and the impact of road and pipe crossings will be considerable and, if not mitigated against, will result in further erosion. Surface runoff and velocities will be increased, and flows will be concentrated by stormwater infrastructure.
- **Freshwater Resources Impact – Water Pollution:** The greater the extent of hardened surfaces (e.g. roofs, parking lots etc.), the lower the infiltration of stormwater and therefore the greater the surface runoff and increase in flood peaks. A change in water distribution generally results in altered wetness regimes, which in turn affect the biophysical processes and the vegetation patterns. Urbanization of the catchment and its associated stormwater runoff is a threat to freshwater biodiversity not only because of the increased hydrological disturbance and habitat loss, but also because of an increased delivery of pollutants to streams. These pollutants often do not have a chronic effect on aquatic biota but their negative and collective effects may be realised over longer periods of time. The most problematic nutrients are nitrogen and phosphorus. Stormwater runoff from urban surfaces may include nutrients, pollutants, raw sewage and other domestic waste. The establishment of sewer pipes within and/or in close proximity to watercourses always poses a long term threat to the water quality and ecological health of freshwater ecosystems due to the relatively high likelihood that surcharge events will occur at some point in the future.
- **Freshwater Resources Impact – Flow Modification:** Hardened/artificial infrastructure will alter the natural processes of rain water infiltration and surface runoff, promoting increased volumes and velocities of storm water runoff, which can be detrimental to the rivers and wetlands receiving concentrated flows from these areas.
- **Socio-Economic Impact - Provision of Tertiary Education:** Education, especially higher education, is an investment in human capital which increases future output and the lifetime earnings of graduates. Universities lead to a more educated and higher earning workforce within a region. As such, universities and colleges have been singled out as the premier institutions for generating and maintaining a nation's professional labour force.
- **Socio-Economic Impact - Provision of housing:** The proposed development will assist to address some of the housing backlog in the area.
- **Socio-Economic Impact - Provision of public open spaces:** The development proposal places strong emphasis on the preservation and enhancement of natural assets present on the site. This development proposal has strategically harnessed the high-quality vegetation in order to allow these natural systems to flourish and contribute to the sustainability of this proposed development. These natural areas can then be enjoyed by students and residents from the area.
- **Socio-Economic Impact - Provision of sports facilities:** The proposed development makes provision for the establishment of various sports facilities. These components will not only contribute to an improved

quality of life for many students, but also the local municipality who can make use of the facilities after hours.

- **Socio-Economic Impact - Provision of facilities to enhance the use of the dam:** The development will allow access to the dam in a controlled and structured manner. This will mean that the dam and its recreational features can be enjoyed in a safe and experience enhancing manner. Currently there are no facilities to speak of when using the dam and no structured points of access.
- **Socio-Economic Impact - Employment and business:** The campus, as well as business and commercial components will create employment opportunities for local residents. The residential component may also create some opportunities for domestic workers and gardeners etc. The majority of the employment opportunities are likely to benefit Historically Disadvantaged Individuals (HDIs). Given the high unemployment levels in the surrounding areas, coupled with the low income and education levels, this would represent a positive social impact. The operational phase will also create opportunities for local businesses, such as local maintenance and building companies, garden services and security companies, petrol stations, shops and restaurants etc. and create opportunities for new businesses to develop. The local estate agencies in the area and legal firms would also benefit from the sale and resale of properties associated with the new development.
- **Socio-Economic Impact - Broaden the rates base:** The development will result in an increase in the rates base. In addition, the proposed development would also generate revenue for the local municipality from the consumption of water and electricity.
- **Socio-Economic Impact - Property Values of surrounding landowners:** Values of real estate are driven by various factors, among others supply and demand, interest rates, the contraction or expansion of the local economy, population growth rates and changes in disposable income to debt ratios. With the increase in facilities, it is likely that surrounding properties values may increase due to their proximity.
- **Traffic & safety impact:** A significant increase in traffic is expected to occur in the area as a result of the proposed development. Vehicles may impact on the existing road network and road safety conditions due to an increase in vehicles entering and exiting the site.
- **Visual Impact – Land use character & “sense of place”:** It is proposed to change the land use character and existing sense of place of the site from a largely undeveloped site to a built up mixed use development of approximately 119ha. The proposed development would impact on the “sense of place” of the area to sensitive receptors that can see the development. In addition, the landscape character of the surrounding scenic routes would be compromised.
- **Visual Impact - Visual intrusion of night lighting:-** The campus and sports facilities would result in additional lighting at night, which would be visible from the surrounding landscape.

## 4.2 Aspects Considered in the Scoping Phase

The following **Specialist Impact Assessments** and **external engineering consultant** input has been undertaken, in order to **inform the design, layout and infrastructure requirements** of the development proposal and **fulfill the content requirements of the Scoping Report in terms of the expected impact significance**:

- A **Town Planning Motivation Report** was produced by Aurecon, dated 2019.
- An **Engineering Services Report** was compiled by Aurecon, dated 2020.
- A **Stormwater Management Plan** was compiled by Aurecon, dated 2020
- A **Biodiversity Sensitivity Analysis** was undertaken by Conservation Management Service, dated 2018, on the Original Conceptual Site Layout Plan.

- A **Freshwater Impact Assessment: Phase 1** was undertaken by Debbie Fordham of Sharples Environmental Services cc in 2019 on the Original Conceptual Site Layout Plan;
- A **Butterfly Survey** was undertaken by Dave Edge & Associates, dated 2019;
- A **Visual Constraints Report** was compiled by Paul Buchholz, dated 2019;
- A **Urban Design Report** was compiled by Linc Architecture, dated 2019;
- A **Socio-Economic Baseline Report** was compiled by Tony Barbour, dated 2019; **and**
- A **Traffic Impact Assessment** was undertaken by SMEC, dated 2019 on the Original Conceptual Site Layout Plan.

The assessments listed above have therefore informed the Draft Scoping Report and associated proposed preferred layout plan.

