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PRE-CONSTRUCTION, CONSTRUCTION AND POST-CONSTRUCTION PHASE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR THE

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

APPLICANT:	George Municipality Contact: Ms D Power
ENVIRONMENTAL CONSULTANT:	Sharples Environmental Services cc Primary Author: Lloyd Barnes Reviewed by: Betsy Ditcham (EAPASA: 1480)
DEA & DP PROJECT REFERENCE:	16/3/3/2/D2/19/0000/22
SES REFERENCE NUMBER:	21/GRD/EMPr/05/2022
DATE:	May 2022

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Appendix 4 of the EIA Regulations 2014 (as amended 2017).

This Environmental Management Programme has been drafted in accordance with Appendix 4 of the Environmental Impact Assessment Regulations 2014 (as amended 2017). The table below shows how the requirements of Appendix 4 have been included within this Environmental Management Programme.

(1) An EMPr must comply with section 24N of the Act and include— (a)details of– (i)the EAP who prepared the EMPr; and (ii)the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Appendix A- EAP CV
(b)a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 4 – Description of the Activity
(c)a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 4 - Description of the Activity
(d)a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— (i)planning and design; (ii)pre-construction activities; (iii)construction activities; (iv)rehabilitation of the environment after construction and where applicable post closure; and (v)where relevant, operation activities;	Section 9 - Environmental Impact Management: Planning and Design Phase Section 10 - Environmental Impact Management: Pre-construction Phase Section 11 - Environmental Impact Management: Construction Phase Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase
(f)a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i)avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii)comply with any prescribed environmental management standards or practices; (iii)comply with any applicable provisions of the Act regarding closure, where applicable; and (iv)comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 9 - Environmental Impact Management: Planning and Design Phase Section 10 - Environmental Impact Management: Pre-construction Phase Section 11 - Environmental Impact Management: Construction Phase Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase
(g)the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 15 - Roles and Responsibilities Section 17 - Monitoring, Record Keeping and Reporting
(h)the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 15 - Roles and Responsibilities Section 17 - Monitoring, Record Keeping and Reporting
(i)an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 9 - Environmental Impact Management: Planning and Design Phase Section 10 - Environmental Impact Management: Pre-construction Phase Section 11 - Environmental Impact Management: Construction Phase Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase Section 15 - Roles and Responsibilities
(j)the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 9 - Environmental Impact Management: Planning and Design Phase Section 10 - Environmental Impact Management: Pre-construction Phase

	Section 11 - Environmental Impact Management: Construction Phase Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase
(k)the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 15 - Roles and Responsibilities Section 17 - Monitoring, Record Keeping and Reporting
(l)a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 9 - Environmental Impact Management: Planning and Design Phase Section 10 - Environmental Impact Management: Pre-construction Phase Section 11 - Environmental Impact Management: Construction Phase Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase Section 15 - Roles and Responsibilities Section 17 - Monitoring, Record Keeping and Reporting
(m)an environmental awareness plan describing the manner in which— (i)the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii)risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 15 - Roles and Responsibilities
(n)any specific information that may be required by the competent authority.	tbd

DOCUMENT DETAILS

Project Ref. No:	21/GRD/DEIAR/05/2022
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Sharples Environmental Services cc Since 1998, SES has been actively engaged in the fields of environmental planning, assessment and management. We advise private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials. Our consultants have over 20+ years of combined experience and we operate in the Southern, Eastern and Western Cape regions.

LLOYD BARNES (**Environmental Assessment Practitioner**)- Lloyd has recently obtained his National Diploma and Bachelor of Technology in Environmental Management from the Cape Peninsula University of Technology. He has gained experience in on-site compliance monitoring, sustainable development, conservation and report writing. In his time as a consultant, he has compiled multiple management plans.

BETSY DITCHAM (Director and Principle Environmental Assessment Practitioner) - Betsy has a Bachelor of Science Honours Degree in Wildlife Management from the University of Pretoria and a Bachelor of Science Degree (Zoology and Ecology) obtained from the University of Cape Town in 2005. She has 9 years' experience in the environmental field, including environmental assessments, legal compliance, on-site compliance monitoring, cleaner production and business greening and sustainability (carbon and environmental footprinting). In her time as a consultant, she has compiled a number of environment assessments and management plans for both private and governmental clients. Betsy is a shareholder of SES and registered with EAPASA as a certified Environmental Practitioner (EAPSA # 1480).

1. Introduction

Sharples Environmental Services cc have been appointed by the George Local Municipality, to undertake the environmental assessment, in accordance with the National Environmental Management Act, 1998 (Act 107 of 1998), in terms of the Environmental Impact Assessment Regulations, 2014 (as amended 2017), for the proposed construction of a tertiary eduction precinct development with related uses such as housing, student accommodation, sports fields and recreational open spaces and associated infrastructure at the Garden Route Dam on a Portion of the remainder of Erf 464 in George.

The site is situated in the North-Eastern part of George, bordering the Southernmost boundary of the Garden Route Dam. The site is bordered by a higher order road to the South, namely Madiba Drive that leads to the NMMU Saasveld Campus. The neighbourhoods of Eden George and Loerie Park are situated directly to the West of the site. The site is currently vacant, with various gravel roads on the site being utilised for recreational activities.

2. About this EMPr

This document is intended to serve as a guideline to be used by the George Local Municipality (as the Implementing Agent) and any person/s acting on behalf of the George Local Municipality, during the pre-construction, construction, post-construction rehabilitation and operational (maintenance) phases of the proposed development. This document provides measures that must be implemented to ensure that any environmental degradation that may be associated with the development is avoided, or where such impacts cannot be avoided entirely, are minimised and mitigated appropriately.

This EMPr has been prepared in accordance with the requirements of an EMPr as specified in the Environmental Impact Assessment Regulations, 2014 (as amended), and with reference to the "Guidelines for Environmental Management Programmes" published by the Department of Environmental Affairs and Development Planning (2005).

It is important to note that not only is the EMPr designed to manage the physical establishment of the development *per se*, but also as a tool which can be used to manage the environmental *impacts* of the development.

The rehabilitation, mitigation, management and monitoring measures prescribed in this EMPr must be seen as binding to the George Local Municipality, and any person acting on its behalf, including but not limited to agents, employees, associates, guests or any person rendering a service to the development site.

2.1 Important caveat to the report

In the past, some developments have had a devastating impact on the environment even though they have had Environmental Management Programmes in place, while other developments have had a low impact even though no management plans have been compiled.

The Implementing Agent and the attitude of the construction team play an integral role in determining the impact that the development will have on the environment. The ECO needs to ensure that all the role-players are aware of the constraints that the EMPr, and associated Environmental Authorization, places on the development and construction team and are prepared to be actively involved in enforcing these constraints. In order to ensure that the development is sustainable and compliant, will depend on the cooperation, mutual respect and understanding of all parties involved.

3. How to use this document

It is essential that this EMPr be carefully studied, understood, implemented and adhered to as far as reasonably possible, throughout all phases of the proposed development. The George Local Municipality must retain a copy of this EMPr, and an additional copy must be kept on site at all times during the pre-construction, construction and post-construction rehabilitation phases of the development.

This EMPr must be included in all contracts compiled for contractors and subcontractors employed by the George Local Municipality, as this EMPr identifies and specifies the procedures to be followed by engineers and other contractors to ensure that the adverse impacts of construction and maintenance activities are either avoided or reduced. Appointed contractors must make adequate financial provision to implement the environmental management measures specified in this document.

This EMPr must be seen as a working document, which may be amended as and when needed, in order to accommodate changing circumstances on site or in the surrounding environment, or in order to accommodate requests/ conditions issued by the competent authority, the Department of Environmental Affairs & Development Planning (DEADP). Amendments to this EMPr must first be approved by the competent authority, in writing, before being implemented.

4. Description of the Activity

The George Local Municipality proposes to construct a university precinct development and associated infrastructure at the Garden Route Dam on a Portion of the remainder of Erf 464 in George. The university precinct development will entail a tertiary education campus, with associated residential units and open spaces. The Public Open Spaces account for > 57% of the development proposal. The following is proposed to be developed as per the Site Layout Plans shown the figures below:

Table 1: Size and number of each respective aspect proposed

Development Proposed	No.	Size (ha)	%
Community Zone 1: Campus – University / Research Institute / Academy	8	13.66	12
Business Zone 1: Waterfront Commercial Development	1	4.66	4
General Residential Zone 6: Hotel	1	1.55	1
General Residential Zone 2: Medium Density Residential / Group Housing	3	5.47	5
General Residential Zone 4: Apartments / Flats / Student Housing	4	4.84	4
Single Residential Zone 1: Free Standing Dwelling Houses	91	5.76	5
Open Space Zone 2: Recreation Spaces / Sports Fields	3	7.57	6
Open Space Zone 3: Parks / Natural Assets / Preservation Areas	5	67.39	57
Transport Zone 2: Roads	1	7.60	6
TOTAL DEVELOPMENT FOOTPRINT		**118.5**	**100**

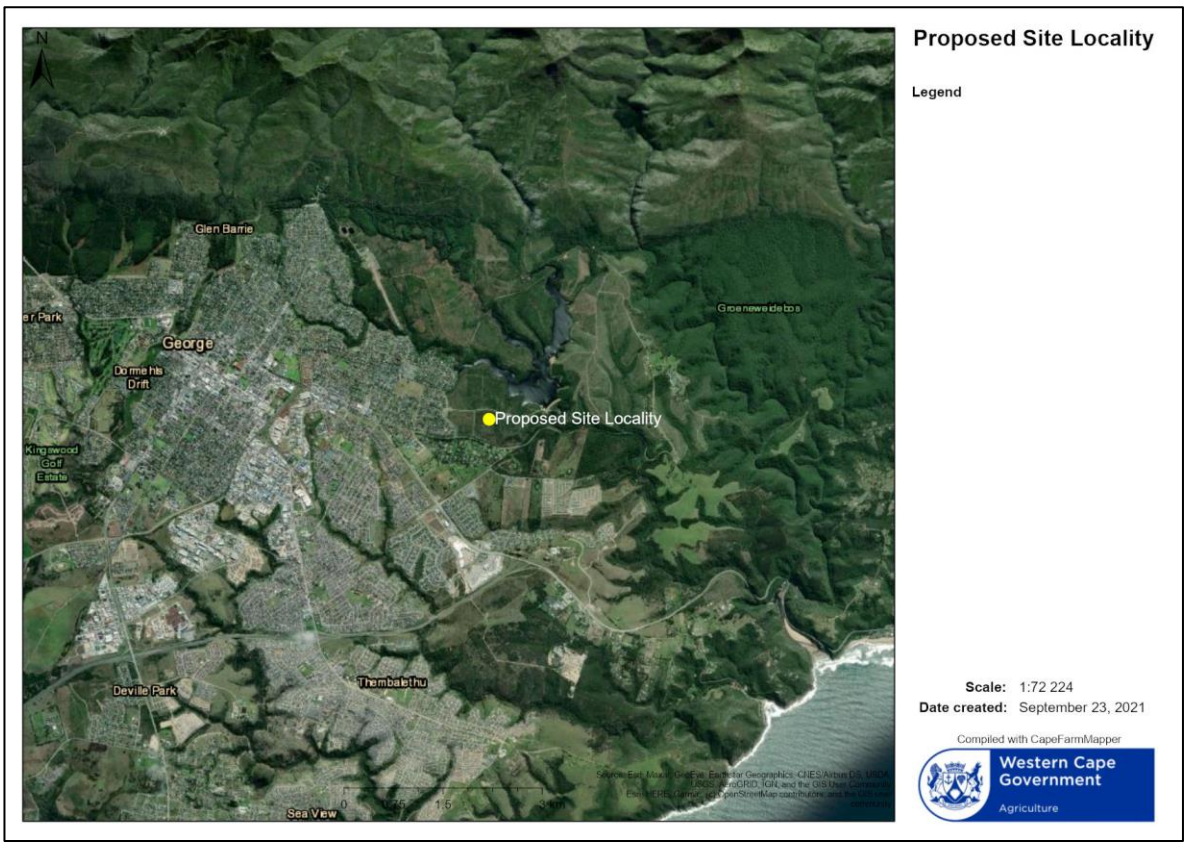

Figure 1: Proposed site locality in relation to George.

