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DRAFT PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT (POSEIA)

Proposed Greenvalley Mixed-Use Development on Portion 28, 31 & 32 of the Farm Wittedrift No. 306, & Associated Bulk Infrastructure, Plettenberg Bay

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)

APPLICANT:	Bitou Local Municipality Contact: Melony Anne Paulsen (Director Community Services)
ENVIRONMENTAL CONSULTANT:	Sharples Environmental Services cc Primary Author of Draft Scoping Report: Betsy Ditcham
DEA & DP PROJECT REFERENCE:	Pre-Application: 16/3/3/6/1/D1/7/0076/21
SES REFERENCE NUMBER:	10/POS/GREENVALLEY/01/2023
DATE:	January 2023

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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 to be undertaken.

This **ANNEXURE** must be read alongside the Draft Scoping Report compiled for the proposed Greenvalley Mixed Use Development, Bitou.

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 currently available for a 30-day Public Participation Period. Once all comments and issues have been received (during the current 30 days public consultation phase on the Post-App Draft Scoping Report), the "Plan of Study for the EIA Phase", as outlined in this Report, may therefore need to be revised before submitted for approval, in order to respond to issues identified by the public and / or Authorities.

2. Objectives of the Environmental Impact Assessment Process

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

- 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, 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 will 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 to be Assessed

3.1 Design / Layout Alternatives

Almost all sites adjacent to Plettenberg Bay and the existing rural settlements, infrastructure, transport services etc are proposed to be infilled by subsidized housing given the phenomenal rate of population increase in Bitou and dire need to meet the housing demand. **No site alternatives** have therefore been identified and comparatively assessed.

However, there have been variations in the proposed layout design of the mixed-use development within the proposed site boundaries. It is also expected that the EIA Process will result in further variations of the layout because one of the main objectives of an EIA process is to inform the design of the development based on Public & Authority comments and results of Specialist Studies, to aim to achieve a sustainable development in terms of social, economic and environmental impacts. At this Scoping stage, **only one layout alternative is proposed**.

3.2 Pipeline Route Alternatives

No feasible pipeline route alternatives have been identified for the routes of the bulk water and sewer pipeline infrastructure yet. The routes have been preliminary designed to be the shortest routes possible, to avoid pump station infrastructure as far as practically possible, to be aligned within the road reserves as far as practically possible, to follow the contours, to allow for as much developable land as possible (to be designed along property borders) and to be interconnected with the existing infrastructure.

3.3 Access Road Alternatives

There are two proposed access roads to the development.

- Access Road 1: High Street is extended and connects with a local street in the Green Valley Development
- Access Road 2: This street will connect to Pine Street via a proposed street extending from the north western side of the development.

No other feasible access road alternatives have been identified.

3.4 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 housing to the community.

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 assessed as part of the EIA Process

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, Freshwater and Socio-Economic 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:

- **Botanical Impact** - **Permanent Loss of Fynbos / Forest:** The total area of good quality fynbos that will be disturbed amounts to ±15 ha, while 1.4 ha of Afrotemperate forest and 3 ha of riverine fringe forest/thicket will be disturbed. In the case of the development (residential) footprint, the loss of fynbos will be permanent.
- **Botanical Impact** – **Loss of Species of Concern & Protected Trees:** Potential loss of identified SCC and Protected Tree Species along the pipeline routes.
- **Botanical Impact** – **Vegetation Type and Habitat:** The impact during the construction of the sewer and water supply pipelines involves the removal of vegetation in a ±15 m wide strip, followed by trenching for the laying of the pipe, backfilling and finally rehabilitation of the disturbed surface. In instances where the pipelines will follow existing roads or farm tracks, the footprint width should be less. In all likelihood, the species which originally occurred along the pipeline routes will return, including aliens that may be present in the area. The species composition and structure of the good quality fynbos areas will be altered in the short to medium term and may return to its original form in the long term, if invasive aliens are controlled.
- **Botanical Impact** – **CBA's and ESA's:** the proposed development site is located mainly inside a mapped ESA. The associated access roads, sewage and water supply pipelines, on the other hand, are located inside a mixture of CBA's, ESA's and transformed areas. While the impact of the development footprint itself will be permanent, the impact of the service pipelines on ecological linkages, such as watercourses, CBA's and ESA's, is of a lesser concern since the pipeline routes follow a linear route underground.
- **Freshwater Resources Impact – Disturbance / loss of aquatic vegetation and habitat:** The disturbance or loss of aquatic vegetation and habitat refers to the direct physical destruction or disturbance of aquatic habitat caused by vegetation clearing, disturbance of riparian habitat, encroachment and colonisation of habitat by invasive alien plants. Indigenous aquatic vegetation within the stream catchments, and possibly within the riparian zone, will be removed and disturbed due to construction activities such as excavations and infilling, as well as machinery and workers on site. This will be a direct and immediate impact resulting in short to medium term vegetation loss. Alien invasive species may be introduced and encroach into disturbed areas. Alien invasive plant encroachment into disturbed areas can outcompete indigenous vegetation and reduce aquatic biodiversity (Bekker; 2017).
- **Freshwater Resources Impact – Erosion of the banks and sedimentation of the watercourses:** Sedimentation and erosion refers to the alteration in the physical characteristics of rivers as a result of increased turbidity and sediment deposition, caused by soil erosion and earthworks that are associated with construction activities, as well as instability and collapse of unstable soils during project operation. These impacts can result in the deterioration of aquatic ecosystem integrity and a reduction/loss of habitat for aquatic dependent flora & fauna. Vegetation clearing and exposure of bare soils within and upslope of the stream habitats 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. 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. Soil compaction resulting in reduced infiltration and increased surface runoff together with the artificial creation of preferential flow paths due to construction activities, will result in increased quantities of flow entering the systems (Bekker, 2017).
- **Freshwater Impact – Water pollution:** Water and/or soil pollution cause negative changes in the physical, chemical and biological characteristics of water resources (i.e. water quality). This can result in possible deterioration in aquatic