### 4.3 Aspects Proposed to be considered during the EIA Phase

It is proposed to undertake the following additional Specialist Impact Assessment Studies and Technical Reports during the EIA Phase:

- A **Visual Impact Assessment**.
- An **updated Biodiversity Impact Assessment** that must include a comparative assessment of the two alternatives.
- An **updated Freshwater Habitat Assessment** that must include a comparative assessment of the two alternatives.
- A **Socio-Economic Impact Assessment**.
- A **revised Traffic Impact Assessment** to assess the revised layout (Alternative 2).

## 5. Methodology for Assessing the Environmental Aspects

### 5.1 Methodology for Visual Statement

The visual specialist should use the table below to identify what category and type of development is proposed in order to determine the significance of the visual impact expected.

*Table 2: Categorisation of Issues to be addressed by the Visual Assessment*

**Table1: Categorisation of issues to be addressed by the visual assessment**

Type of environment	Type of development (see Box 2) Low to high intensity				
	Category 1 development	Category 2 development	Category 3 development	Category 4 development	Category 5 development
Protected/wild areas of international, national, or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected
Areas or routes of low scenic, cultural, historical significance / disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

The contents of the Visual Impact Assessment Report must meet the requirements of the required content as listed in Appendix 6 of the 2014 EIA Regulations, as amended.

## 5.2 Methodology for Additional Ecological/Botanical Input

Conservation Management Services have already produced an Biodiversity Impact Assessment on the original Site Layout Plan. The updated proposed Site Layout Plan has since been revised to respond to the recommendations made in the various specialist reports as well as input from the engineers. The same methodology previously used should be followed, including all three alternatives (No-Go included).

The methodology includes the following:

- To determine if vegetation of high conservation value will be affected by the project. Reference will be made to its conservation value and potential impact on ecological linkages, CBA's, etc.
- To determine if any rare and threatened (Species of Conservation Concern) plant species will be affected.
- To comparatively assess the presented alternatives in terms of the identified impacts.
- To propose mitigation measures to be included in the EMP to ensure that the impact on biodiversity is minimised.
- The contents of the Updated Ecological Impact Assessment must meet the requirements of the required content as listed in Appendix 6 of the 2014 EIA Regulations, as amended.

## 5.3 Methodology for Additional Freshwater Habitat Assessment Input

The Aquatic Specialist has already produced a Phase 1 Freshwater Habitat Assessment on the original Site Layout Plan. The updated proposed Site Layout Plan has since been revised to respond to the recommendations made in the various specialist reports as well as input from the engineers. The Aquatic Specialist therefore needs to follow the same methodology as before and comparatively assess the Freshwater Impact for the 3 Alternative Options (No-Go included).

The required scope of work includes the following:

- Desktop delineation of all watercourses within a 500m radius of the proposed development utilising available aerial photography, contour data and water resource data;
- Contextualisation of the study area in terms of important biophysical characteristics and aquatic conservation planning information (including National Freshwater Ecosystem Priority Areas);
- Undertake a risk screening assessment to determine which of the desktop delineated watercourses is likely to be measurably affected by the proposed activity;
- Detailed infield delineated freshwater habitats in relation to the proposed construction using the manual A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas (DWA, 2005)
- Classification of delineated freshwater habitats in accordance with the National Wetland Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis et al, 2013) and WET-Ecoservices (Kotze et al, 2009);
- Identification of site-specific biophysical characteristics, e.g. hydrology, vegetation, geomorphological features and soils;
- Conduct a Present Ecological State (PES) and functional importance assessment of the delineated wetland habitats, utilising:
  - Level 1 WET-Health tool (Macfarlane et al, 2009 – PES);
  - WET-Ecoservices (Kotze et al, 2009) – Functional assessment;
- Conduct a Present Ecological Status (PES) and present Ecological Importance and Sensitivity (EIS) assessment of the delineated river/riparian habitats, utilising:
  - Qualitative Index of Habitat Integrity (IHI) tool adapted from (Kleynhans, 1996) – PES;
  - DWA (DWS) river EIS tool (Kleynhans, 1999) – EIS;
- Undertake water quality sampling and analysis to inform current instream habitat water characteristics;
- Identification, prediction and description of the potential impacts of the proposed project on the delineated wetland/ riparian areas and the significance of these impacts; and
- Recommendation of impact management/mitigation guidelines for the proposed project including guidelines for the rehabilitation of disturbed areas and monitoring protocols.
- The contents of the Updated Freshwater Impact Assessment must meet the requirements of the required content as listed in Appendix 6 of the 2014 EIA Regulations, as amended.

#### **5.4 Methodology for Additional Socio-Economic Assessment Input**

The Socio-Economic Specialist has produced a Socio-Economic Baseline Report on the original Site Development Plan. The Socio-Economic Specialist therefore needs to compile a Socio-Economic Impact Assessment for the second phase of the process.

The required scope of work includes the following:

- Review comments submitted on Scoping Report and other relevant specialist studies;
- Identify and set up meetings with key stakeholders;
- Interviews with key affected parties, including local communities, rate payers associations, local councilors, local landowners, key government officials (local and regional), non-government organizations, the client chamber of commerce etc.;
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction and operational phase of the proposed development. This will include assessment of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created, breakdown of the employment opportunities in

terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.;

- The assessment of operational phase impacts will include an assessment of potential socio-economic benefits associated with the establishment of a medium sized education facility, including jobs, benefits to the local property and retail market etc. The potential negative impacts of large influx of students will also be identified and assessed. The assessment will include a review of case studies from other small to medium university towns, such as Grahamstown and Potchestroom.
- Identification of appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts;
- Preparation of Draft SIA Report for comment and attend project meeting;
- Prepare Final SIA based on comments.

## 5.5 Terms of Reference Provided to All Specialists

Specialists in their field of expertise will consider baseline data and identify and assess impacts according to predefined rating scales. Specialists will also suggest optional or essential ways in which to mitigate negative impacts and enhance positive impacts. Further, specialists will, where possible, take into consideration the cumulative effects associated with this and other projects which are either developed or in the process of being developed in the local area. The results of these specialist studies will be integrated into a Draft Environmental Impact Report.