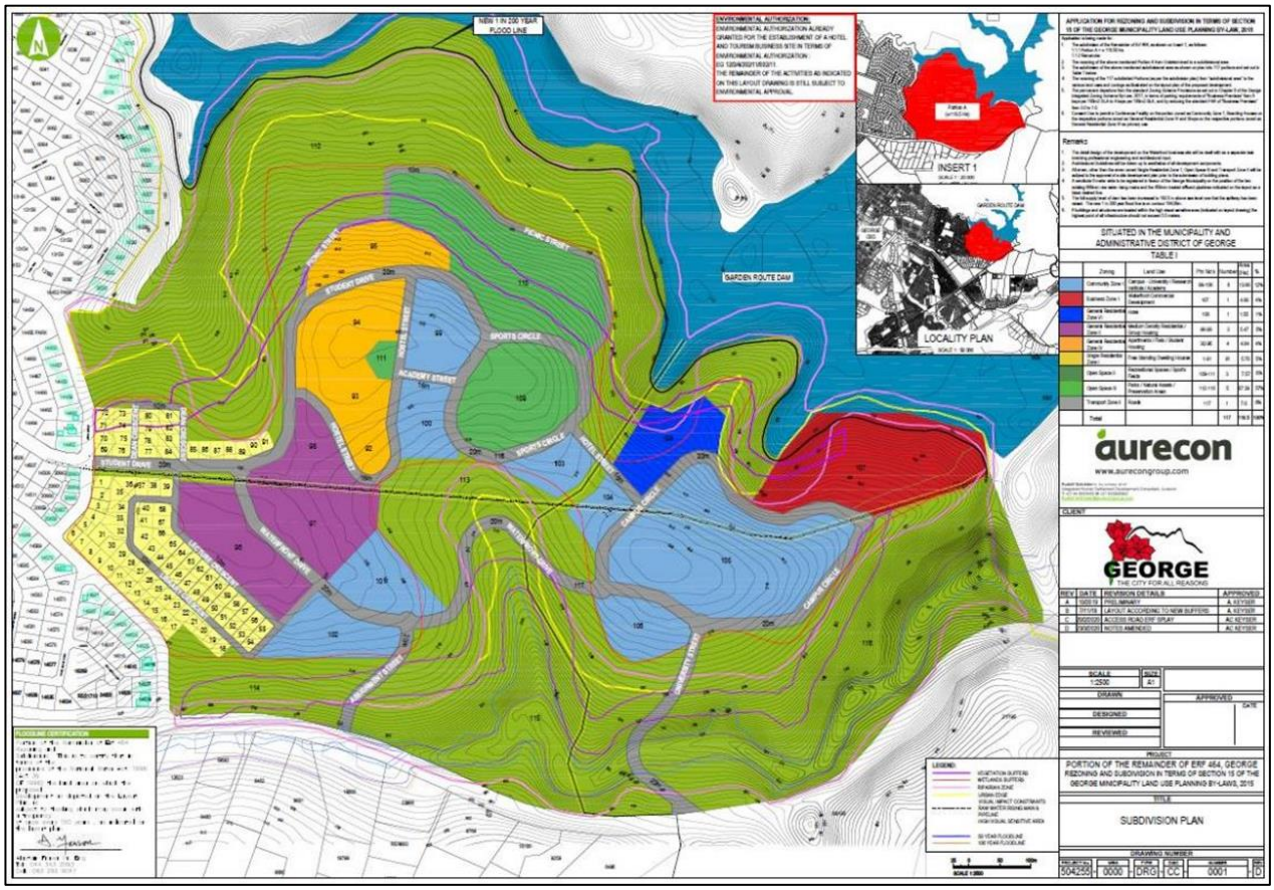

Figure 2: Proposed Site Layout Plan

Campus – University / Research Institute / Academy

The key component of this development proposal is the proposed campus. The basis of this development proposal is the provision of educational spaces and facilities, which is collectively referred to as the campus. This development proposal thus places strong emphasis on the clustering of a variety of buildings, which will vary slightly in use.

The core of the campus is located centrally in the eastern half of the site. This campus is strategically located on the flatter slopes on the site and is intended to be a key attraction to the site. The design has thus made provision for selected prominent buildings towards the southern parts of the site, so that these selected buildings would be visible from Madiba Drive. This emphasis on visibility is however not in line with the Visual Impact Assessment findings.

Findings from socio-economic studies indicate that a university/research institute/academy would become a regional attraction and would greatly contribute to the growth of George. It also states that educational institutions are, in a sense, recession proof, as people still need to be taught no matter the state of the economy. This is very important in a country like South Africa where economic growth and job creation remain a huge challenge.

Due to the nature of such institutions, this development proposal illustrates a focused cluster of various buildings in order to accommodate various institutions on the site. The diversity of institutions will be a crucial part of the creation of a mixed-use, vibrant, inclusive, sustainable and technologically advanced educational precinct in George. The proposed placement of these buildings also eliminates the possibility of the creation of exclusive spaces and further encourages foot traffic through these spaces through the inclusion of NMT infrastructure.

Due to the envisioned diversity of these educational institutions, an expansion of the core campus is proposed towards the north-west of the main campus. This expansion continues the inclusive, vibrant and sustainable nature of the main campus by also emphasising pedestrian movement and by harnessing and maintaining the presence of natural vegetation and green corridors which will allow the open spaces to be managed better.

The development proposal illustrates the continued fine-grained nature of the buildings in order to ensure that all activities on this site is visually similar, with urban design practices guiding the finer detail within this proposal.

It should be noted that the Municipality would be preparing the land and securing development rights through the town planning and environmental authorisation processes. After the development rights are secured, the Municipality will follow a process endorsed in terms of the provisions of the Municipal Finance Management Act and Municipal Asset Transfer Regulations to call for proposals from suitable developers and partners to facilitate the development. At that stage, the needs and feasibilities of the proposals will be investigated, in order to determine the best type of facility to be developed. These proposals could include industry trade schools, post-graduate research facilities, sports science institutions, TVET colleges (Technical vocational education training), Technikons or traditional Universities.

Residential zones

The residential land uses are seen to be first and foremost to support the campus environment and could also evolve and grow into various products that can be used for students during term and holidaymakers during the holidays.

A variety of types of housing is planned that could cater for undergrad students, lecturers, visiting lecturers, and post grad students through to single residential erven. The varied public uses, which takes full opportunity of the scenic nature of the site, are accessible to the community of George as well as the campus users.

A mix of Single Residential and Group Housing land uses are proposed towards the western side of the site. This is to ensure greater integration between the existing neighbourhood and the newly proposed land uses towards the west of the site.

There is currently existing demand for a range of housing opportunities in this area, together with predicted increase in demand due to the proposed development. It is estimated that this provision of residential space on the site will also absorb the demand for on-site housing by future employees, post-graduate students and other users of this space. It is envisioned that these residential spaces would be based on the principles of inclusivity, integration, choice, variety and sustainability. These residential opportunities would also generate a substantial income for the municipality, through rates and taxes accrued from such residential units.

Another obvious residential component is the inclusion of spaces for on-site student housing. Student housing is proposed in clusters on the eastern portion of the site, and in dispersed locations around the extended campus. These student housing opportunities are strategically designed in order to provide a range of housing options to ensure affordability and choice.

Natural Assets and Preservation Areas &Recreational Spaces

As per the findings of the various environmental studies undertaken on the site, this 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. As illustrated in this development proposal, riparian areas are located along the southern boundary of the site. The riparian areas have been maintained in the development proposal and selected buffer areas have been placed around these riparian zones. In order for the natural environment to maintain its functionality, this development proposal further makes use of green belts throughout the site and at strategic locations these green belts are used as buffers and beautification tools.

Understanding the importance of the functions of the natural resources on this site played an integral role in the layout of the proposed residential, educational, commercial and public spaces. The extensive natural features on the site forms a key component of the overall design of the proposed development. The inclusion of adequate recreational spaces on the site is also an important aspect of the development proposal. In order to conform to a variety of best practice guidelines and regulations, this development proposal includes several sports fields in key locations around the site. Most notable is a campus sports oval, large enough for a cricket field or athletics track, which would provide a good-quality space in which to host various events for the benefit of the entire community.

These facilities could be shared by the various institutions on the site and will be open to public use at dedicated times. Additional sports fields (international standard rugby / soccer fields) are located towards the northern boundary of the site in order to make use of the aesthetic beauty of the site. These recreational spaces are also strategically located in order to ensure that these facilities do not cause a nuisance to the existing residential developments adjacent to the site. These spaces will simultaneously act as public spaces in off-peak times.

The natural beauty of the site can further be enjoyed by the public through the inclusion of picnic areas along the water's edge as well as exploring the natural features of the surroundings such as the picturesque Garden Route Dam and Katrivier Nature Reserve.

The proposal also aims to improve access for cyclists, trail runners, walkers and canoeists, fishermen, amongst others to the existing recreational areas around the dam. This area has historically been used by the public as a recreational area and the proposal aims to enhance this aspect. As such, an Open Space of approximately 67ha is proposed around the development area to be utilised for these uses. Many cyclists, runners and walkers utilise the main gravel road which leads to the dam wall as access to the trails situated on the eastern and northern side of the dam wall. George is fortunate to have such areas for recreation and many residents use these areas both on weekdays and weekends. There are also trails on the area to be developed but some of these trails become overgrown and need to be constantly maintained. There are a large number of open areas in George which need to be maintained by the City's parks and gardens Department on a weekly basis. The City's budget to maintain parks and gardens is not going to be able to cover the maintenance and construction of paths and trails on this property and therefore developing paths and trials in tandem with the development of the area is a way for a long-term sustainable system of paths and trails to be implemented.

Another way to ensure the use of the area for recreation is the development of the "waterfront precinct", which was approved in 2014. The aim of the waterfront is to have coffee shops, canoe hire and possibly a sports hall, amongst other facilities, to cater for the various sports enthusiasts and clubc. This area could then become the focal venue for future sporting events.

Currently, the majority of sporting activities at the dam take place on an ad-hoc basis. Ultimately, when the campuses, sports fields and waterfront is developed, this will not only serve as a central place for recreation events to be organised and held from but will also serve to provide the students with the ability to obtain semi-professional guidance and instruction in their chosen sporting disciplines.

To ensure this is done in an inclusive manner and that the conditions as per the Environmental Authorisation (EA) are adhered to, the various sporting bodies are encouraged to become part of the Environmental Liaison Committee (ELC). This ELC would be invited to attend meetings during construction to help unpack the conditions of the EA so that the right structures are implemented at the right time and that appropriate monitoring takes place so that the Environmental Management Programme (EMPr) is adhered to. By providing constructive input into the EIA process, the various sporting disciplines such as trail runners, road runners, mountain bikers, canoeists, fishermen etc, can add value to the process and ensure that their needs are encapsulated in the Environmental Reports and Environmental Authorisation.

Through the establishment of more formal paths and walkways which do not currently exist, the safety of the area will be improved. Local hiking, running, biking clubs and fishing clubs would be able to assist with monitoring the trails and feeding any issues back to the Municipality and Developers to address.