ecosystem integrity and a reduction in, or loss of, species of conservation concern (i.e. rare, threatened/endangered species). 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. These alternations impact the species composition of the systems, especially species sensitive to minor changes in these parameters. Sudden drastic changes in water quality can also have chronic effects on aquatic biota in general and result in localised extinctions. Hydrocarbons including petrol/diesel and oils/grease/lubricants associated with construction activities (machinery, maintenance, storage, handling) may potentially enter the system by means of surface runoff or through dumping by construction workers. Raw cement entering the systems through incorrect batching procedure and/or direct disposal. The incorrect positioning and maintenance of the portable chemical toilets and use of the surrounding environment as ablution facilities may result in sewage and chemicals entering the systems (Bekker, 2017).

- **Freshwater Impact – Flow Modification:** The changes in the quantity, timing and distribution of water inputs and flows within the watercourse. Possible ecological consequences associated with this impact may include: deterioration in freshwater ecosystem integrity, reduction/loss of habitat for aquatic dependent flora & fauna, and a reduction in the supply of ecosystem goods & services. Land clearing and earth works upslope of the rivers 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 (Bekker, 2017).
- **Archaeological & Paleontological Impact –** It is proposed to clear approximately 20ha of mostly undisturbed area for the construction of the mixed use development and a further 17ha for the bulk services. Archaeological material or fossils could be damaged or destroyed.
- **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.
- **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.
- **Socio-Economic Impact (positive impact) – Creation of business and employment opportunities:** Barbour (2017) explains in the Socio-Economic Impact Assessment that the estimated capital expenditure costs for the development are expected to be region of R 800 million – 1 billion (2016 rand value). The proposed development will therefore represent a positive benefit for the local construction and building sector in the EDM and BLM. The majority of the building materials associated with the construction phase will be sourced from locally based suppliers from the EDM and BLM. This will represent a positive injection of capital into the areas local economy. The project should also be viewed within the context of the slump in the construction and building sector in the wake of the 2008 global financial crisis. Since 2008 there have been a limited number of large scale residential and mixed use developments in the EDM and BLM. The proposed development would therefore represent a significant opportunity for the local construction and building sector. For the purposes of the assessment it is assumed that ~ 600 employment opportunities will be created per annum during the construction phase for the residential component of the development. Based on information from similar employment numbers the total annual wage bill is estimated to be in the region of R 100 million. Of this total the annual wage bill for semi-skilled and skilled workers will be in the region of R 60 million and R 40 million respectively. The total wage bill over 5 years will therefore be in the region of R 500 million. A significant portion of the annual and total wage bill will be spent in the local EDM and BLM. This would in turn benefit local business (Barbour, 2017).

- **Socio-Economic Impact - Presence of construction workers and potential impacts on family structures and social networks.** Presence of construction workers may lead to potential impacts on family structures and social networks. Risk to local communities as a result of construction workers in the area has been identified.
- **Socio-Economic Impact - Threat to safety and security.** With approximately 600 construction phase staff per year in the area, this could pose a risk to nearby residents in terms of their safety and security.