**Specialists' reports must comply with content requirements listed in Appendix 6 of the National Environmental Management Act (NEMA) EIA Regulations** (as provided in GN 326 published on the 7<sup>th</sup> April 2017) whereby the following is to be included:

1. Details of-
  - a. the specialist who prepared the report; and
  - b. the expertise of that specialist to compile a specialist report including a curriculum vitae;
2. A declaration that the specialist is independent in a form as may be specified by the competent authority;
3. An indication of the scope of, and the purpose for which, the report was prepared;
4. An indication of the quality and age of base data used for the specialist report;
5. A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
6. The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;
7. A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;
8. Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;
9. An identification of any areas to be avoided, including buffers;
10. A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
11. A description of any assumptions made and any uncertainties or gaps in knowledge;
12. A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities.
13. Any mitigation measures for inclusion in the EMPr;
14. Any conditions for inclusion in the environmental authorisation;

15. Any monitoring requirements for inclusion in the EMPr or environmental authorisation;
16. A reasoned opinion-
  - a. whether the proposed activity, activities or portions thereof should be authorised;
  - b. regarding the acceptability of the proposed activity or activities; and
  - c. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;
17. A description of any consultation process that was undertaken during the course of preparing the specialist report;
18. A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
19. Any other information requested by the competent authority.

In addition to the above, specialists are expected to:

- Review the Scoping Report to familiarize themselves with all relevant issues or concerns relevant to their field of expertise;
- In addition to the impacts listed in the Scoping Report, identify any issue or aspect that needs to be assessed and provide expert opinion on any issue in their field of expertise that they deem necessary in order to avoid potential detrimental impacts;
- Assess the degree and extent of impacts employing the criteria and methodology set out in the Scoping Report of all identified impacts and issues that the preferred project activity and its proposed alternatives, **including that of the no-go alternative**, may have;
- Identify and list all legislation and permit requirements, relevant to their field of study, required before construction may commence.
- Reference all sources of information and literature consulted; and
- Include an executive summary to the report.

The specialist is expected to prepare a report that addresses the scope of the work as set out above.

The following assessment methodology will be provided to all the specialists so that the same impact significance methodology is used across the board:

**Table 4:** Methodology in determining the extent, duration, probability, significance, reversibility and cumulative impact of an environmental impact

**Determination of Extent (Scale):**

<b>Site Specific</b>	The impact is limited to the development site (development footprint) or part thereof.
<b>Local</b>	The impacted area includes the whole or a measurable portion of the site, but could affect the area surrounding the development, including the neighbouring properties and wider municipal area.
<b>Regional</b>	The impact would affect the broader region (e.g. neighbouring towns) beyond the boundaries of the adjacent properties.
<b>National</b>	The impact would affect the whole country (if applicable).

**Determination of Duration:**

<b>Temporary</b>	The impact will be limited to part of the construction phase or less than one month.
<b>Short term</b>	The impact will continue for the duration of the construction phase, or less than one year.



<b>Medium term</b>	The impact will continue for part the operational phase
<b>Long term</b>	The impact will continue for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
<b>Permanent</b>	This is the only class of impact that will be non-transitory. Such impacts are regarded to be irreversible, irrespective of what mitigation is applied.

**Determination of Probability:**

<b>Improbable</b>	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
<b>Probable</b>	There is a possibility that the impact will occur to the extent that provisions must therefore be made.
<b>Highly probable</b>	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up to mitigate the activity before the activity commences.
<b>Definite</b>	The impact will take place regardless of any prevention plans.

**Determination of Significance (without mitigation):**

<b>No significance</b>	The impact is not substantial and does not require any mitigation action.
<b>Low</b>	The impact is of little importance, but may require limited mitigation.
<b>Medium</b>	The impact is of sufficient importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
<b>Medium-High</b>	The impact is of high importance and is therefore considered to have a negative impact. Mitigation is required to manage the negative impacts to acceptable levels.
<b>High</b>	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.
<b>Very High</b>	The impact is critical. Mitigation measures cannot reduce the impact to acceptable levels. As such the impact renders the proposal unacceptable.

**Determination of Significance (with mitigation):**

<b>No significance</b>	The impact will be mitigated to the point where it is regarded to be insubstantial.
<b>Low</b>	The impact will be mitigated to the point where it is of limited importance.
<b>Medium</b>	Notwithstanding the successful implementation of the mitigation measures, the impact will remain of significance. However, taken within the overall context of the project, such a persistent impact does not constitute a fatal flaw.
<b>High</b>	Mitigation of the impact is not possible on a cost-effective basis. The impact continues to be of great importance, and, taken within the overall context of the project, is considered to be a fatal flaw in the project proposal.

**Determination of Reversibility:**

<b>Completely Reversible</b>	The impact is reversible with implementation of minor mitigation measures
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<b><i>Partly Reversible</i></b>	The impact is partly reversible but more intense mitigation measures
<b><i>Barely Reversible</i></b>	The impact is unlikely to be reversed even with intense mitigation measures
<b><i>Irreversible</i></b>	The impact is irreversible and no mitigation measures exist

**Determination of Degree to which an Impact can be Mitigated:**

<b><i>Can be mitigated</i></b>	The impact can be completely mitigated
<b><i>Can be partly mitigated</i></b>	The impact can be partly mitigated
<b><i>Can be barely mitigated</i></b>	It is possible to mitigate the impact only slightly
<b><i>Not able to mitigate</i></b>	It is not possible to mitigate the impacts

**Determination of Loss of Resources:**

<b><i>No loss of resource</i></b>	The impact will not result in the loss of any resources
<b><i>Marginal loss of resource</i></b>	The impact will result in marginal loss of resources
<b><i>Significant loss of resources</i></b>	The impact will result in significant loss of resources
<b><i>Complete loss of resources</i></b>	The impact will result in a complete loss of all resources

**Determination of Cumulative Impact:**

<b><i>Negligible</i></b>	The impact would result in negligible to no cumulative effects
<b><i>Low</i></b>	The impact would result in insignificant cumulative effects
<b><i>Medium</i></b>	The impact would result in minor cumulative effects
<b><i>High</i></b>	The impact would result in significant cumulative effects

## 6. Consultation with the Competent Authority

Section 7 (Duties of Competent Authorities) of the NEMA EIA Regulations of 2014 states that “*Where a Competent Authority is requested by an applicant to comment in terms of these Regulations, such competent Authority must submit its comments within 30 days*”. In an effort to ensure that the Final EIA Report contains sufficient information for DEA & DP to make an informed decision and to ensure they satisfy the content requirements listed in the EIA Regulations of 2014, as amended, DEA & DP will be

requested to provide comment on the draft Environmental Impact Assessment Report when it is made available for 30 days Public Participation.