<u>Hotel and Tourism Business Development</u>

As previously approved by DEA&DP and the Minister of Local Government, this development proposal retains the idea of the construction of a hotel and tourism business development on a portion of the site (north-eastern portion of the site). It is felt that the inclusion of these uses has been well argued in previous applications and that the potential benefits which can be extracted from these uses can now be further enhanced through the inclusion of the proposed additional land uses.

The hotel site will have a coverage of approximately 2.47 ha. The detail design of the hotel site will be dealt with as a separate task involving professional engineering and architectural input. The business/tourism site proposed to be a Waterfront area would have an approximate coverage of 4.3 ha. According to the Final BAR submitted as part of the previous process, yhe proposed Waterfront development is planned to become a destination of preference within the regional context. The following complimentary land uses may form part of a development proposal:

- Top quality restaurant (regional as well as local)
- Eco-tourism and related facilities with opportunities to expand
- Structures and facilities for non-motorised water sport
- Jetties for sailing-yachts, canoes and related non-engine driven water craft
- Boardwalk linking activities mainly along the water edge.

It is envisioned that the inclusion of hotel and business facilities will attract a variety of users and will become an important role player in stimulating the local economy. The inclusion of hotel and business facilities would act as a major attraction use which will not only attract the wider community, but which will also ensure that the site is utilised at all times of the year. In addition, these facilities will greatly encourage the integration of various income levels and will provide pedestrian activity which would in turn support other uses on the site. A commercial sector will link the hotel area and the waterfront area to create a hub for students and citizens alike.

The strategic location of these proposed facilities would extract the natural beauty which is harnessed on this site and thus has the potential to attract investment into surrounding land uses.

The Hotel area can be linked to the business area with a pedestrian bridge and this precinct could also include a Business School and possible tourism related training facilities.

Adjacent to the above-mentioned hotel and business school is a proposed waterfront commercial area. This area has been strategically placed to capitalise on the potential of the integration between land and water. Due to the popularity of this portion of the site, the inclusion of commercial space ensures that public access and usability is retained on this site. This commercial area would accommodate formal trade and retail activities which would attract the general public and be a retail space that will serve the campus. The strategic placement of these commercial uses also ensures that users filter through the overall site, thus further activating the rest of the site. In addition, the nature of this space will contribute greatly to safety through surveillance and activity spaces. This commercial space is also envisioned to provide local entrepreneurs with viable spaces within which to apply their trade.

This waterfront commercial area does however not only focus on formalised commercial activity, but also includes the provision of ample public spaces/open spaces in an attempt to retain the existing interest in the use of this space for recreational activities. The vibrancy created through the integration of public/open spaces and commercial activities would enhance the social, economic and environmental uses of this site and will thus ensure further inclusivity of all members of society.

<u>Accessibility</u>

Due to the desire to make this development highly inclusive and accessible, a well-designed road network is integrated throughout the site. Planning practices aimed at taking the focus away from car-oriented development has been incorporated. George is currently served by three phases of the George Integrated Public Transport Network (George IPTN). As Kraaibosch and George Campus is rolled out, it is anticipated that these developments will be well served by an extended Phase 1 of the George IPTN. With the intention of providing access through public transport to the site it is imperative that the site is not

only accessible through one access point. As such this development proposal introduces two new access points along Madiba Drive, which will be accompanied by the formalisation of the existing informal access point along Stander Road. With multiple access points to the site, inclusivity is encouraged, and traffic congestion is relieved.

Table 3: Summary Table: Site and Farm Details

Province	Western Cape	
District Municipality	Garden Route Municipality	
Local Municipality	George Local Municipality	
Ward number(s)	Ward No 18	
Nearest town(s)	George	
SG Code	Erf 464	C02700020000046400000
Co-ordinates of the property boundaries as shown in the adjacent table and figure:		

Table 4: Site boundary coordinates

Point	Longitude (S)	Latitude (E)
A	22° 29' 47.33"	33° 57' 47.20"
B	22° 30' 9.89"	33° 57' 30.31"
C	22° 30' 24.52"	33° 57' 48.83"
D	22° 30' 51.21"	33° 58' 1.93"
E	22° 30' 18.94"	33° 58' 11.65"
F	22° 29' 53.08"	33° 58' 6.94"
G	22° 29' 47.09"	33° 57' 57.06"

Figure 3: Site boundary coordinates.

5. Description of Environmental Setting

5.1 Vegetation

5.1.1 Vegetation description

The Biodiversity Sensitivity Analysis was undertaken by Conservation Management Service (2018). According to the analysis, the study area falls within the Garden Route Shale Fynbos and Garden Route Granite Fynbos vegetation units of the Vegetation Map of South Africa, Lesotho and Swaziland (Mucina et al, 2012).

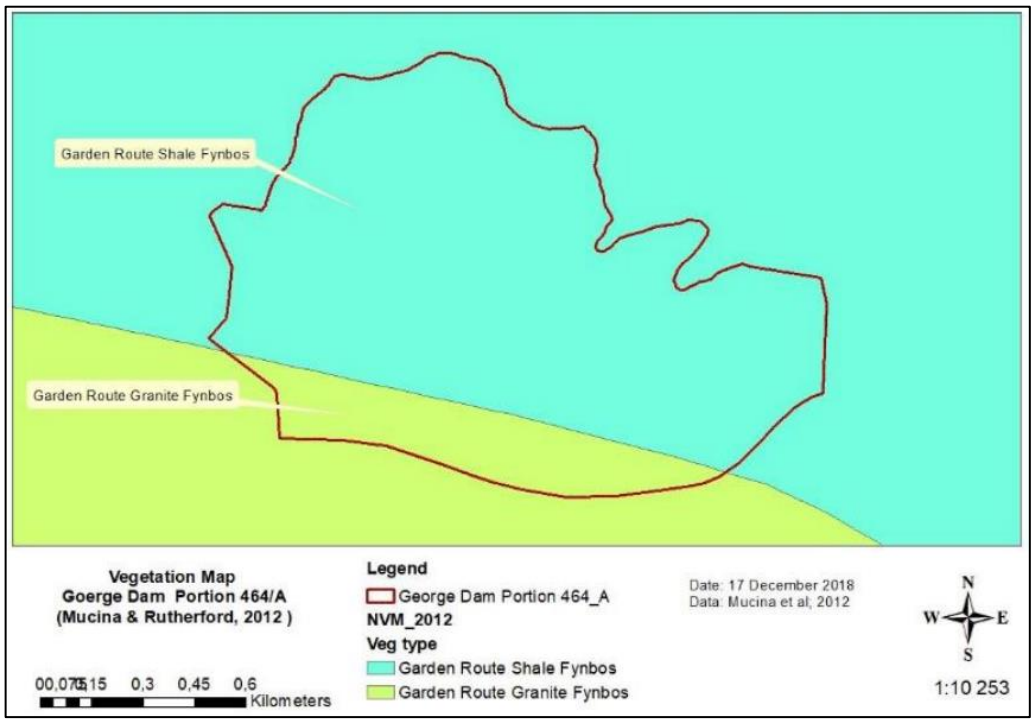

Figure 4: Vegetation Map of SA

According to the CAPE Project Broad Habitat Units of the CAPE Floristic Kingdom (Cape Nature Conservation Board, 2002 & Cowling et al., 1999), the study area falls within the Knysna Afromontane Forest broad habitat unit.

Neither of these landscape mapping initiatives are at a fine enough scale for precise mapping of a unit as small as the study area (approximately 124ha). The above vegetation description does, however, help to give an indication of what the historical situation may have been, which is a mosaic of Shale Fynbos on the fire-prone ridges and Forest in the fire-protected valleys.

The entire study area can be described as a highly disturbed and formerly transformed habitat. The majority of the study area was covered by a commercial pine tree plantation in the past. Only a very narrow belt along the Garden Route Dam shore, the public picnic area and the small river along the southern boundary was free of pine trees.

Originally the area would have consisted of Fynbos on the flatter "upland" areas and Forest / Thicket in the valleys and on valley slopes. Some remnants of these natural vegetation types persisted during the forestry cultivation period and are the source for the current vegetation cover (i.e. since the pine trees were removed).

The study area currently consists of four broad habitat types, namely:

- Pioneer Fynbos;
- Pioneer Thicket / Forest;
- Highly disturbed areas with an ephemeral weed cover;
- Wetland habitat

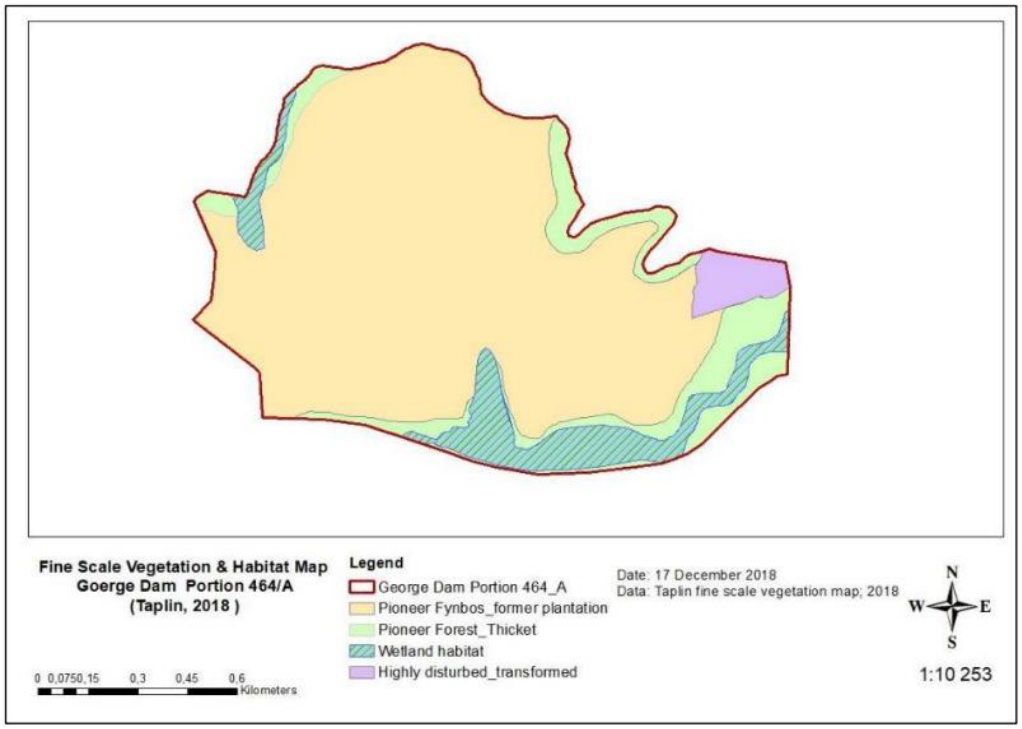

Figure 5: Fine scale vegetation and habitat units of the study site (Taplin ,2018).

Pioneer Fynbos

This vegetation occurs on the northern slope, flatter upper and plateau areas and persisted within the plantations, along with pioneer "weedy" species which germinated after the intense disturbance of pine tree harvesting. In addition to these species, invasive alien plants are invading the entire study site. In summary, this vegetation can be described as formerly transformed and thus highly disturbed. Areas of pioneer Fynbos highlighted as "Sensitive Fynbos Restoration Opportunity" on the vegetation and habitat sensitivity map and located on the slope of the northern portion of the study site can be classified as more sensitive (Coetzee 2007 and 2012 and Coetzee & Taplin 2018) and do have the potential to be rehabilitated into an improved ecological state with suitable management intervention.