4.1.2 Operation Phase

- **Botanical Impact - Establishment of alien vegetation** as a result of land disturbance. Of particular concern is the establishment of alien vegetation in the area disturbed for the route of the bulk services infrastructure.
- **Freshwater Resources Impact - Disturbance / loss of aquatic vegetation and habitat:** The disturbance or loss of aquatic vegetation and habitat refers to the direct physical destruction or disturbance of aquatic habitat caused by vegetation clearing, disturbance of riparian habitat, encroachment and colonisation of habitat by invasive alien plants. The project will introduce unnatural disturbance to aquatic ecosystems, promoting the establishment of disturbance-tolerant species, including colonization by invasive alien species, weeds and pioneer plants. Although this impact is initiated during the construction phase it is likely to persist into the operational phase. Residents of the proposed development may harvest wood from the riparian habitat for firewood or create footpaths through riparian habitat. The stormwater infrastructure of the housing and associated road network will increase and concentrate flows into the systems. This may lead to erosion in the systems (Bekker, 2017). Waste management practises and littering during the operation phase could lead to waste, raw materials or chemicals causing contamination and / or pollution of the natural wetlands and watercourse on site, leading to further downstream impacts.
- **Freshwater Resources Impact - Erosion of the banks and sedimentation of the watercourses:** Sedimentation and erosion refers to the alteration in the physical characteristics of rivers as a result of increased turbidity and sediment deposition, caused by soil erosion and earthworks that are associated with construction activities, as well as instability and collapse of unstable soils during project operation. These impacts can result in the deterioration of aquatic ecosystem integrity and a reduction/loss of habitat for aquatic dependent flora & fauna. 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 on adjacent/downstream water resources in the study area. The increase in hardened surface by the development will be considerable and, if not mitigated against, will result in erosion in the systems. Surface runoff and velocities will be increased and flows may be concentrated by stormwater infrastructure. (Bekker, 2017).
- **Freshwater Resources Impact - Water Pollution:** Water and/or soil pollution cause negative changes in the physical, chemical and biological characteristics of water resources (i.e. water quality). This can result in possible deterioration in aquatic ecosystem integrity and a reduction in, or loss of, species of conservation concern (i.e. rare, threatened/endangered species). The increase in vehicles on the property due to the development increases the potential for pollutants to enter the systems. During maintenance of the development there could be water pollution impacts similar to those encountered in the construction phase. It is assumed that all waste water will be disposed of via existing infrastructure and will not be treated on the property. However, should any onsite waste water treatment infrastructure fail, and result in raw sewerage entering any watercourses, it may impact the water quality of the systems. In the operational phase there is potential for water pollution to occur during maintenance activities (Bekker, 2017). The nature of this type of development (low cost housing) is expected to result in litter and waste entering the nearby watercourses that border the site. Storm water from the site will be discharged into the watercourses that will most likely consist of litter and other waste. Polluted (nutrients and litter) discharged stormwater is expected to have a detrimental impact on the water quality of the downstream receiving aquatic ecosystems, if not mitigated effectively with stormwater management and litter management infrastructure and regular servicing and maintenance of the systems.
- **Freshwater Resources Impact - Flow Modification:** The changes in the quantity, timing and distribution of water inputs and flows within the watercourse. Possible ecological consequences associated with this impact may include: deterioration in freshwater ecosystem integrity, reduction/loss of habitat for aquatic dependent flora & fauna, and a reduction in the supply of ecosystem goods & services. 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 receiving concentrated flows off of these areas. According to the SANRAL (2006), urbanisation typically increases the runoff rate by 20 -50%, compared with natural conditions. Increased volumes and velocities of storm water draining from the development and discharging into down-slope rivers can alter the natural ecology the systems, increasing the risk of erosion and channel incision/scouring (Bekker, 2017).

- **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 an undeveloped site of natural vegetation where some agricultural activities dominate adjacent to an existing urban environment to a built up mixed use development of almost 20ha in size. The proposed development could impact on the "sense of place" of the area to sensitive receptors that can see the mixed use development when before they were not impacted upon by the existing adjacent urban development.
- **Traffic & safety impact:** An increase in traffic is expected to occur in the area as a result of more than 730 erven and various social amenities proposed. Vehicles may impact on the existing road network and road safety conditions due to an increase in vehicles entering and exiting the site.
- **Positive Socio-Economic Impact - Provision of low and middle income housing:** Barbour (2017) explains that the proposed development will assist to address the housing backlog in the area by providing 730 houses, specifically the housing needs of the low and middle income households. This will represent a significant social benefit for the households in the local municipality that currently live in informal areas.
- **Positive Socio-Economic Impact - Provision of schools and public spaces:** The proposed development makes provision for the establishment of an early childhood development centre and public open spaces. These components will contribute to an improved quality of life for many local residents in the local municipality who currently live in informal areas that are not well serviced and lack public facilities, such as parks and open spaces.
- **Positive Socio-Economic Impact - Employment and business:** Barbour (2017) explains that the business and retail components will create employment opportunities for local residents. The residential component may also create some opportunities for domestic workers and gardeners etc. However due to the low income levels these opportunities are likely to be limited. The development will also create increased demand for municipal services, such as waste, maintenance etc, which will require additional municipal posts to be created. 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 increased number of households will also create opportunities for the taxi sector. 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.
- **Positive 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 (Barbour, 2016).