The Competent Authority could comment on whether they deem it necessary to conduct additional specialist assessments other than what is proposed already in this POSEIA when they accept the Final Scoping Report.

## 7. Public Participation Process during the EIA Phase

The Environmental Impact Assessment Report, still to be compiled, will take into account all comments received from interested and affected parties, commenting Authorities and the Competent Authority during the two Public Participation Phases on the Scoping Report. The EIA will respond to each written comment received in a "Comments & Response" Table. In addition, further changes to the layout, development proposal or proposed specialist input to be undertaken, will be informed by the comments received during the Scoping Phase 30 day Public Participation Periods.

There is however only 1 opportunity for the public and commenting authorities to provide input during the EIA Process. There is one 30 day PP period on the Draft EIA Report, after which the report is revised and submitted for final decision making.

## 8. Description of Tasks to be undertaken during the EIA Phase

The following tasks are proposed to be undertaken during the EIA Phase:

### Environmental Impact Assessment Report & Specialist Assessments & WULA

- Compilation of the Terms of Reference for additional specialist input for the EIA phase specialist reports required / addendums to previous impact reports.
- Management of the appointment of the additional specialists and input;
- Review of specialist assessments and provide detailed comments for amendment (if required).
- Project management meetings with applicant and specialists.
- Additional site visits with specialists, authorities and I & AP's, if required.
- Co-ordination of various specialists input to produce sensitivity maps and site layouts for inclusion in the EIA Report.
- Compile EIA Report;
- Compile Environmental Management Plan;
- Submit EIA & EMP to DEA & DP.
- Compile WULA Report;

### 30 days Public Participation on EIA Report (including WULA)

- Conduct 30 days PP on EIA Report – including printing colour hardcopies and courier to all key commenting Authorities;
- Written Notification letters to I & AP's;
- Uploading onto website;
- Respond to each comment received;

- Project management meetings and focus group meetings with I & AP's;
- Update Comments & Response Table;
- Update I & AP Database;
- Update EIA Report and EMP based on all comments received during PP;
- Printing and submission of hardcopies to DEA & DP and to client.
- Submit WULA to DWS.

DEA & DP provide 106 days to submit the EIA Report from the day the Scoping Report is accepted. During which time 30 days PP on the EIA Report must take place and the EIA Phase specialist assessments. The EIA Report and EMP must also be updated during this time period before submission.

## 9. Measures to Avoid, Reverse, Mitigate or Manage Impacts

The following measures are proposed to avoid, reverse, mitigate or manage impacts:

### 9.1 Construction Phase

#### 9.1.1 *Agricultural Potential Impact - Loss of Agricultural Land*

- No mitigation is proposed.

#### 9.1.2 *Botanical Impact - Permanent Loss of Indigenous Vegetation*

- Ensure sufficient quality, quantity and connectivity of habitat remains throughout the area of the property.
- Remove alien invasive plants and rehabilitate.
- Develop and implement fire management program
- Development of an EMPr to control construction impacts.

#### 9.1.3 *Botanical Impact - Loss of Species of Conservation Concern*

- Make use of a search and rescue team to remove bulbs prior to the development of the road and transplant them in adjacent areas listed as highly sensitive *Gladiolus fourcadei*.
- Alternatively, an onsite nursery should be established. A suitably qualified person must be in charge of this nursery.
- Rescued plants need to be used in the landscape plan after development
- Remove alien invasive plants and rehabilitate
- Ensure sufficient quality, quantity and connectivity of habitat is available.
- Develop and implement fire management program.
- Development of an Environmental Management Programme (EMPr) to control construction impacts.

#### 9.1.4 *Botanical Impact - Susceptibility of some areas to erosion as a result of construction related disturbances.*

- Suitable measures must be implemented in areas that may be susceptible to erosion, including but not limited to gabions and runoff diversion berms (if necessary).
- Areas must be rehabilitated and a suitable cover crop planted once specific phases of construction is completed.
- If site development does not occur soon after preparation of the site, a suitable cover crop to be established as a temporary measure.
- Development of an Environmental Management Plan (EMP) to control construction impacts.

### **9.1.5 Contamination & Pollution Impact – Associated with Construction Activities**

The appointed Environmental Control Officer (ECO) must undertake at least one site inspection per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.

#### General Pollution Management:

- No pollution of surface water or ground water resources may occur due to any activity on the site.
- No storm water runoff from any premises containing waste, or water containing waste emanating from construction activities may be discharged into the environment. Polluted stormwater must be contained on the site.
- Cement batching / mixing may not take place directly on the soil surface, it must be done on an impervious lining that will prevent cement particles from contaminating the soil.