Pioneer Forest / Thicket

These habitats are restricted within the valleys and on the slopes of the valleys and along drainages. These small forest patches are typical of drainage vegetation in the area. Outside of the small valleys and along the south-facing slopes, the habitat is more thicket-like, currently consisting of pioneer Thicket and Forest trees returning after the removal of the pine plantations. Seedlings and saplings of these forest pioneers have emerged in large numbers in some areas since the removal of the plantations. These Thicket / Forest areas, however, are also infested with invasive alien trees, mostly black wattle, blackwood and bugweed. With committed management, these habitats can be fully rehabilitated into useful conservation corridor areas.

Wetland vegetation

A small fluvial wetland occurs along the southern boundary of the study area. The small stream is fed by drainage from the study area and the Saasveld Road, in the form of seepage and runoff after rains. The original wetland vegetation is completely dominated by invasive alien plants such as *Acacia mearnsii*, *A. melanoxylon* and *Solanum mauritianum*. Much of the original wetland cover has been lost due to this invasion. A smaller wetland area occurs on the northwestern boundary, which later converges into a drainage line and feeds into the dam. This area is also heavily infested by *Acacia mearnsii, A. melanoxylon* and *Solanum mauritianum.*

Highly Disturbed and Transformed Areas

These areas include the roads and road verges, public picnic area and similar areas of disturbance. The most prominent pioneers on these areas are grasses like *Paspalum dilatatum* and *Paspalum urvillei* (both alien) and *Eragrostis curvula, Cynodon dactylon* and *Ehrharta species* (indigenous). Being disturbed, these areas are also invaded by a host of weedy pioneers, both alien and indigenous. A recent fire (October 2018) is estimated to have burnt at least 40% of the study area and both pioneer Fynbos and Pioneer Forest / Thicket have been affected. From what can be ascertained during the site visit, due to the high density of alien plants on site and dry conditions prior to the fire, the fire burnt extremely hot and has scorched large areas of topsoil, making these areas susceptible to further alien infestation and erosion. The pioneer stages of both Fynbos and Forest / Thicket are likely to persist, long with aggravated alien plant infestation.

5.1.2 Conservation Status

Prior to the completion of the 2017 Western Cape Spatial Biodiversity Plan (WCSBP), the study area did not lie within any part of a Critical Biodiversity Area (CBA) and in fact the study site was mapped as a transformed area. With the completion of the much improved WCSBP in 2017 and the revised conservation, biodiversity and connectivity objectives much of the site now falls within biodiversity priority categories.

With specific reference to the study area, the following biodiversity priority categories can be explained:

Protected Area (PA) Nature Reserve

The Katrivier Nature Reserve extends into the northern areas of the study site. These areas should be kept in a natural state with a management focus of maintaining or improving the state of biodiversity. It can be stated that the PA is completely transformed and occupied with alien invasive plants.

Critical Biodiversity Area 1 (CBA 1) Aquatic / wetland

The aquatic or wetland CBA 1 is located in the southern most drainage line of the study site. The area is currently invaded by alien invasive plants and considerably atrophied.

Critical Biodiversity Area 1(CBA 1) Terrestrial

The terrestrial CBA 1 area is located in the south eastern corner of the study site. This area is currently completely invaded by invasive alien plants. The land use objective should be to maintain in a natural or near-natural state, with no further loss of natural habitat.

Critical Biodiversity Area 2 (CBA 2) Terrestrial

The terrestrial CBA 2 occurs in a narrow band within the south eastern portion of the study site as well as in the north eastern side. During the site visit it was established that the majority of the north eastern areas are completely transformed and occupied with alien vegetation.

Ecological Support Area 1 (ESA 1) Terrestrial

The terrestrial ESA 1 represents the majority of the study area. If one refers to the Vegetation and Habitat Sensitivity Map, this area has mostly been classified as low sensitivity and highly disturbed and transformed, with the exception of the areas highlighted in pink which have been classified as sensitive Fynbos rehabilitation opportunity areas. The most recent fire which has gone through the area has almost entirely burnt the terrestrial ESA 1 and scorched large areas of the soil due to hot fires caused by the alien vegetation and dry conditions.

Ecological Support Area 2 (ESA 2) Climate Corridor, River, Wetland

The ESA 2 climate corridor, river and wetland areas occur in the southern portion of the study site. These areas are also invaded by alien plants and are in a transformed state.

The Red Listed and Critically Endangered *G fourcadei* falls within the river and climate corridor ESA 2, Terrestrial CBA 2 as well as the Aquatic / wetland CBA1.

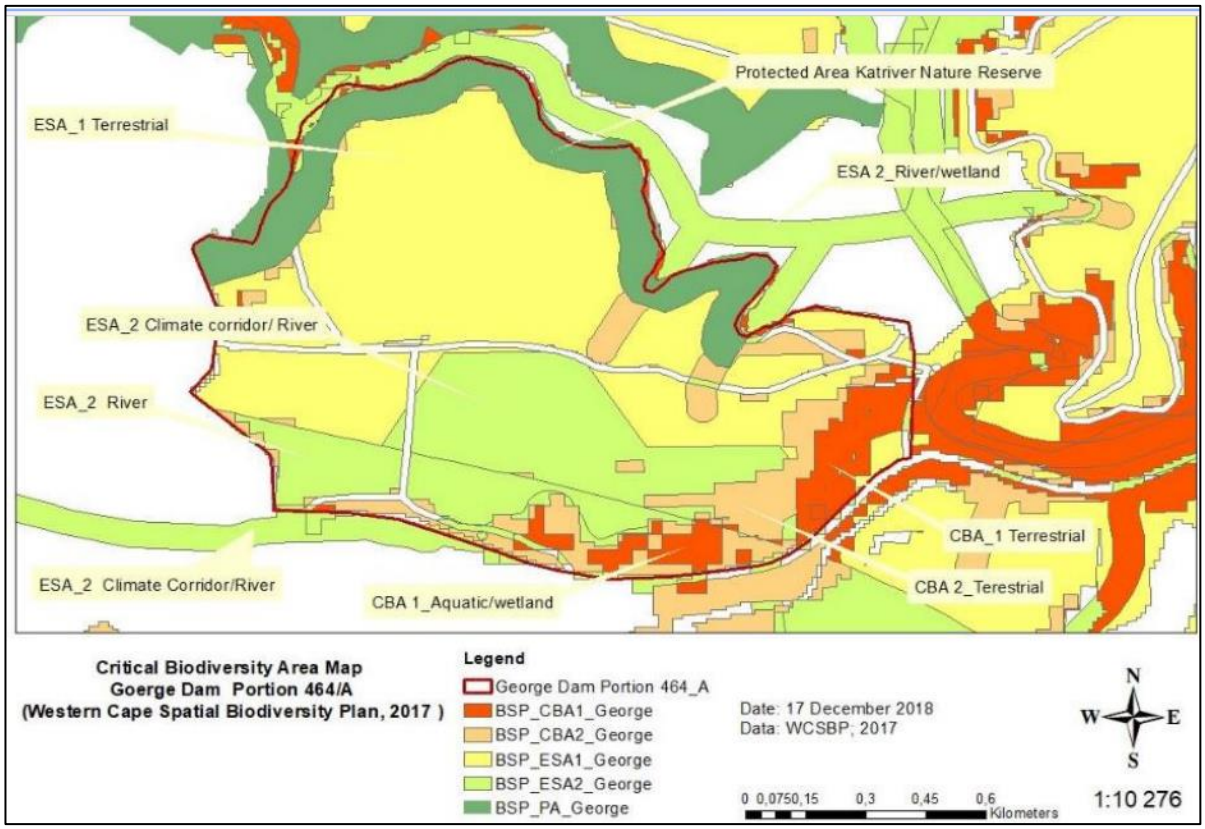

Figure 6: Critical Biodiversity Area Map of the George Dam study site portion 464A

5.2 Fauna

The study area lies at the George municipal urban edge and has been regularly subjected to a high incidence of anthropogenic disturbances like forestry activities, municipal maintenance activities, public recreational use of the area and even squatting. Predatory domestic dogs and cats from the adjacent residential areas have also contributed to faunal disturbance.

As a result of this long and persistent disturbance, only the most tolerant of the larger vertebrates still occur in the study area. Examples are bushbuck (*Tragelaphus scriptus*), bushpig (*Potamochoerus porcus*) and baboon (*Papio ursinus*), all of which generally persist in the area, even in pine tree plantations. The more sensitive habitat specialist species like blue duiker, grysbok, leopard and honey badger have retreated into areas of lower disturbance in the mountains and forests to the north and east.

The table below, compiled by Conservation Management Services (2018) lists the Red Data vertebrate faunal species that are likely to occur on the proposed site and surrounding areas. The Red Data species and distributions are according to Friedman & Daly (2004).

Table 2: Red Data listed mammals that are predicted to occur on the site

Red Data Species			
Common name	**Scientific Name**	**Red Data Category**	**Predicted Occurrence**
Long-tailed forest shrew	*Myosorex longicaudatus*	Near Threatened	Likely
Fynbos golden mole	*Amblysomus corriae*	Near Threatened	Likely
Cape golden mole	*Chrysochloris asiatica*	Data Deficient	Likely
Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Near Threatened	Possible
Cape horseshoe bat	*Rhinolophus capensis*	Near Threatened	Possible
Temminck's hairy bat	*Myotis tricolor*	Near Threatened	Possible
White-tailed rat	*Mystromys albicaudatus*	Endangered	Possible
African striped weasel	*Poecilogale albinucha*	Data Deficient	Likely

The long-tailed forest shrew is listed as Near Threatened due to the increasing loss of forest habitat. The presence of this species is considered highly likely because the Forest / Thicket habitat of the study site is very suitable for these indigenous forest-loving species. They are known to occur in the general area but are only known from true Forest or Forest / Fynbos transition areas.

The fynbos golden mole and Cape golden mole are considered likely to occur in the study area. The golden moles are restricted to fynbos and forest habitat.

The three bats are also classed as Near Threatened.

The white-tailed rat is considered to be Endangered due to large-scale loss of habitat which includes Fynbos, Renosterveld and southern Savannah Grassland. If this species does occur in the area, its continued existence will be ensured by retaining areas of the natural rehabilitating Fynbos habitat as open space.

The African wildcat is common and widespread, and used to be listed as a Red Data species, because they freely hybridize with domestic cats and no longer occur in genetically pure populations near to developed settlements.

The striped weasel is likely to occur in the study area and it is considered to be under threat due to habitat and prey reduction. On the study area, this species will have adequate habitat in the unaffected riverine, dam shore and forest areas.

Two of the bird species that could possibly occur in the area are classed as Red Data species (Barnes, 2000). They are the Stanley's bustard (*Neotis denhami*) and the grass owl (*Tyto capensis*) which are not really provided with suitable habitat in the study area but may occur occasionally or temporarily. Their favoured habitat, open but tall, dense grassland is in any case artificial in the study area and is far too small to support sustainable natural populations of these birds.

A butterfly survey was conducted by Dave Edge & Associates in October 2019. The proposed development area on George Dam Portion 464A does not appear, as per the findings of the butterfly survey, to contain any rare or endangered butterflies, and the eight butterflies recorded are reasonably common and widespread.

5.3 Freshwater features

5.3.1 The Aquatic Environment

The site is within the Quaternary Catchment K30C of the Coastal Gouritz Water Management Area and the Southeastern Coastal Belt Ecoregion.

A screening assessment identified that the property is bordered by, and traversed by the Kat River in the north, that feeds the adjoining Garden Route Dam, and the Klein Swart River in the south. Small drainage lines within the site contain non perennial tributary streams that drain into the larger systems.

The other freshwater habitat identified within the regulated study area was determined to not be impacted and were therefore not assessed further.