4.2 Aspects assessed by Specialists during the Scoping Phase

The following **Specialist Impact Assessments** and **external engineering consultant** input has already been undertaken, prior to the application being submitted with the DEA & DP, 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 required impact identification, significance ranking and mitigation measures required to be included in the Report**:

- A **Civil Engineering & Services Assessment** was undertaken by Nadeson Engineers, dated June 2017. This Assessment includes the proposed design of the **Conceptual Storm Water Management**.
- An **Electrical Assessment** was undertaken to determine the capacity of the existing electrical services and requirements to support the development proposal.
- A **Town Planning Report** was produced by WMDe Kock Associates, dated February 2021.
- A **Botanical Assessment** was undertaken by Mark Berry Environmental Consultants, dated September 2016). An additional Assessment of the proposed pipeline route was undertaken in December 2020.

- A **Freshwater Impact Assessment** was undertaken by Debbie Bekker from Sharples Environmental Services cc.
- A **Scoping Phase Socio-Economic Impact Assessment** was undertaken by Tony Barbour Environmental Consulting and Research in October 2017.
- A **Traffic Impact Assessment** was undertaken by ITS, dated August 2019.

The assessments listed above have therefore informed the findings in the Pre-Application Draft Scoping Report and associated proposed layout plan that is currently available for the first round of Public Participation. **All Assessments were conducted prior to the promulgation of the GN No. 320; i.e. prior to 20 March 2020,which came into effect on 09 May 2020.**

4.3 Aspects Proposed to be assessed by Specialists during the EIA Phase

Based on the findings of the Scoping Phase, it is still proposed to undertake the following detailed Specialist Impact Assessment Studies during the EIA Phase:

- Urban Design / Architectural Design and Landscaping Plan;
- A Detailed EIA Phase Visual Impact Assessment;
- A Detailed EIA Phase Traffic Impact Assessment;
- A Detailed EIA Phase Socio-Economic Impact Assessment;
- A Detailed EIA Phase Freshwater Impact Assessment, inclusive of the freshwater impact associated with the proposed bulk sewer and water infrastructure routes.
- A Detailed EIA Phase Botanical Impact Assessment inclusive of the freshwater impact associated with the proposed bulk sewer and water infrastructure routes.
- Agricultural Compliance Statement;
- Avian Impact Assessment;
- Invertebrate, Mammal, Reptile and Amphibian Compliance Statements;
- In addition, an **Integrated Heritage Impact Assessment** may be requested by Heritage Western Cape given the undisturbed nature and scenic value of the site providing a significant “sense of place” in the area.

5. Methodology for Assessing the Environmental Aspects

5.1 Methodology for Visual Impact Assessment

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 basic components comprising an accepted methodology for visual studies are given in the table below:

Table 3: Typical Components of Visual Studies

Box 7: Typical Components of Visual Studies

- Identification of landscape types, landscape character and sense of place, generally based on geology, landforms, vegetation cover and land use patterns;
- Identification of viewsheds, and view catchment areas, generally based on topography;
- Identification of important view points and view corridors within the affected environment, including sensitive receptors;
- Indication of distance radii from the proposed project to the various view points and receptors;
- Determination of the visual absorption capacity (VAC) of the landscape, usually based on vegetation cover or urban fabric in the area;
- Determination of the relative visibility, or visual intrusion, of the proposed project.
- Determination of the relative compatibility or conflict of the project with the surroundings;
- A comparison of the existing situation with the probable effect of the proposed project, through visual simulation, generally using photo-montages.

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

5.2 Methodology for Traffic & Safety Impact Assessment

The purpose of this assessment is to investigate the expected traffic & safety impacts from the development and to recommend suitable measures to mitigate the traffic and safety impact. It is also required to identify all possible access alternatives and investigate the traffic impacts associated with each access alternative. Traffic impacts include impacts to the existing road network and safety impacts associated with pedestrians on the road.

The following scope of work is required:

- Investigate and report on the existing access and suitability of the development gaining access from the proposed accesses (there are two proposed access points).
- Identify and suggest site access alternatives for both sites, if any.
- Assess the traffic impacts associated with all site access alternatives.