#### General Waste Management:

- Dedicated waste bins or skips must be provided on site, and kept in a demarcated area on an impermeable surface.
- Separate waste bins/skips must be provided for recyclable waste, general waste and hazardous waste. Recovered builder's rubble & green waste may be stockpiled on the ground within the site camp, or in separate skips until removal.
- Waste must be placed in the appropriate waste bins/skips/ stockpiles.
- Hazardous waste bins must be kept on an impermeable bunded surface capable of holding at least 110% of the volume of the bins.
- Skips/ bins must be provided with secure lids or covering that will prevent scavenging and windblown waste or dust.
- Waste bins/skips must be regularly emptied and must not be allowed to overflow.
- Construction workers must be instructed not to litter and to place all waste in the appropriate waste bins provided on site.
- The Contractor must ensure that all workers on site are familiar with the correct waste disposal procedures to be followed.
- Waste generated on site must be classified and managed in accordance with the National Environmental Management: Waste Act – Waste Classification and Management Regulations (GN No. R. 634 of August 2013).
- Disposal of waste to landfill must be undertaken in accordance with the National Environmental Management: Waste Act – National Norms and Standard for the Assessment of Waste for Landfill Disposal (GN No. R. 635 of August 2013).
- All waste, hazardous as well as general, which result from the proposed activities must be disposed of appropriately at a licensed Waste Disposal Facility (WDF).

#### Pollution Management – hydrocarbons (oil, fuel etc.)

- Vehicles and machinery must be in good working order and must be regularly inspected for leaks.
- If a vehicle or machinery is leaking pollutants it must, as soon as possible, be taken to an appropriate location for repair. The ECO has the authority to request that any vehicle or piece of equipment that is contaminating the environment be removed from the site until it has been satisfactorily repaired.
- Repairs to vehicles/ machinery may take place on site, within a designated maintenance area at the site camp. Drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs.
- Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips.
- Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks.
- Drip trays must be placed under generators (if used on site) water pumps and any other machinery on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage.
- Where feasible, fuel tanks should be elevated so that leaks are easily detected.
- A spill kit to neutralise/treat spills of fuel/ oil/ lubricants must be available on site, and workers must

be educated on how to utilise the spill kit.

- Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste.

#### Pollution Management – Ablution facilities

- Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over.
- Toilets must be located well outside of any storm water drainage lines, and may not be linked to the storm water drainage system in any way.
- Chemical toilets must be regularly emptied and the waste disposed of at an appropriate waste water disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets.

#### Pollution Management – Hazardous Substances

- Any hazardous substances (materials, fuels, other chemicals etc.) that may be required on site must be stored according to the manufacturers' product-storage requirements, which may include a covered, waterproof bunded housing structure.
- Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases.
- Hazardous chemicals and fuels should be stored on bunded, impermeable surfaces with sufficient capacity to hold at least 110% of the capacity of the storage tanks.

#### Cement Batching:

- Cement batching must take place on an impermeable surface large enough to retain any slurry or cement water run-off. If necessary, plastic/ bitem lined detention ponds (or similar) should be constructed to catch the run-off from batching areas. Once the water content of the cement water/ slurry has evaporated the dried cement should be scraped out of the detention pond and disposed of at an appropriate disposal facility authorised to deal with such waste
- Cement batching should take place on already transformed areas within the footprint of the facility.
- Unused cement bags must be stored in such a way that they will be protected from rain. Empty cement bags must not be left lying on the ground and must be disposed of in the appropriate waste bin.
- Washing of excess cement/concrete into the ground is not allowed. All excess concrete/ cement must be removed from site and disposed of at an appropriate location.

### **9.1.6 Dust & Noise Impact – Associated with Construction Activities**

#### Dust Mitigation:

- Land clearing and earthmoving activities should not be undertaken during strong winds, where possible.
- Cleared areas should be provided with a suitable cover as soon as possible, and not left exposed for extended periods of time.
- Stockpiles of topsoil, spoil material and other material that may generate dust must be protected from wind erosion (e.g. covered with netting, tarpaulin or other appropriate measures. Note that topsoil should not be covered with tarpaulin as this may kill the seedbank).
- The location of stockpiles must take into account the prevailing wind direction and should be situated so as to have the least possible dust impact to surrounding residents, road-users and other land-users.
- Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution.
- The speed limit should be set at 20-40km/h.
- Dust must be suppressed on access roads and the construction site during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of excessive run off.
- Dust suppression measures such as the wetting down of sand heaps as well as exposed areas

around the site must be implemented especially on windy days.

- The use of straw worked into the sandy areas may also help and the ECO must advise when this is necessary.
- If dust appears to be a continuous problem the option of using shade cloth to cover open areas may be necessary or the erecting of shade netting above the fenced off area may need to be explored.
- All vehicles transporting sand need to have tarpaulins covering their loads which will assist in any windblown sand occurring off the trucks.
- Work on site must be well-planned and should proceed efficiently so as to minimise the handling of dust generating material.
- Dust levels specified in the National Dust Control Regulations (GN 827 of November 2013) may not be exceeded. i.e. dust fall in residential areas may not exceed 600mg/m<sup>2</sup>/day, measured using reference method ASTM D1739;
- A Complaints Register must be available at the site office for inspection by the ECO of dust complaints that may have been received.
- The appointed Environmental Control Officer (ECO) must undertake a site inspection once per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.

Noise Mitigation:

- A noise complaints register will be opened.
- Excavations and earth-moving activities must be restricted to normal construction working hours (7:30 – 17:30) as far as possible.
- Work on site must be well-planned and should proceed efficiently so as to limit the duration of the disturbance.
- Vehicles and equipment must be kept in good working condition. Machinery and equipment should be fitted with mufflers/ exhaust silencers. No unnecessary disturbances should be allowed to emanate from the construction site.
- Due to the proximity of the proposed development site to residents, noise levels must be kept to a minimum at all times. If excessive noise is expected on the boundary of the residential erven bordering the site they must be informed in advance of when the high noise levels will occur and for how long they will occur.
- Workers should be educated on how to control noise-generating activities that have the potential to become disturbances, particularly over an extended period of time.
- Noise levels must comply with the relevant health & safety regulations and SANS codes and should be monitored by the Health & Safety Officer as necessary and appropriate.
- Affected parties must be informed of the excessive noise factors.
- The noise management and monitoring measures prescribed in the EMP must be adhered to.
- The appointed Environmental Control Officer (ECO) must undertake a site inspection once per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.

#### **9.1.7 Faunal Impact – Loss of habitat**

- Ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population (ecological corridors).
- Remove alien invasive plants and rehabilitate.