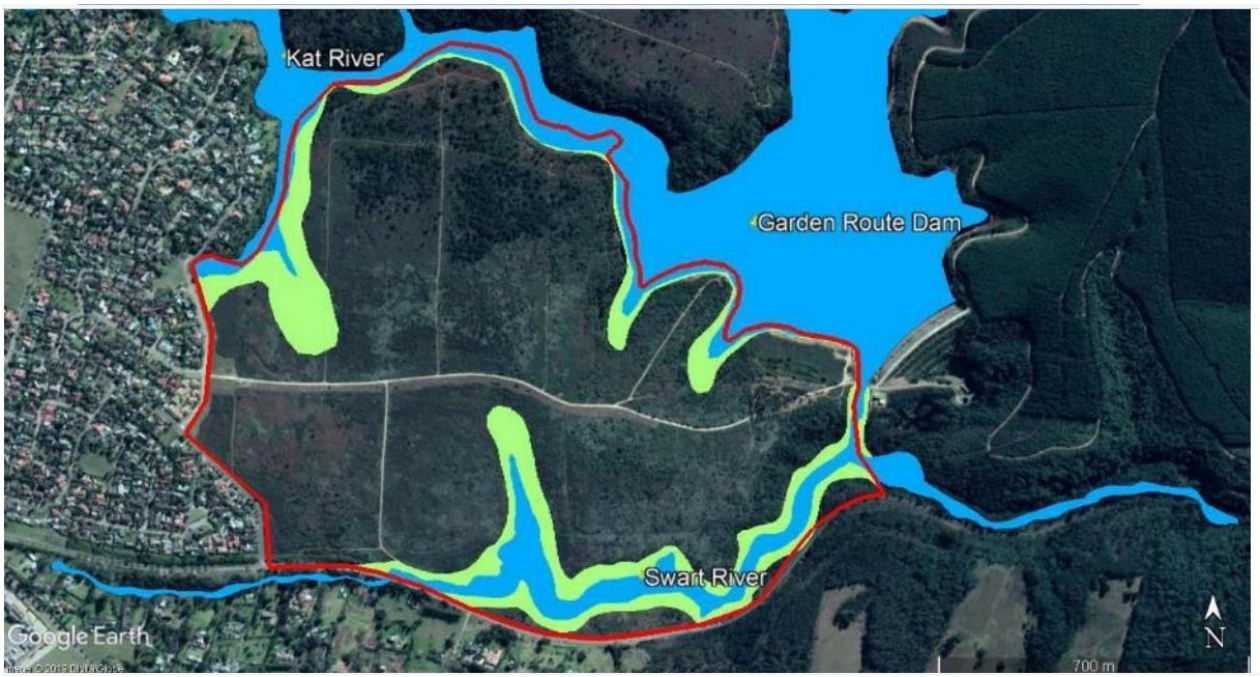

Figure 7: The study area in relation to the identified freshwater habitat

Kat River and Garden Route Dam

The Kat River is a perennial stream with its source in the Outeniqua Mountains above the town of George. It flows along the edge of the developed area and then becomes dammed shortly upslope of the confluence with the Swart River to the south. The reach of the Kat River assessed has a moderately steep gradient and is within the Upper foothills longitudinal zone. It is situated within a semi-confined valley floor and has a narrow channel with limited floodplain development.

The substrate is dominated by gravel and coarse sand. The river is relatively well vegetated but largely with alien invasive trees species such as *Acacia mearnsii*. It has been subjected to significant degradation due to land cover and land use changes associated with urban development, plantation, damming, and alien invasive tree infestation. However, it is important to manage the system wisely due to its value as a corridor network, domestic water provisions, and the important rivers downstream. The assessment of the river PES and EIS is detailed in the Phase 1 Freshwater Habitat Report.

The Kat River has an overall PEC Score of 3.5 placing it within the Ecological Category D (Poor). This implies that it is largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.

The river has an EIS score of High, with many elements sensitive to changes in water quality/ hydrological regime.

Klein Swart River Wetland

The reach of the Swart River system that will be impacted by the proposal can be classified as a channelled valley bottom wetland. Historically, it is likely that wetland habitat occupied the entire (although narrow) valley floor but various impacts through time have resulted in the loss of connectivity in wetland habitat along the reach. The pockets of wetland habitat that remain consist largely of robust indigenous vegetation such as *Phragmites australis, Typha capensis, Pteridium aquilinum*, *Cyperus sp., Zantedeschia aethiopica, Helichrysum sp*. The disturbed areas are however dominated by alien invasive plant species such as *Acacia melanoxylon, Acacia mearnsii, Rubus cuneifolius, Arundo donax*, and *Pinus sp*.

The wetland has been subjected to impacts caused by past forestry activities, infrastructure, and alien invasive plant species infestation. The construction of the road to the south of the wetland has directly destroyed habitat, altered flow movements, and increased sediment inputs. A sewage pump station has been constructed within the wetland habitat, pipelines cross the wetland, and the water quality analysis of the water indicated that this effluent is escaping into the system and causing pollution.

This has altered the morphology and hydrology of the wetland and resulted in habitat fragmentation within the valley. Any proposed development within this catchment will result in further impacts on the watercourse but there are opportunities to rehabilitate it. Past and present impacts have resulted in significant wetland habitat loss in large sections of the system. The hydrological regime has deviated greatly from the perceived reference state due to changes in water movement and retention patterns. The geomorphological characteristics have been transformed from the natural condition largely through erosion and sedimentation. Channel incision and straightening resulting in no bank overspill are especially harmful to a system dependent upon over-topping of the channel.

The Present Ecological State (PES) of the Swart River Wetland in the south of the property is defined as Largely Modified represented by an overall 'D' score category for the WET-Health 2 assessment. This category is indicative of a system where a large change in ecosystem processes and loss of natural habitat and biota and has occurred. At a desktop level the functionality of channelled valley-bottom wetlands as a whole tend to contribute less towards flood attenuation and sediment trapping than typical floodplain wetland types but would supply these benefits to a certain extent. The indirect goods and services provided by the wetland, such as sediment and nutrient trapping, were assessed as being Moderate to High. However, the wetland has a very low provision of direct ecosystem services apart from the small amount it contributes to the open space recreational setting (such as cycling) on the property. The system is not significant in terms of food or resource provisions, education/research and/or socio-cultural. This is mostly due to the lack of any endangered species, no known traditional practices, and the poor condition of the system.

The Ecological integrity and sensitivity of the Swart River Wetland was assessed and obtained a Moderate EIS score.

The management objective was determined through the recommended ecological category of the wetland. This places it in the REC 'D' category which recommends maintaining the river in its present state.

Tributary streams

There are three small drainage lines that concentrate runoff from the property into the Kat River and dam, and there is one tributary draining in a southernly direction into the Swart River Wetland. These tributaries

are small natural systems with temporary flow. The systems are of similar ecological integrity as they share biophysical characteristics and have been similarly impacted by land use and cover changes.

The tributaries all have narrow, shallow channels that are stable despite being steep longitudinally. No erosion was evident within these catchments. The tributaries are well-vegetated with shrubs such as *Diospyros dichrophylla* and *Searsia glauca*, with an understory dominated by *Helichrysum Sp*. and *Pteridium aquilinum*. However, there is a moderate level of alien invasive tree infestation (largely *Acacia mearnsii, Acacia melanoxylon* and *Pinus sp*.). *Rapanea melanophloeos* trees (Cape Beech), a protected species, were observed within the southern tributary riparian zone.

The four drainage systems will have been impacted upon in the past by forestry activities associated with the planation on the property, but they are not currently subjected to anthropogenic impacts and function in a near natural manner. The present ecological state of the small tributary systems was determined to be within the "B" category, indicating that modification is limited to very few localities and the impact on habitat quality, diversity, size and variability is also very small or not evident. The proposed development is located within these catchments and will impact these systems.

The ecological importance and sensitivity category of the tributary network was determined as being 'Moderate' (C category). The systems do not have a high sensitivity as they are only intermittently inundated with no significant diversity of habitat along the reach. However, they act as an important ecological corridor.

The National Aquatic Ecosystem Priority Areas (NFEPA) map provides strategic spatial priorities for conserving South Africa's aquatic ecosystems and supporting sustainable use of water resources. FEPAs were identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (Driver et al. 2011). However, the Klein Swart River, Kat River and the dam are not classified as FEPA systems despite being identified by the NFEPA project.

6. Legal Framework

6.1 The NEMA, Act No 107 of 1998, as Amended, and the EIA Regulations (2014)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) as per EIA Regulations, 2014 (as amended 2017), gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment. NEMA requires that an environmental authorisation be issued by a competent authority (CA) before the commencement of an activity listed in the Environmental Impact Assessment Regulations, 2014 (as amended 2017), in terms of the Listing Notices G.N. 324, 325, 326 & 327 published on the 7th April 2017.

Due to the fact that this development proposal consists of activities listed in the EIA Regulations, Listing Notice 1, 2 and 3, a Full Scoping and Environmental Impact Assessment was required and the respective reports (Full Scoping and Environmental Impact Assessment and Appendices) were submitted to the DEA&DP, for assessment, before the environmental authorization was issued to the applicant, the George Local Municipality.

The following table indicates the amendments necessary for the new development proposal to be compliant with the latest NEMA Regulations:

Table 5: Listed Activities in terms of the NEMA Environmental Impact Assessment Regulations (2017), as amended, that are proposed to be triggered

Activity #	Listing notice 1. Description of Activity as per GN No. R 327
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or where such development will occur within an urban area.
12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.
24	The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road— (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or which is 1 kilometre or shorter.
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or maintenance purposes undertaken in accordance with a maintenance management plan.

28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.
Activity #	**Listing notice 3. Description of Activity as per GN No. R 324**
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. Western Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.
14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;

	excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.
Activity #	**Listing notice 2. (GN No. R325): Scoping & Environmental Impact Reporting**
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or maintenance purposes undertaken in accordance with a maintenance management plan.

Therefore, in summary, the following activities will be applied for:

- Listing Notice 1: Activity No: 9; 10, 11; 12; 14 and 28
- Listing Notice 2: Activity No: 15; and
- Listing Notice 3: Activity No: 4; 12; and 14.

6.2 Other applicable legislation

The George Local Municipality is responsible for ensuring that all contractors, labourers and any other appointed person/entity acting on their behalf, remain compliant with the conditions of the received authorisations, as well as the provisions of all other applicable legislation, including *inter alia*:

- National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended);
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Water Act (Act 36 of 1998)
- National Forest Act (Act No 84 of 1998);
- National Heritage Resources Act (Act No 25 of 1999);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Veld and Forest Fire Act (Act No. 101 of 1998).

The above listed legislation has general applicability to most development applications, and it is the responsibility of the George Local Municipality to ensure that all contractors and employees are aware of their obligations in terms of these Acts. This EMPr does not detract from any other legal requirements.

The proposed development requires a Water Use License (WUL) in terms of Chapter 4 and Section 21 (c) and (i) of the National Water Act No. 36 of 1998 and this must be secured prior to the commencement of construction.

The following water uses have been identified for the project:

- Section 21 (c): Impeding or diverting the flow of a watercourse
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse

A Notice of Intent to develop was submitted for the previous environmental authorisation process and a Record of Decision (RoD) from Heritage Western Cape (HWC), dated 13 August 2007, was issued which states that no further study is required, and the development may proceed with no conditions.

It is not envisioned that there would have been any further impact on Heritage aspects on the site based on the new design.

The proposed development activity will take place through various phases. Each phase has specific impacts or issues unique to that phase of the development activity. These phases of the development are listed below, and the impacts associated with each phase as identified through the environmental impact assessment process are identified and given a brief description. Brief management statements are provided, as well as a description of the desirable impact management outcomes.