- Determine the traffic impacts associated with proposed site layout and proposed site access.
- Determine the trip generation and distribution of traffic to and from the proposed development expected for an activity of this nature.
- Provide conceptual geometric layouts for the proposed access arrangement (existing and suggested alternatives).
- Determine what traffic impacts could result from the development and propose suitable road upgrades that would be needed to ensure that traffic is accommodated suitably.
- Provide mitigation measures that will reduce traffic impacts associated with the development and the use of the existing/suggested alternative site access points.
- The contents of the Traffic Impact Assessment must meet the requirements of the required content as listed in Appendix 6 of the 2014 EIA Regulations.

5.3 Methodology for Additional Freshwater Impact Assessment Input

The required scope of work is the following:

- Desktop delineation of all watercourses within a 500m radius of the proposed development utilising available aerial photography, contour data and water resource date;
- 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 (DWAF, 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 (PES0 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;
    - DWAF (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.

5.4 Methodology for Botanical Impact Assessment Input

The following methodology, in addition to the requirements in the Protocols, should be used for the Biodiversity Impact Assessment:

- To determine if vegetation or fauna 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 or faunal 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 Ecological Impact Assessment must meet the requirements of the required content as listed in Appendix 6 of the 2014 EIA Regulations, as amended, as well as the promulgated Protocols.

5.5 Methodology for Socio-Economic Impact Assessment

The Detailed Socio-Economic Impact Assessment Report will predict, analyse and assess the socio-economic impact of the proposed development and recommend mitigation measures to avoid or mitigate socio-economic impacts. The following Scope of Works / methodology will be applied:

The proposed approach to the assessment will be informed by the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994). The approach will also be informed by IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will focus on:

- The construction phase;
- The operational phase.

The activities will include:

- Review of existing project information;
- Review of baseline socio-economic data (Census 2011) and relevant planning and policy documents for the area, including Integrated Development Plan, Spatial Development Plan and Local Economic Development Plan;
- Comment on layout plans prepared by town planner to identify potential ways of maximising opportunities and avoiding potential negative impacts. These comments could be linked to type and location of community facilities etc. The objective of providing comment at an early stage is to identify potential opportunities and risks at an early stage in the planning and design process;
- Preparation of socio-economic baseline report. The report will summarise the key socio-economic conditions in the study area that the relevance of these conditions to the proposed development. The report will summarise the key policy and planning documents pertaining to the study area and the proposed development and comment on the proposed developments compatibility with these key land use policies and plans;
- Identification of the components associated with the construction phase of the proposed development, including estimate of timing of construction phase, 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, and assessment procurement policies etc.;
- Site visit and semi-structured interviews with selected key affected parties, including the client, local councilors, business, local resident organisations and community representatives, key local government officials, local community representatives, adjacent landowners etc.;
- Identification and description of the adjacent land uses and potentially sensitive social receptors;
- Identification and assessment of key social and socio-economic issues;
- Assessment of potential impacts (positive and negative) associated with the construction and operational phase;
- Identification of potential mitigation and enhancement measures;
- Preparation of Draft Report for comment;
- Incorporate comments on Draft Report and prepare Final Report.

Comments on the interview process

The interview process is a fundamental component of the SIA process. The experience with previous SIA's is that the interview process (identifying interviewees, setting up meetings, confirming interviews, and undertaking interviews) can be a time consuming process that is not always fully understood and or appreciated by the client.

Identifying and contacting interested and affected parties to set up interviews

In this regard the first stage of the interview process is identifying the key stakeholders to be interviewed as part of the SIA. The public participation database provides a starting point for this process. However, the SIA also seeks to identify people who may not have been able to attend public meetings and or register as Interested and Affected Parties (IAPs). The process of identifying and contacting people to set up interviews can be a time consuming process and in many instances dates and times have to be changed on a regular basis to accommodate the needs of the IAPs.

Time allocated to interviews

Experience with previous interviews has shown that a minimum of 45 – 60 minutes should be allocated to each interview. This provides the interviewer with the opportunity to introduce himself or herself to the interviewee and outline the proposed development, before focusing on the interview itself. Based on this timeframe the maximum number of interviews that can be conducted in a day is in the region of 5-6, bearing in mind that time must be allocated for traveling between interviews. In rural areas the distances can be significant and as such the number of interviews that can be undertaken in a day is less than 5. The process of setting up, confirming and undertaking interviews is therefore a time consuming exercise.

5.6 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 7th 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.

Alternatively, should a Protocol be applicable to the study, the requirements contained therein and the Guideline Document should be complied with.