#### **9.1.8 Faunal Impact – Loss of Faunal Species**

- Protect reptiles from harm during the construction phase and translocate individuals where possible.
- Limit speeds of construction vehicles.

#### **9.1.9 Freshwater Resources Impact – Loss and disturbance of aquatic vegetation & habitat**

- Bridges over wetland habitat must span the entire width of the freshwater habitat and channel wherever possible. It is recommended that the number of support piers to be located within the

riparian zone (wetted zone and supported habitat) be limited in number as far as possible.

- The extent of infilling within the freshwater habitat must be minimised as far as possible. This is in alignment with a single span design instead of box culverts.
- Use existing roads or upgrade existing tracks to cross wetlands rather than constructing entirely new roads wherever possible.
- Avoid multiple watercourse crossings and align pipeline crossings of watercourses with planned road crossings where possible.
- The buffer area must be considered as a No-Go area for infrastructure.
- Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils.
- No equipment laydown or storage areas must be located within delineated freshwater buffer zone.

#### **9.1.10 Freshwater Resources Impact – Sedimentation and Erosion**

- Construction must be carried out during the dry season where possible and contingency plans must be in place for high rainfall events during construction.
- Before any work commences, sediment control/silt capture measures (e.g. bidim/silt curtains) must be installed downstream/downslope of the active working areas.
- Silt fences/curtains must be regularly checked and maintained (de-silted to ensure continued capacity to trap silt) and repaired where necessary.
- When de-silting takes place the silt must not be returned to the watercourse.
- Excavated rock and sediments from the construction zone, and including any foreign materials, should not be placed within the delineated rivers and riparian areas in order to reduce the possibility of material being washed downstream.
- All bare slopes and surfaces to be exposed to the elements during clearing and earthworks must be protected against erosion using rows of silt fences, sandbags, hay bales and/or earthen berms spaced along contours at regular intervals. The spacing interval must be smaller for steeper slopes and if required the ECO should advise in this regard.
- Stockpiles must not be located within 50 metres of the wetland, dam, and must avoid the riparian buffer. The furthest threshold must be adhered to.
- Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. Alternatively, the exposed slopes must drain into small temporary stormwater and silt traps/ponds.

#### **9.1.11 Freshwater Resources Impact – Water Pollution**

The appointed Environmental Control Officer (ECO) must undertake at least one site inspection per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.

- It is recommended that baseline water quality measurements are undertaken.
- The recycling/reuse of dirty water is promoted; alternatively, this water will need to be directed into the sewer system.

##### General Pollution Management:

- No pollution of surface water or ground water resources may occur due to any activity on the site.
- No storm water runoff from any premises containing waste, or water containing waste emanating from construction activities may be discharged into the environment. Polluted stormwater must be contained on the site.
- Cement batching / mixing may not take place directly on the soil surface, it must be done on an impervious lining that will prevent cement particles from contaminating the soil.

##### General Waste Management:

- Dedicated waste bins or skips must be provided on site and kept in a demarcated area on an impermeable surface.
- Separate waste bins/skips must be provided for recyclable waste, general waste and hazardous waste. Recovered builder's rubble & green waste may be stockpiled on the ground within the site



camp, or in separate skips until removal.

- Waste must be placed in the appropriate waste bins/skips/ stockpiles.
- Hazardous waste bins must be kept on an impermeable bunded surface capable of holding at least 110% of the volume of the bins.
- Skips/ bins must be provided with secure lids or covering that will prevent scavenging and windblown waste or dust.
- Waste bins/skips must be regularly emptied and must not be allowed to overflow.
- Construction workers must be instructed not to litter and to place all waste in the appropriate waste bins provided on site.
- The Contractor must ensure that all workers on site are familiar with the correct waste disposal procedures to be followed.
- Waste generated on site must be classified and managed in accordance with the National Environmental Management: Waste Act – Waste Classification and Management Regulations (GN No. R. 634 of August 2013).
- Disposal of waste to landfill must be undertaken in accordance with the National Environmental Management: Waste Act – National Norms and Standard for the Assessment of Waste for Landfill Disposal (GN No. R. 635 of August 2013).
- All waste, hazardous as well as general, which result from the proposed activities must be disposed of appropriately at a licensed Waste Disposal Facility (WDF).

Pollution Management – hydrocarbons (oil, fuel etc.)

- Vehicles and machinery must be in good working order and must be regularly inspected for leaks.
- If a vehicle or machinery is leaking pollutants it must, as soon as possible, be taken to an appropriate location for repair. The ECO has the authority to request that any vehicle or piece of equipment that is contaminating the environment be removed from the site until it has been satisfactorily repaired.
- Repairs to vehicles/ machinery may take place on site, within a designated maintenance area at the site camp. Drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs.
- Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips.
- Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks.
- Drip trays must be placed under generators (if used on site) water pumps and any other machinery on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage.
- Where feasible, fuel tanks should be elevated so that leaks are easily detected.
- A spill kit to neutralise/treat spills of fuel/ oil/ lubricants must be available on site, and workers must be educated on how to utilise the spill kit.
- Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste.

Pollution Management – Ablution facilities

- Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over.
- Toilets must be located well outside of any storm water drainage lines and may not be linked to the storm water drainage system in any way.
- Chemical toilets must be regularly emptied and the waste disposed of at an appropriate waste water disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets.

Pollution Management – Hazardous Substances

- Any hazardous substances (materials, fuels, other chemicals etc.) that may be required on site must be stored according to the manufacturers' product-storage requirements, which may include a covered, waterproof bunded housing structure.
- Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental

impacts during accidental releases.

- Hazardous chemicals and fuels should be stored on bunded, impermeable surfaces with sufficient capacity to hold at least 110% of the capacity of the storage tanks.

#### Cement Batching:

- Cement batching must take place on an impermeable surface large enough to retain any slurry or cement water run-off. If necessary, plastic/ bitem lined detention ponds (or similar) should be constructed to catch the run-off from batching areas. Once the water content of the cement water/ slurry has evaporated the dried cement should be scraped out of the detention pond and disposed of at an appropriate disposal facility authorised to deal with such waste
- Cement batching should take place on already transformed areas within the footprint of the facility.
- Unused cement bags must be stored in such a way that they will be protected from rain. Empty cement bags must not be left lying on the ground and must be disposed of in the appropriate waste bin.
- Washing of excess cement/concrete into the ground is not allowed. All excess concrete/ cement must be removed from site and disposed of at an appropriate location.