7. Scope of this EMPr

This EMPr describes the measures that must be implemented in order to avoid, minimise, manage and monitor the potential environmental impacts of the development, during all phases of the project life cycle, namely:

- Planning and Design Phase
- Pre-construction Phase
- Construction Phase
- Post-Construction Rehabilitation
- Operational Phase

General environmental management measures that must be applied throughout the project lifecycle (as and where applicable) are described in Chapter 8 below. Additional management measures that must be implemented to address specific impacts that may arise during each phase are provided in **Chapters 9-12** of this EMPr.

8. General Environmental Management

The following general management measures are intended to protect environmental resources from pollution and degradation during all phases of the project life cycle. These measures should be implemented as and where applicable, reasonable and practicable during the pre-construction, construction and post-construction rehabilitation and operational (maintenance) phases of the proposed development.

Code of Conduct

The purpose of the Code of Conduct (CoC) is to minimise the impact of the activities associated with the construction phase on the environment. The rules and regulations prescribed in this CoC are intended to ensure that the impacts on the environment are not prejudiced by the construction activities. Failure to adhere to or any breach of this CoC will result in a fine being levied against the offending or defaulting party / individual.

Labourers during the construction phase should conserve the natural environment, endorsing the principles of sustainable use and minimum impact. They should also be sensitive to the impact of their operation on the environment within which they work and minimise any adverse impacts.

This EMPr forms an integral part of the activities during the construction phase and as such, is legally enforceable. In addition to the restrictions and controls provided for in this EMPr, the environmental controls comprise the following:

Engineers

- Unless otherwise stated by the holder, only a registered engineer must be appointed for the construction phase of the development.
- The engineer shall provide work or services of a quality and scope, and to a level, which are commensurate with accepted standards and practices.
- The engineer shall be impartial in decision-making, provision of advice and judgement.

Contractors and sub-contractors

- Unless otherwise determined, only appropriately registered contractors shall be appointed.
- It shall be the responsibility of the holder / engineer to ensure that the contractors abide by and comply with the rules and regulations of the Code of Conduct.
- Contractors shall at all times be responsible for their sub-contractors and employees whilst they are on the development property.

Rules and Regulations

It is of vital importance that engineers, and contractors understand and acknowledge that they are working on an environmentally sensitive development and agree to conform to all environmental controls specified in this EMPr, and any additional environmental permits/licenses, as well as any additional input by the ECO. In addition to the EMPr, the environmental controls comprise of the following:

- **Building Plan Controls**
  - A copy of the approved and signed building plans must be available on site during the construction phase of the development.
  - Variations of the building plans must be approved by the engineer / holder prior to being implemented.
  - Prior to commencing building, the contractor must remove all topsoil and store it in a berm of not more the 2m high, away from construction activities.

- **Site tidiness**
  - The contractor must keep the appearance of the site neat and tidy at all times. Building rubble must be removed from site at regular intervals, and litter must be removed from the site on a daily basis. Refuse drums must be available on site which waste can be placed in. The drums must be emptied on a regular basis and the waste taken to a licenced local waste disposal facility.
- **Safety**
  - The contractor shall comply with the Health and Safety Act (Act No. 85 of 1993), as amended, together with such regulations promulgated thereunder.

8.1 Site access and traffic management

The site will be accessed from Protea Street.

All construction vehicles need to adhere to traffic laws and regulations, drivers must be sensitised to the fact that they are working in an area with a potentially high volume of foot and vehicle traffic. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. As far as possible, care should be taken to ensure that the local traffic flow pattern is not significantly disrupted, and vehicle operators therefore need to be educated in terms of "best-practice" operation in order to minimise unnecessary traffic congestion or dangers. These practices include, but are not limited to, not unnecessarily obstructing the access point or traffic lanes used to access the site; considering the load carrying capacity of road surfaces and adhering 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 should be erected to warn other road users (motorists and pedestrians) about the presence of construction vehicles, particularly at the point where construction vehicles enter/ exit the site from the N2 warning them of the construction. Signage would need to be clearly visible and include, amongst 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 are working on the site.

Other mitigation measures include:

- No construction to take place over or during the December holiday period without prior permission from the relevant authorities.
- 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.
- ECO to do awareness training with the contractor and labourers and to highlight the traffic related risks before construction commences (see Appendix B for Environmental Awareness Plan).
- Where possible, construction traffic that may obstruct traffic flow on the surrounding roads should be scheduled for outside of peak traffic times.
- Ensure appropriate behaviour of operators of construction vehicles.
- 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.

8.2 Site demarcation

The working areas should be clearly demarcated on site during the pre-construction or construction phases of the development, as appropriate.

8.2.1 Construction working area

Prior to the commencement of any land-clearing or construction activities, the outer boundary of the development area must be surveyed and pegged, particularly near the aquatic no-go area. This demarcation boundary is to ensure that land clearing and construction activities are restricted to only that area strictly required for the proposed development, and to prevent unnecessary disturbance of soil surfaces and vegetation outside of the development footprint.

The outer boundary of the working area should be enclosed with, at least, shade netting, droppers & wire, or similar – as is feasible and practical. Access point should be temporarily gated. The fencing should be retained and maintained for the duration of the construction period, it should not be removed until construction and reinstatement/rehabilitation concludes, unless changes are required, which will only

apply with the approval of the appointed ECO and Site Engineer. Areas to be cleared must be demarcated before any clearing and grubbing commences.

8.2.2 No-go areas

Prior to the commencement of any land-clearing or construction activities, all sensitive areas (as identified by the ECO), must be demarcated and must not be disturbed during the construction phase. It is recommended that the No-Go areas be demarcated with a suitable material that can be easily identified and noticed. Danger tape flagging (pieces of danger tape tied to twine or rope) may be utilised, however the use of only danger tape is not recommended for long-term demarcation as this will easily become untidy and blown away by the wind resulting in pollution.

The aquatic buffer areas should be treated as No-Go zones for development and all associated infrastructure should be set back (apart from road crossings which cannot avoid the buffer areas).

No-go areas could include areas with slopes of 1:4 and steeper, greenbelt / corridor areas, public open spaces, drainage lines, demarcated/barricaded trees, streams and/or other wetlands outside of the approved development area. No-go areas outside the approved development area must be off-limits to all construction workers, vehicles and machinery during all phases of the development. No vegetation may be cleared from within the no-go areas (unless in accordance with an approved alien invasive management plan and under the supervision of the ECO), and no dumping of any material (waste, topsoil, subsoil etc.) may occur in these areas. Construction workers must be informed of the no-go areas, and if necessary appropriate signage can be used to enforce the demarcation. Any interaction with no-go areas should be consulted between the contractor and ECO prior to any actions.

8.2.3 Demarcation of the site camp

The area chosen for the site camp and associated facilities must be the minimum area reasonably required to accommodate the site camp facilities, and which will involve the least disturbance to the environment. It is recommended that easily accessible, transformed areas must be used for the site camp, at least 50m away from any no-go areas. Site selection must be done in consultation with the ECO.

8.3 Site camp and associated facilities

The following general management measures pertaining to the set-up, operation and closure of a site camp should be applied where appropriate, reasonable and practicable:

8.3.1 Fencing & Security

The site camp area must be secured to prevent any un-authorised individuals from entering the site camp and possibly getting injured or posing a safety and/or security risk. Adequate signage must be displayed, designating the site office / camp as a restricted area to non-personnel. If required, the site camp and associated areas may be fenced off along the demarcated boundaries of these areas, preferably with 2m high fence and shade netting or similar.

8.3.2 Fire Fighting Equipment

No less than 2 fire extinguishers must be present in the site camp. The extinguishers must be in a working condition and within their service period. A fire extinguisher must always be present wherever any "hot works" (e.g. welding, grinding etc.) are taking place. It is recommended that all construction workers receive basic training in fire prevention and basic fire-fighting techniques and are informed of the emergency procedure to follow in the event of accidental fires. No open fires may be made on the construction site during any phase of the project. Construction workers may make small, contained fires (e.g. for warming or cooking purposes), within the site camp provided the small fire is encircled by a corrugated iron structure, drum or similar, to prevent wind-blown cinders from causing fires elsewhere.

Such fires may not be left unattended and must be thoroughly extinguished after use. No smoking must be allowed on the construction site. In the case of accidental fires the contractor must (if required) alert the Local Authority's Fire Department as soon as a fire starts prior to the fire becoming uncontrollable.

8.3.3 Waste Storage Area

Sufficient bins for the temporary storage of construction related waste must be provided inside the site camp and/or at the working area and should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. Label each waste receptacle for waste separation, and ensure waste is contained either by use of lids or by ensuring waste receptacles are emptied prior to filling up, making them susceptible to wind dispersion. Sufficient signage and awareness should be created to ensure that these bins are properly used.

8.3.4 Hazardous Substances Storage Area

Fuels, chemicals, lubricants and other hazardous substances must be stored in a demarcated, secured and clearly sign-posted area within the site camp away from the watercourses on site. Sufficient signage and awareness should be created to ensure that these bins are properly used. Ensure that when substances are transferred, this is done on an impermeable and/or bunded surface, to contain any spillage. Spillage, should it occur, should be disposed of appropriately.

8.3.5 Potable Water

An adequate supply of potable water must be provided to construction workers at the site camp. It is the Contractors duty to ensure that the labour has adequate access to potable water throughout construction phase, and to monitor weather conditions, to ensure that labour has enough drinking water on hotter days, or construction activity must cease, until conditions are safe to continue.

8.3.6 Ablution Facilities

Chemical toilets should be maintained on the site camp for the duration of the construction phase and rehabilitation, on a level surface and secured from blowing over and located in such a way that the toilets will not cause any form of pollution. As per the SANS10400 requirement, one ablution facility for every 8 male workers and 2 ablution facilities for every 8 female workers will be provided.

The ablution facilities must not be linked to the river system in any way. Toilets must be serviced regularly and kept in an orderly state. The contractor must ensure that no spillage occurs when the toilets are cleaned, serviced or moved. The toilet facilities should be emptied on a weekly basis, by an appropriately registered service provider. Proof of this weekly servicing must be obtained and filed in the Environmental File on site. Performing ablutions outside of the provided toilet facilities is strictly prohibited and the ECO would need to regularly inspect the state of the chemical toilets to ensure compliance.

- Ablution facilities provided for construction workers must be placed away from the terrace edge.
- Ablutions should be further than 50m from the identified aquatic buffer area.

8.3.7 Eating Area & Rest Area

A dedicated area within which construction workers can rest and eat during breaks should be provided within the site camp. Seating and shade should be provided.

8.3.8 Vehicle & Equipment Maintenance Yard

Where possible, construction vehicles and equipment that require repair must be removed from site and taken to a workshop for servicing. If emergency repairs and/or basic maintenance of construction vehicles or equipment are necessary on site, such repair work must be undertaken within the designated maintenance yard area away from any watercourses. Repairs must be conducted on an impermeable surface, and/or a tarpaulin and/or drip trays must be laid down prior to emergency repairs taking place,

in order to prevent any fuel, oil, lubricant or other spillages from contaminating the surrounding environment.

8.3.9 House-keeping

The site camp and related site camp facilities must be kept neat and orderly at all times, in order to prevent potential safety risks and to reduce the visual impact of the site during construction.

8.4 Protection of fauna

Construction workers are to be sensitised to the fact that they may encounter fauna during the construction period. This should be included in the environmental awareness training completed with all site personnel before any construction commences (see Appendix B for Environmental Awareness Plan). No faunal species are to be trapped, or killed, if any fauna is encountered by construction workers, the ECO is to be notified. If the ECO is not on site, the site manager is to be informed. Rescued fauna should be released into a nearby area of similar habitat away from any construction. Contact details for animal rescue services and/or snake wrangler, from the local area, should be available on site, in case of an emergency.