In addition to the above, specialists are expected to:

- Review the Pre-Application Scoping Report to familiarize with all relevant issues or concerns relevant to their field of expertise;
- In addition to the impacts listed in this 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 this 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 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):

Site Specific	The impact is limited to the development site (development footprint) or part thereof.
Local	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.
Regional	The impact would affect the broader region (e.g. neighbouring towns) beyond the boundaries of the adjacent properties.
National	The impact would affect the whole country (if applicable).

Determination of Duration:

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

Long term	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.
Permanent	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:

Improbable	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
Probable	There is a possibility that the impact will occur to the extent that provisions must therefore be made.
Highly probable	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.
Definite	The impact will take place regardless of any prevention plans.

Determination of Significance (without mitigation):

No significance	The impact is not substantial and does not require any mitigation action.
Low	The impact is of little importance, but may require limited mitigation.
Medium	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.
Medium-High	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.
High	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.
Very High	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):

No significance	The impact will be mitigated to the point where it is regarded to be insubstantial.
Low	The impact will be mitigated to the point where it is of limited importance.
Medium	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.
High	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:

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

Determination of Degree to which an Impact can be Mitigated:

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

Determination of Loss of Resources:

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

Determination of Cumulative Impact:

Negligible	The impact would result in negligible to no cumulative effects
Low	The impact would result in insignificant cumulative effects
Medium	The impact would result in minor cumulative effects
High	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 Scoping Report and the Final EIA Report contain 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 Scoping Report and Environmental Impact Assessment Report when they are 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 is still to be compiled which 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 a 30-day PP period on the Pre-Application Draft Scoping Report and another 30 day PP period on the Post-Application Draft Scoping Report.

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.
- Co-ordination of various specialists input to produce revised sensitivity maps and site layouts for inclusion in the EIA Report.
- Compile EIA Report;
- Compile Environmental Management Programme;
- 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;
- Written Notification letters to I & AP's, where required;
- 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

- Chosen site should aim to minimise fragmentation of the existing agricultural area.

9.1.2 Botanical Impact - Permanent Loss of Indigenous Vegetation

- Arrange for a walkdown of the proposed routes by a botanist during its staking to mark protected tree species for protection.
- A search and rescue of selected plant species, such as bulbs and succulents, is recommended if done at an appropriate time of the year, i.e. around July-August just before the main flowering season. Search and rescued species should be transplanted in suitable rehabilitation areas nearby in a similar vegetation type from which it originates.
- If *Euphorbia procumbens* is found in a construction area it should be collected and transplanted in a suitable receiving area away from the development, such as a nearby nature reserve.

9.1.3 Botanical Impact – Modification of Vegetation Type and Habitat

- Pull the development back from the forest edge on the eastern side of site.
- Utilise all the fallow areas outside the development footprint in favour of the good quality fynbos inside the footprint.
- With regards to the access roads, shorter route options to the village below will certainly lessen the impact and should be investigated.
- Remove and protect topsoil from fynbos areas to be disturbed, especially along the sewer and water supply pipeline routes. It can be used for rehabilitation of the disturbed area after construction work has been completed.
- Demarcate/fence off the construction area.
- Search and rescue of suitable plant species, such as succulents and bulbs.
- Utilise farm tracks, fallow land and disturbed/degraded areas optimally in the positioning of infrastructure to minimise the impact on fynbos and Afrotemperate forest.
- Remove and protect topsoil from fynbos/forest areas to be disturbed. It can be used for rehabilitation of the disturbed area after construction work has been completed.
- Demarcate/fence off the construction corridors through fynbos and Afrotemperate forest area.

9.1.4 Botanical Impact – CBA's and ESA's

- With regards to the access roads, shorter route options to the village below will certainly lessen the impact and should be investigated.
- Remove and protect topsoil from fynbos areas to be disturbed, especially along the sewer and water supply pipeline routes. It can be used for rehabilitation of the disturbed area after construction work has been completed.
- Demarcate/fence off the construction area.
- Search and rescue of suitable plant species, such as succulents and bulbs.
- Rehabilitation of pipeline routes and alien control in the long term..

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/ bidem 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 are 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/m2/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.
- A Complaints Register must be available at the site office for inspection by the ECO of dust complaints that may have been received

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.
- 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 EMPr 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 report, reporting on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.

9.1.7 Freshwater Resources Impact – Loss of Aquatic Habitat and Associated Biota

- A buffer area from the boundary of the riparian habitat must be adopted and demarcated. A minimum buffer of 15m is required between any proposed activities and the more degraded, western tributaries. For the eastern, near pristine watercourses, a 30m aquatic buffer zone is required from the boundary of the riparian zone to any proposed activities.
- The ECO must advise on the most appropriate demarcation fencing and signage required to be erected prior to the construction phase to protect the NO-GO buffer areas.
- Any development activities that need to take place within the aquatic habitat and their recommended buffers will be kept to a minimum and rehabilitated immediately afterwards.
- Monitoring implementation and management of the final buffer areas should be undertaken throughout the duration of construction activities to ensure that the effectiveness of the final buffer zone areas is maintained.
- The appointed Environmental Control Officer (ECO) must undertake at least once site inspection per fortnight, 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 EMPr.