#### **9.1.12 Freshwater Resources Impact – Flow Modification**

- The mitigation of impacts must focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment.
- The stormwater flows must enter the wetland areas in a diffuse flow pattern without pollutants.
- Frequent, multiple stormwater outlets must be designed to prevent erosion at discharge points.
- All erosion protection measures (e.g. Reno-mattresses) must be established to reflect the natural slope of the surface and located at the natural ground level. Structures such as these must be located within the layout footprint and not encroach into the buffer areas.
- Inlet protection measures to capture solid waste and debris entrained in storm water entering the storm water management system (inlet protection devices) will be incorporated into the design of the system.
- Roads should follow the natural elevation contours where possible in order to maintain gentle gradients so as to minimise the risk of surface water runoff, high flow velocities and soil erosion.
- Bridge and culvert structures must be designed to adequately allow for the natural movement of water from the upstream to the downstream sides of the structure without inhibiting the natural movement of water and may not result in changes to flow volumes and velocities, or create artificially inundated areas but allow for the free-flow movement of water.
- The level of piped culverts (if required at all) needs to match the ground level of the wetland/river bed and should not be elevated above the wetland/river at the downstream end so as to cause erosion where water flows incorrectly onto the wetland surface/river bed from height.
- Energy dissipaters should be installed to prevent scour at any culvert outlet. This can be constructed of appropriately sized rock armour and should have a concave cross-section to prevent the scouring of adjacent banks. Coarse bedding material or geotextile wrapped dump rock must be considered for use wherever the roads crosses wetland characterised by diffuse subsurface flows or within the non-perennial tributaries.
- Appropriate measures to dissipate flow velocity below bridge structures must be considered and designed for pre-construction.

#### **9.1.13 Heritage Impact**

In the event that any heritage resources (human remains, grave stones, stone tools, artefacts, old coins and pottery, fossil shell middens, rock art and engravings, remains of old built structures etc.) are encountered during construction:

- The finding should be protected from further disturbance (ideally left in situ) and the ECO and relevant Heritage Authority should be notified.
- The finding should be handled and/or removed from site as per instructions issued by the Heritage Authority or delegated heritage specialist.

#### **9.1.14 Socio-Economic - Creation of Business & Employment Opportunities**

In order to enhance local employment and business opportunities associated with the construction phase of the project the following measures are proposed to be implemented:

- The developer will inform the local authorities, local community leaders, organizations and councillors of the project and the potential job opportunities for local builders and contractors;
- The developer will establish a database of local construction companies in the area, specifically SMME's owned and run by HDI's, prior to the commencement of the tender process for the bulk services component of the project. These companies will be notified of the tender process and invited to bid for project related work;
- The developer in consultation with the appointed contractor/s will look to employ a percentage of the labour required for the construction phase from local area in order to maximize opportunities for members from the local HD communities.
- The above conditions must only be enforced where they do not contradict local and national employment practices and guidelines.

#### **9.1.15 Traffic & Safety Impact – Associated with Construction Vehicles**

- All construction vehicles must adhere to traffic laws when travelling to and from the site.
- All drivers and machinery operators must be sensitised to the fact that they are working in an area with a potentially high volume of foot and vehicle traffic and must exercise due caution when entering/ exiting the site.
- Appropriate signage should be erected to warn other road users about the presence of construction vehicles, particularly at the point where construction vehicles enter/ exit the site from Madiba Drive.
- Speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users.
- Construction vehicles must adhere to the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles.
- The Contractor must ensure that any large or abnormal loads (including hazardous materials) that must be transported to/ from the site are routed appropriately, and that appropriate safety precautions are taken during transport to prevent road accidents.
- Where possible, construction traffic that may obstruct traffic flow on the surrounding roads should be scheduled for outside of peak traffic times.
- Where possible, heavy machinery should be parked within a secure demarcated area within the footprint of the site instead of moving the machinery to and from the site each day.

#### **9.1.16 Visual Impact Associated with Construction Activities**

- Consult with the ECO when determining the appropriate site for the site camp.
- The site camp must be kept neat and tidy and free of litter at all times.
- Waste must be managed according to the EMP and the mitigation measures listed above in terms of waste management. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy.
- Work on site must be well-planned and well-managed so that work proceeds quickly and efficiently, thus minimizing the disturbance time.
- The site camp, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible.
- The site camp may require visual screening via shade cloth or other suitable material.
- Special attention should be given to the screening of highly reflective material.
- Use of lighting (if required) should take into account surrounding residents and land users and should present little or no nuisance. Downward facing, spill-off type lighting is recommended.
- Construction vehicles must enter and leave the site during working hours.
- The appointed Environmental Control Officer (ECO) must undertake at least once site inspection per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.

## 9.2 Operation Phase

### 9.2.1 Botanical Impact - Invasion by exotic and alien species

- Draft an alien invasive monitoring, control and eradication plan
- Implement initial and follow-up alien invasive clearing and rehabilitate the area post clearing.
- An appropriate fire regime must be applied to all the remaining natural areas that require periodic fire for rejuvenation.

### 9.2.2 Botanical Impact - Disturbances to ecological processes

- No clearing outside of development and infrastructure footprints to take place.
- Open Space to be incorporated in final plan to include ecological corridors and riparian zones.