8.5 Indigenous vegetation clearing and protection.

An alien invasive monitoring, control and eradication plan is to be drafted and implemented prior to construction. Support should be given to Working for Water to assist with the prevention of alien vegetation in the watercourses.

Where indigenous vegetation must be cleared for the development, the following measures must be implemented:

- Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing commences
- Where feasible vegetation must simply be trimmed to facilitate access/ construction, rather than being completely cleared or removed, unless vegetation has been identified as an SCC (Species of Conservation Concern), in which case no removal, trimming or any further alteration ay take place unless the relevant authority is notified, and procedures are undertaken to permit alternations.
- Vegetation clearing/trimming must be cleared by hand (i.e. brush cut) and stockpiled for use as mulch/ brush-packing during rehabilitation of the site. Any alien vegetation that is cleared must be disposed of off-site, immediately, in consultation with the ECO and the Alien Vegetation Management Plan. If disposal cannot occur immediately, the cleared alien vegetation should be stored in an appropriate waste disposal vessel, that prohibits dispersal of the vegetation, from wind, etc, and disposed of as soon as possible.
- Only the areas required to accommodate the construction and access to the construction site must be cleared/trimmed of vegetation, as long the vegetation has not been identified as an SCC.
- After any clearing is completed, if the area is not to accommodate hardened surfaces, an appropriate cover crop should be planted where any weeds or exotic species are removed from disturbed areas timeously.
- Vegetation outside of the construction footprint and within any no-go areas must not be cleared, unless permitted in accordance with the alien invasive management plan, and under the supervision of the ECO.
- Land clearing and earthmoving activities should not be undertaken during strong winds, where possible.
- Ensure the open space is kept clear of alien plant species through the adoption of an Alien Invasive Management plan.

- Trees located in areas where sidewalks, open areas or gardens are proposed, these trees are to be barricaded and not cleared.
- No fires are permitted on site.
- 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*.
- Alien vegetation should be removed, and disposed off-site, at a registered waste facility, disposal slips must be obtained for waste disposal.
- 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.
- Develop and implement fire management program

The proposed development requires the clearance of vegetation; however the following measures should be implemented to protect the indigenous vegetation where possible.

- Great care will be taken if cement is to be mixed on site, especially in the proximity of vegetation. Cement is to be mixed on thick plastic sheets or in large buckets and not allowed to spill onto bare ground. Any spillage will be cleaned up immediately. Cement water is also to be contained in the above manner and allowed to dry out and then removed from site. Cement water, which is highly alkaline, poses a definite threat to the soil and seed banks.
- Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing and grubbing commences.
- A monitoring programme shall be in place, not only to ensure compliance with the EMPr throughout the construction phase, but also to monitor any post-construction environmental issues and impacts such as increased surface runoff. The monitoring should be regular and additional visits must be taken when there is potential risk to the aquatic habitat.
- No clearing outside of development and infrastructure footprint area to take place.
- Rescued plants should be replanted into a nearby disturbed area of similar habitat or for open space rehabilitation.
- An Independent Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here and will be on site regularly.
- Provide provisions in the detailed design of the layout to accommodate protected trees.

8.6 Topsoil and subsoil management

It is recommended that topsoil be removed from any area where physical disturbance of the surface will occur, including within the footprint of the development site (working area) and possibly within the site camp, ablution area, vehicle maintenance yard, refuelling area and temporary waste storage area. Topsoil removal and stockpiling must be undertaken only after consultation with the ECO.

- Excavated topsoil and subsoil must be stockpiled for the duration of the active construction period and utilised for the final landscaping and rehabilitation of disturbed areas on site.
- Stockpiles must not be located within the buffer area, or close to any sloped surfaces.
- The topsoil berm may be a few meters wide but must ideally not be more than 2m high to allow light and air penetration.
- Excavated subsoil must be stockpiled separately from topsoil.
- 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.
- The topsoil & subsoil storage area must be located on a level area outside of any surface drainage channels outside the riparian zone, and at a location where it can be protected from disturbance and river flow/floods during construction and where it will not interfere with construction activities.

- Topsoil and subsoil stockpiles must be adequately protected from being blown away or eroded by storm water. If necessary, shade cloth or other suitable measures must be used to stabilise and protect the stockpile from wind/water erosion. Topsoil stockpiles must not be covered with tarpaulin, as this may smother and decrease the virility of topsoil.
- Stockpiles must not be located within 50 metres of the aquatic buffer.
- Handling of topsoil must be minimised as much as possible, and the location of the topsoil berm must be chosen carefully to avoid needing to relocate the topsoil berm at a later date.
- Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.
- If soil stockpiles will be stored for an extended period of time, the stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding, (or application of herbicides if agreed with the ECO).
- Soil material that will not be re-utilised on site may be removed from site and taken to an appropriate site for re-use or disposal.
- Topsoil removed from fynbos areas to be reused in rehabilitation areas, e.g. open space areas. Where possible, topsoil from fynbos areas, containing indigenous plant seeds, should be transferred immediately to rehabilitation areas rather than being stockpiled, as stockpiling kills important fungi, microbes, seeds and soil fauna. Topsoil stockpiles of this kind must not exceed 0.5 m in height and must not be compacted.
- Note that the topsoil must be the final layer applied to a rehabilitated/ re-landscaped site, after subsoil/ spoil material has been placed and shaped on the site.
- Cleared areas must be rehabilitated and a suitable cover crop planted once specific phases of construction is completed.

8.7 Integrated waste management approach

It is recommended that an integrated waste management system is adopted on site. The system must be based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Separate waste bins/skips that are weather and animal proof 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. These bins/skips must be emptied, and the waste taken to a registered recycling facility. The receipts from the facility must be kept on file and must be available on request.

The non-recyclable and non-reusable waste (e.g. builder's rubble, etc.) generated on site must be disposed of at a landfill site licensed in terms of the applicable legislation. The receipts from the facility must be kept on file and must be available on request.

Chemical toilets present a risk to the surrounding environment and must be managed accordingly. Chemical toilets must be kept within the site camp (not be linked to the storm water drainage system), on a level surface and secured from blowing over. Chemical toilets must be regularly emptied, and the waste disposed of at an appropriate wastewater disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets. Ablutions should be further than 50m from aquatic buffer area.

Hazardous substances such as diesel, oil and detergents will be present on site throughout the construction phase of the proposed development. Hazardous substances pose a greater risk to the surrounding environment than general substances and therefore need to be managed accordingly. A designated storage area within the site camp that is clearly demarcated must be set aside for the storage of hazardous substances and is to be treated as a no-go zone to unauthorised personnel. Appropriate signage, Material Safety Data Sheets (MSDSs), recently serviced fire extinguishers and spill kits should

accompany the hazardous substances. Appropriate storage of hazardous substances is important while drip trays should always be utilised when decanting of hazardous substances and when refilling chemical/ fuel storage tanks. If any spills do occur, the solid must be excavated and disposed of as hazardous waste.

Cement and concrete batching will be permitted on site, but may only take place on designated impermeable, bunded surfaces, as agreed with the ECO. Used cement bags should be disposed of as hazardous waste on site.

8.8 Erosion control and stormwater management

Appropriate measures must be implemented to control the flow of stormwater across the construction site, in order to prevent possible flooding, soil loss and dispersion of pollutants. To prevent excessive erosion activities, exposed earth surfaces must be protected from wind and water erosion.

The scale and nature of the erosion and stormwater control measures implemented on site must be appropriate to the conditions on site, and sufficient to achieve the desired outcomes (soil preservation, prevention of flooding, stormwater control) to the satisfaction of the ECO and consulting engineer.

The prevention of soil erosion can be initiated by designating specific areas for stockpiling of raw materials with consultation of the ECO. No stockpiling is to occur on or near slopes or water resources (must not be located within the buffer area) and all stockpiling areas must be approved by the ECO before stockpiling occurs. Before any work commences, sediment control/silt capture measures (e.g. bidim/silt curtains) must be installed downstream/downslope of the active working areas.

Stockpiles need to be effectively managed and maintained as they have the potential to contribute to runoff and erosion. To prevent this, the following management measures must be implemented.

- Stockpiles of topsoil & spoil material must be protected from wind & water erosion.
- Stockpiles of earth material may not be located within any storm-water drainage pathways and must be outside of the reach of potential flood waters.
- Any erosion runnels/ gulleys/ channels that form on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures put in place to prevent recurrent erosion at that site. Rehabilitation of erosion channels should be ongoing during the construction phase and not left until the end of the construction period
- 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.
- When de-silting takes place the silt must not be returned to the watercourse.

It may be necessary to implement small-scale erosion protection measures at the construction site, to prevent soil erosion. Such measures may include the use of shade netting, geo-fabric, brush-packing or similar barriers in areas susceptible to erosion and along exposed slopes. The storm water management plan should adhere to the principles of sound storm water management. The storm water management system must be implemented on site and must be properly maintained to ensure that contaminated run-off from the construction site is prevented from flowing into the watercourse.

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. 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. No clearance or brush-cutting is to be permitted within the aquatic buffer.

8.9 Construction near a watercourse

Construction within the vicinity of the aquatic system needs to be conducted in a conscious manner. The Aquatic Biodiversity Impact Assessment completed by Sharples Environmental Services cc (2021) explains that an aquatic buffer is required to be adhered to during construction. The buffer areas determined for this project are relatively large, beyond 100 m in width in most locations, to fulfil the objective of protecting the freshwater habitat (Figure 10). The aquatic buffer areas should be treated as No-Go zones for development and all associated infrastructure should be set back (apart from road crossings which cannot avoid the buffer areas).

It must be ensured that development is restricted to approved development area and that the buffer area is regarded as a no-go area. Ablutions and stockpiles should be at least 50m from the aquatic buffer area.

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, and that management measures are appropriately implemented. Regular inspections during the operational phase should also be undertaken to ensure that functions are not undermined by inappropriate activities. It is also recommended that a stormwater management plan be developed to maintain or mimic the natural runoff as well as prevent the wash-off of pollutants to receiving waters.

The following measures must be implemented in association with the buffer area:

- Buffer area to be adhered to.
- All erosion protection measures (e.g. Reno-mattresses) must be located within the layout footprint and not encroach into the buffer areas.
- No equipment laydown or storage areas must be located within delineated freshwater buffer zone.
- Stockpiles must not be located within 50 metres of the wetland, dam, and riparian buffer.
- The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area.