9.1.8 Freshwater Resources Impact – Erosion & Sedimentation

- The mitigation of impacts should focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment. Therefore, the stormwater infrastructure must not be positioned where concentrated flows will enter these systems without efficient energy dissipaters (such as baffle structures like gabion mattresses). Additionally, these stormwater flows must enter the buffer area in a diffuse flow pattern.
- On the steeper sections of the housing and road networks, and on slopes where stormwater will drain into a water resource, it is recommended that the frequency of stormwater outlets is increased to prevent erosion at discharge points.
- Cleared areas and any other area susceptible to erosion should be provided with a suitable cover and stabilised as soon as possible via the implementation of appropriate erosion control measures, as described in the EMP. This may include use of cut-off drains, temporary/permanent drainage channels, brush-packing, mulching, planting or sodding, use of environmentally benign soil binders, use of geo-textile or other coverings. The appropriate measures should be selected by the contractor in consultation with the Engineer & ECO.
- Designated areas for stockpiling of raw materials must be identified before material is brought onto site. No stockpiling is to occur on or near slopes or water resources. All stockpiling areas must be approved by the ECO before stockpiling occurs.
- Soil surfaces must not be left open for lengthy periods to prevent erosion.
- Eroded areas will be planted with suitable indigenous vegetation.
- The appointed Environmental Control Officer (ECO) must undertake at least once site inspection per fortnight, 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 EMPr.

9.1.9 Freshwater Resources Impact – Flow Modification

- The mitigation of impacts should focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment. Therefore, the stormwater infrastructure must not be positioned where concentrated flows will enter these systems without efficient energy dissipaters (such as baffle structures like gabion mattresses). Additionally, these stormwater flows must enter the buffer area in a diffuse flow pattern.
- On the steeper sections of the housing and road networks, and on slopes where stormwater will drain into a water resource, it is recommended that the frequency of stormwater outlets is increased to prevent erosion at discharge points.

9.1.10 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.

9.1.11 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 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.

9.1.12 Socio-Economic - Threat to Safety & Security

The developer and or contractors cannot be held responsible for the off-site, after-hours behaviour of all construction employees. However, the contractors appointed by the developer and individual homeowners will ensure that all workers employed on the project are informed at the outset of the construction phase that any construction workers found guilty of theft will be dismissed and charged. All dismissals will be in accordance with South African labour legislation. In addition, the following mitigation measures are recommended. These recommendations apply to the construction of the bulk infrastructure on the site and the establishment of housing by individual homeowners:

- No construction workers, with the exception of security personnel, will be allowed to stay on site overnight;
- Construction related activities will comply with all relevant building regulations. In this regard activities on site will be restricted to between 07h00 and 18h00 during weekdays and 08h00 and 13h00 on Saturdays. No work will be permitted after 13h00 on Saturdays and on Sundays.

9.1.13 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.
- 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.
- Adequate signage, that is both informative and cautionary to passing traffic (motorists and pedestrians), warning them of the construction activities must be suitably located in the area where the construction is occurring and must be easily visible by all road users.
- Signage needs to be clearly visible and needs to include, among others, the following:
    - Identifying working area as a construction site;
    - Cautioning against relevant construction activities;
    - Prohibiting access to construction site;
    - Clearly specifying possible detour routes and/or delay periods;
    - Possible indications of time frames attached to the construction activities, and;
    - Listings of which contractors and engineers are working on the site.
- If needed, appropriate traffic management measures and/ or points men (traffic marshals) should be utilized to assist vehicles entering/ exiting the site, particularly where vehicles must cross the path of oncoming traffic.
- 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.

9.1.14 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 EMPr 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

- The alien invasive plants within the stream corridors on the site should be removed during the construction phase. These areas will need to be monitored and managed to ensure that they remain clear of alien invasive plants and that alien invasive plants do not spread downstream.
- There is a good chance that indigenous species will re-colonise the disturbed areas, such as the sewer pipeline route, if the aliens are controlled. Regular follow-up clearing of aliens is required in order to achieve rehabilitation successfully. It is assumed that the responsibility of alien clearing will rest with the local authority. If not, an alien clearing contractor will be employed to conduct alien clearing.
- An Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here, and will be on site regularly.
- The presence of dense stand of woody aliens on the adjacent properties poses a fire risk to the future residents and requires the need for firebreaks of a suitable width between the development and the alien infested properties. It is a legal requirement for the adjacent landowners to clear the vegetation on their land, and the local authority must ensure that this is implemented prior to occupation.