### 9.2.3 Freshwater Resources Impact – Loss and disturbance of aquatic vegetation & habitat

- Demarcations are to remain until construction and rehabilitation is complete.
- For bridge crossings, once the base is cast and the piers are constructed, the excavated riparian zone must be backfilled subsoil and topsoils in the proper order that they were excavated.
- All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated immediately to the satisfaction of the ECO. All disturbed areas must be prepared and then re-vegetated to the satisfaction of the ECO. Erosion control measures such as soil savers, eco-logs, sand bags and biodegradable silt fences must generally be installed prior to re-vegetation.
- It is recommended that a wetland rehabilitation plan be developed and implemented to conserve the freshwater habitat in the Klein Swart River. Ideally this plan would also extend to the wetland areas on the Kat River.
- Plant indigenous riparian vegetation along degraded unvegetated edges of watercourses, such as along the edge of the dam, to increase vegetation in the riparian zone and remove alien species.
- It is recommended that landscaping promote the use of indigenous species common to the region and that as much natural ground cover is established on the site to help with binding soils and encouraging water infiltration, thus reducing overland flows and the pressure on storm water management infrastructure.
- Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented.
- Engage with the community and Home Owners Association to explain the reasons why the buffer and the water resources are protected and what human activities are allowed. The landowners and community could be involved in the monitoring and rehabilitation.
- Promote the use of the open space area (whilst avoiding the freshwater habitat and riparian area) for recreational activities. Surrounding the dam buffer area, walkways, picnic benches, or cycling trails, are potential low impact land uses that are unlikely to impact upon the freshwater habitat. Promoting a sense of ownership from the residents of their open space area will benefit them as well as the environment.
- A section of the Kat River Nature Reserve along the dam falls within the recommended buffer area. Although the reserve is currently poorly managed or utilised, there is potential to expand its protection to the rest of the buffer area and open space of the proposed development area. Corridors such as this are ecologically beneficial.

### 9.2.4 Freshwater Resources Impact – Sedimentation and Erosion

- Stormwater infrastructure must be inspected at least once every year (before the onset of rains) to ensure that it is working efficiently.
- The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area.
- The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion.
- The mitigation of impacts must focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment.

- The stormwater flows must enter the wetland areas in a diffuse flow pattern without pollutants.
- Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area.

#### **9.2.5 Freshwater Resources Impact – Water Pollution**

- The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater.
- Key maintenance will include litter and sediment clearing and the servicing and maintenance of key collection points like catch pits, detention tanks etc. Such maintenance should be budgeted for.
- Appropriate waste water infrastructure must be designed to prevent any such water from entering the surrounding environment.
- 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.
- The pipeline should be regularly monitored and maintained to ensure that any problems with the pipeline are rectified before they can impact on any watercourses.
- The Department of Water regional office should be notified, as soon as possible, of any significant chemical spill or leakage to the environment where there is the potential to contaminate surface water or groundwater. Stop the existing effluent from entering into the river from the existing pump station.
- Better management of the system is required to prevent water pollution.
- Direct discharge of untreated effluent into the river is not permissible

#### **9.2.6 Freshwater Resources Impact – Flow Modification**

- Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented.

#### **9.2.7 Provision of formal Sports Facilities, Public Spaces and Enhanced access to the Dam**

- The proposed development represents an enhancement measure on its own. However, formalization of nature walks and the inclusion of environmental education facilities would further enhance the open spaces.
- Allowing local existing schools and adult sports teams access to the facilities would further enhance the provision of the formal sports fields and associated facilities.
- Formal access control and other boating facilities (such as sailing clubs) would further enhance the use of the dam by the public.

#### **9.2.7 Traffic & Safety Impact**

- Convert the Saasveld Road & Meyer Road intersection to a roundabout with one circulating lane.
- Development should be serviced by the George Integrated Public Transport Network.
- Sidewalks be provided along internal roads to encourage pedestrian accessibility and mobility.
- The necessary road markings, traffic signage, speed limits and early warning systems will need to be developed as per the requirements of the relevant roads-authority (and outcome of the traffic impact assessment yet to be undertaken) to ensure the safety of vehicular and pedestrian traffic during the operational phase of the development.

#### **9.2.3 Visual Impact – Change of Land Use and “Sense of Place”**

- The development must be designed so that buildings, structures, and other improvements do not extend above the existing ridgelines (high visual sensitivity) or alter the ridge profile significantly when viewed from the public streets, roads, water bodies or facilities where possible.
- Infrastructure should be designed to conform to the natural topography and hillside setting of the project site.

- Buildings and associated infrastructure located on the hillsides (moderate and low visual sensitivity) below ridgelines should follow the contours of the site and blend with the existing terrain to reduce bulk and mass.
- Infrastructure should be positioned to allow adequate space for tree planting and other vegetation screening interventions.
- Roof forms and rooflines should be broken into smaller building components to reflect the irregular forms of surrounding natural features. The slope of roofs should be oriented in the same direction as the natural slope.
- A Landscaping Plan and an Architectural Plan should be compiled and included in the EMPR, post EA, before the development is constructed.

The following general mitigation measures will be implemented to reduce the identified visual impacts:

- Infrastructure should be visually unobtrusive.
- Materials and colours used for the development should blend into the surrounding landscape.
- Infrastructure should be grouped in clusters with open spaces between clusters.
- Infrastructure should not interfere with the skyline (ridgelines), landmarks, major views and vistas.
- The development should not increase light or noise pollution.
- The development should correspond to the historical, architectural and landscape style of surrounding layout and buildings.

#### Lighting

- External lights will increase the visual impact of the project at night therefore attention must be given to their selection for the specific function.
- All lighting therefore must be carefully considered with regard to the extent of illumination, the intensity and color of lights and the luminaire.
- Light fittings must have shields to eliminate sight of the light source;
- Down lighting of areas is preferred to up lighting;
- Any perimeter lights are to be directed downwards and inwards to the development;
- Emitted light color will be a softer light than sodium (yellow) or mercury halide (blue-white), where possible.
- The use of flood lights to illuminate structures, large areas or features should be limited. Rather incorporate concealed lights to shine downwards. Darker areas on the building elevations will provide a less visually noticeable structure.
- No light fittings will spill light upwards or be directed upwards from a distance towards the area or building to be illuminated.
- Security lights will not flood the area with light continuously but should be activated by a motion sensor, where possible.
- It is now accepted practice that lighting of new projects should be subdued in terms of light emissions and energy efficient.