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

- A buffer area from the boundary of the riparian habitat must be adopted and demarcated. A minimum buffer of 15m is required between any proposed activities and the more degraded, western tributaries. For the eastern, near pristine watercourses, a 30m aquatic buffer zone is required from the boundary of the riparian zone to any proposed activities.
- Mitigation measures must include a focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment. The stormwater management plan must attempt to include porous pavements, grassed swales, and infiltration trenches and basins within the property (as per The South African Guideline for Sustainable Drainage Systems by Armitage et al. 2013).
- The permanent storm water management plan must be properly monitored and maintained throughout the operational phase. Blockages in the system must be cleared timeously.
- Appropriate waste water infrastructure (grates or litter traps) must be installed to prevent polluted water from entering the surrounding environment.
- The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater.
- Residents should be educated regarding the effects of pollution on the environment and the responsible methods for the disposal of waste.
- Maintenance of the buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any infrastructure or agricultural activities must be prevented and litter removed.
- Any development activities that need to take place within the aquatic habitat and their recommended buffers will be kept to a minimum and rehabilitated immediately afterwards.

- The invasive alien plants within the stream corridors within and downstream of the site will be removed. These areas will need to be monitored and managed to ensure that they remain clear of alien invasive plants and do not spread down the stream corridor.

9.2.3 Freshwater Resources Impact – Water Pollution

- Mitigation measures must include a focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment. The stormwater management plan must attempt to include porous pavements, grassed swales, and infiltration trenches and basins within the property (as per The South African Guideline for Sustainable Drainage Systems by Armitage et al. 2013).
- The permanent storm water management plan must be properly monitored and maintained throughout the operational phase. Blockages in the system must be cleared timeously.
- The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater.
- Residents should be educated regarding the effects of pollution on the environment and the responsible methods for the disposal of waste.
- Appropriate waste water infrastructure (grates or litter traps) must be installed to prevent polluted water from entering the surrounding environment.
- Maintenance of the buffer area must be implemented during the operation phase for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any infrastructure or agricultural activities must be prevented and litter removed.
- Stormwater exit points must include a best management practice approach to trap any additional suspended solids and pollutants originating from the proposed development.
- The local authority should make an effort to prevent illegal dumping in this area by providing suitable waste disposal facilities where waste can be recycled and disposed of in a controlled manner.
- Regular inspections of the buffer areas and watercourses downstream of the site during the operational phase should be undertaken to ensure that functions are not undermined by inappropriate activities. The community could be involved in the monitoring and clean-up of these systems. Annual Auditing is therefore required during the operational phase.

9.2.4 Freshwater Resources Impact – Flow Modification

- The stormwater management infrastructure must be designed to ensure the run-off from the development is not highly concentrated before entering the watercourses. The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion.
- It is proposed to install headwalls with flow energy dissipaters at all storm water pipe outlets (design has been provided in the EMPR). Additionally gabion structures are proposed to be incorporated into the headwall structures to aid in the catching of solid waste.
- A detailed Storm Water Management Plan will be designed during the pre-construction and design phase, based on the principles of the Conceptual SWMP.
- Public Open Spaces will also be utilised for storm water infiltration in the final detailed Storm water Management Plan design.
- The area will need to be monitored to ensure that erosion of the streams downstream of the site does not become eroded, especially at the proposed storm water discharge points. If erosion and scouring is noted then erosion rehabilitation measures must be installed as follows:
- The scale and nature of the erosion and storm water control measures implemented on site should be appropriate to the conditions on site, and sufficient to achieve the desired outcomes (soil preservation, prevention of flooding, storm water control) to the satisfaction of the ECO and consulting engineer.
    - Small-scale control measures: This may include the use of shade netting, geo-fabric or similar barriers in areas susceptible to erosion and along exposed slopes. The netting/fabric is placed directly across the path of flow of storm water. Poles and logs, staked in along the contours of a slope susceptible to erosion may also be used.
- Medium-scale control measures: This may entail the establishment of small berms and benches cut into affected slopes, as well as the placement of poles and logs along the contours of the slope. Berms can be created to divert storm water run-off into surrounding vegetated areas.

9.2.5 Traffic & Safety Impact

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.

9.2.6 Visual Impact – Change of Land Use and "Sense of Place"

- Infrastructure should be designed to conform to the natural topography of the project site.
- Infrastructure should be positioned to allow adequate space for tree planting and other vegetation screening interventions.
- 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 should 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.
- The development should not increase light or noise pollution.

<u>Lighting</u>

- 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.