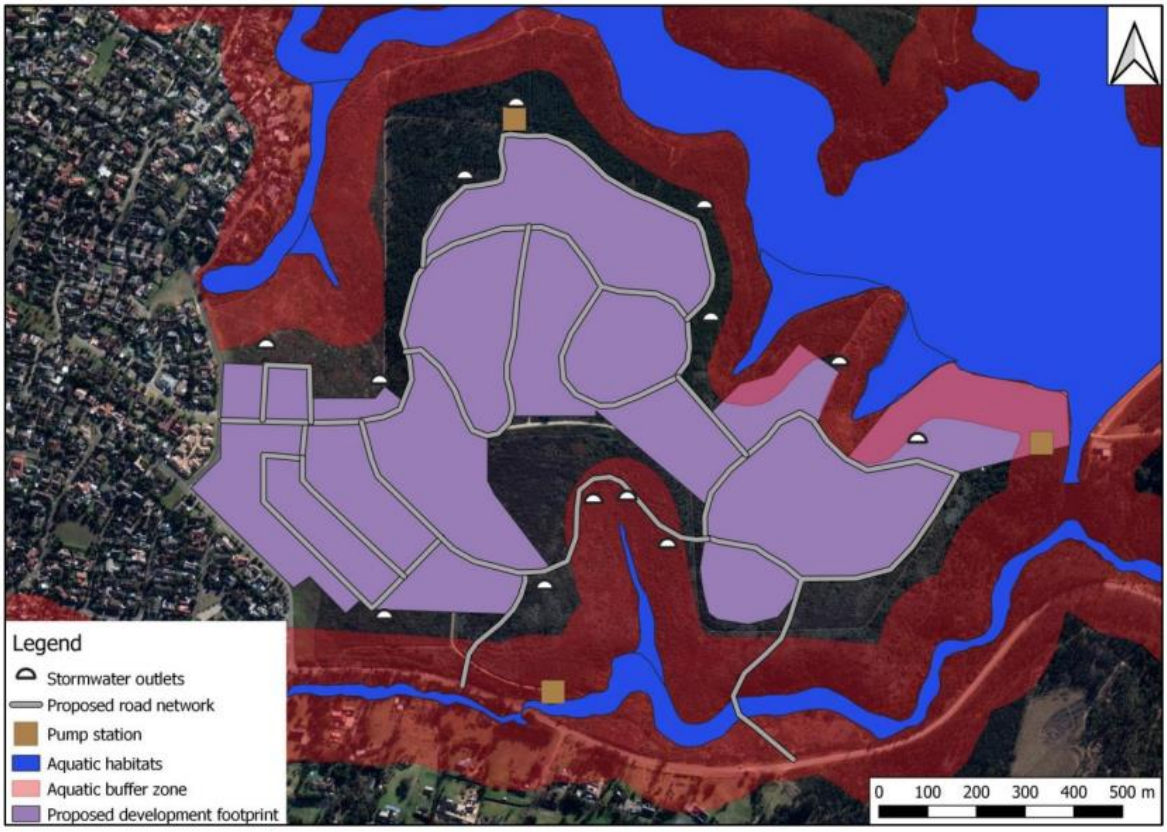

Figure 8: The recommended aquatic buffer zones in relation to the development

Once construction has been completed, the objective would be to promote the re-establishment of the ecological functioning of any area disturbed by construction activities and maintain a healthy system throughout operation. The buffer area regarded as a no-go area during construction will be zoned as open space during the operational phase of the development. During the post-construction and operational phase of the development, erosion features that have developed are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed. Placement of signage near the boundary of the buffer zone should also be considered to help mark the boundary and educate the community about the purpose and value of protecting buffer zones. Information can include a description and visual of alien invasive plant species.
All equipment and material storage areas must (if practical, reasonable and feasible) be located at a minimum distance of 50m from the watercourse. The appointed ECO must be consulted in this regard.

It is recommended that baseline water quality measurements are undertaken.

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.

It is recommended that construction must be carried out during the dry season where possible and contingency plans must be in place for high rainfall events during construction.

8.10 Excavations and Earthworks

Any major earthworks with bulldozers and heavy machinery must be under constant supervision and operators are to be aware of all the environmental obligations, as there is always the potential to inflict damage to the sensitive areas. Any unnecessary or excessive heavy machinery movement must be kept to a minimum i.e. only what is absolutely necessary. Areas to be excavated must be clearly demarcated. Areas, which have already been excavated and entail fairly significant earthworks, must be similarly demarcated to avoid the spreading of construction activities into more sensitive areas.

All excavated material must be stored on a flat surface away from any drainage line or area susceptible to erosion. The location must be decided upon in consultation with the ECO. Stored material must be protected from wind and water erosion and this may entail covering the material with suitable shade cloth material or similar (if and when necessary). The shade cloth may need to be weighed down in such a manner that any stream flow is directed away from the stockpile, reducing the risk of erosion.

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 Heritage Authority or delegated heritage specialist, will advise on way forward.

8.11 Visual Impact.

The proposed development has the potential to cause a visual impact during the construction and operational periods. To minimise the potential visual impact, all working areas, storage facilities, stockpiles, waste bins, elevated tanks and the site camp should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. Waste must be managed according to this EMPr. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy. The site camp may require visual screening via shade cloth or other suitable material. The use of reflective materials and excessive lighting should be avoided, and construction vehicles must enter and leave the site during working hours.

8.12 Noise management.

Additional noise is expected during the construction period due to construction activities. It is important that noise complaints register should be opened and that all 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. This is to be done by ensuring that all equipment is in good working condition and fitted with mufflers/exhaust silencers in necessary. 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, and all affected parties must be informed of the excessive noise factors.

8.13 Dust management.

Although the generation of dust is synonymous with construction sites, care needs to be taken to prevent excessive dust from impacting the surrounding environment and community. Majority of the dust causing activities will take place during the construction period. Exposed surfaces, such as stockpiles and cleared areas should be provided with a suitable cover as soon as possible or wetted down. Construction vehicles should maintain low speeds of 20-40km/h and must ensure that tarpaulins are used to cover any loads transported. 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, in case of complaints, such as those related to dust. This should form a part of your Environmental File.

8.14 Heritage Resources

Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities, all works must be stopped immediately within this area, and Heritage Western Cape must be notified without delay.

Heritage Western Cape:
T: 021 483 5059
E: hwc.hwc@westerncape.gov.za

8.15 Site closure and rehabilitation

Upon completion of the construction phase, and after each maintenance event, all disturbed areas, including the working area (disturbance corridor), temporary access road, and all areas utilised for the site camp and associated site camp facilities will require rehabilitation as follows:

- On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material.
- All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped to improve filtration and reduce run-off.
- All demarcation fencing, including all droppers, wires, netting and barrier tape must be removed from site and taken to an appropriate site for re-use or disposal.
- Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the ECO. Any soil contaminated with hydrocarbons (oil, fuel, etc) or other hazardous substance must be collected and disposed of as hazardous waste to a licenced disposal facility.
- All construction waste is to be removed from the site and disposed of at an appropriate facility. Burying or burning of waste or rubble on site is strictly prohibited.
- Topsoil that was removed and stockpiled before construction, must be replaced by spreading it evenly over the areas from which it was removed. This topsoil (and the seedbank it contains) will facilitate the re-vegetation of the site.
- Disturbed areas, especially areas where excavations have taken place, must be shaped as appropriate (original topography must be restored where possible), and covered with a layer of stockpiled topsoil as soon as possible.
- Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and disposed of at an appropriate disposal site.
- The disturbed, newly rehabilitated surfaces (particularly steeper slopes and areas recently covered with topsoil) must be protected from wind & water erosion using mulch, brush packing or other appropriate erosion protection measures. Brush-packing/ mulching is done by covering the exposed surface with organic plant material such as branches, plant cuttings and leafy material. Ideally the vegetation removed from site at the start of the construction must be utilised. Brush-packing/ mulching plays a valuable role in erosion control, while also promoting re-vegetation of the site by retaining moisture in the soil, introducing seeds and/or trapping wind-blown seeds and providing organic material (compost) to promote new plant growth.
- Rehabilitate the buffer area with indigenous vegetation.
- Final landscaping and rehabilitation of the site must be done to the satisfaction of the ECO and must adhere to all conditions/ requirements of the Environmental Authorisation.

9. Environmental Impact Management: Planning and Design Phase

No direct environmental impacts are associated with the planning and design phase. However, poor planning or inappropriate design decisions in this phase may result in environmental impacts arising during subsequent phases of the project.

Planning and design activities must therefore take into account the environmental constraints and opportunities identified during the Environmental Impact Assessment process, in order to avoid or minimise the potential future impacts of the development. Proper planning is also essential to ensure that adequate provision is made to implement the environmental requirements of this EMPr, and to ensure that the development is compliant with additional conditions which may be included in the Environmental Authorisation.

The environmental management objectives (goals) during this phase are to:

- Appoint an Independent Environmental Control Officer.
- Complete the detailed design of the structures and detailed site layout plan.
- Update the EMPr (if necessary).

These environmental management objectives, as well as the management actions that must be implemented in order to achieve the desired objective and avoid/minimise potential impacts are discussed in more detail below.

9.1 OBJECTIVE 1: APPOINTMENT OF AN INDEPENDENT ENVIRONMENTAL CONTROL OFFICER

***Impact Management Objective:* To appoint a suitably qualified and experienced Environmental Control Officer.**		
Potential impact to avoid	Failure to appoint an ECO will result in non-compliance with the requirements of the EMPr.	
Impact Management Outcome	The requirements of the EMPr are implemented and monitored during all phases of the development, which will promote sound environmental management on site. Provisions made for all environmental measures and rehabilitation of any disturbance to the wetland.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• A suitably qualified and experienced Environmental Control Officer must be appointed before any activities commence on site. • The appointed ECO must adhere to the requirements stated in Chapter 15 and any other requirements specified in the Environmental Authorisation. • The appointed ECO must be advised of the construction start date, at least two weeks in advance, prior to the commencement of any construction activities on site, so that the ECO can perform a pre-commencement inspection, ensure any pre-construction conditions of the environmental	George Local Municipality	During design phase

authorization are completed, and plan for environmental awareness training of construction workers (see Appendix B for Environmental Awareness Plan). • An alien invasive monitoring, control and eradication plan is to be drafted and implemented prior to construction.		
Performance Indicator	A qualified ECO is appointed prior to the commencement of any construction activities (including pre-construction set-up activities) on site.	

9.2 OBJECTIVE 2: DETAILED DESIGN AND SITE LAYOUT PLAN

***Impact Management Objective:* To compile a detailed design and site layout plan that adheres to the recommendations of the BAR Report and any additional conditions which may be included in the Environmental Authorisation.**		
Potential impact to avoid	Substantial deviation from the conceptual layout plan may result in: • Non-compliance with the Environmental Authorisation during construction. • Triggering of additional listed activities not authorised in the Environmental Authorisation. • An increase in the severity of the impacts identified and assessed in the BAR or may result in new impacts not previously assessed and not provided for in the EMPr, resulting in environmental degradation. • Visual disturbance. • Damage to the aquatic ecosystem.	
Impact Management Outcome	Development is compliant with recommendations of the BAR and the EMPr.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
General • 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.	George Local Municipality / Consulting Engineer	During design phase

• 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 final detailed design & layout must adhere to the conceptual layout assessed in the BAR process. • The final detailed design & layout must adhere to any conditions of the Environmental Authorisation (EA). • If the final detailed design differs significantly from that assessed during the BAR, the revised layout must be assessed by an Environmental Consultant and the approved EA must be amended by the Competent Authority before proceeding. • Interested & Affected Parties may need to be provided with an opportunity to comment on any proposed amendment to the EA depending on the significance of the changes. • It is recommended that the stormwater management plan take into account any ecological input and be developed based on Sustainable Drainage Systems (SUDS). • Provide provisions in the detailed design of the layout to accommodate protected trees. • Open Space to be incorporated in final plan to include ecological corridors and riparian zones. • Appropriate measures to dissipate flow velocity below bridge structures must be considered and designed for pre-construction. • 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. • Soft infrastructure must be considered where practical. For example, permeable surfaces can be done via permeable concrete block pavers (such as Amorflex), brick pavers, stone chip, and gravel and may contribute to slowing surface flows (especially if maintained). Baffles in the stormwater conduits are effective. Stormwater managed by the development could be discharged into porous channels / swales ('infiltration channels or basins') running near parallel or parallel to contours within and along the edge of the development		
Performance Indicator	Detailed designs and site layout plans that adhere to the conditions of the EA and EMPr are finalised prior to the commencement of construction.	

10. Environmental Impact Management: Pre-construction Phase

Proper set-up during the pre-construction phase can set the foundation for good environmental management during the active construction phase to follow and can avoid potential impacts from arising at a later date.

The Impact Management Objectives for this phase of the project relate to:

- Identification and Demarcation of no-go areas and working areas.
- Establishment of site camp and associated site facilities.
- Pre-construction ECO visit.

10.1 OBJECTIVE 1: IDENTIFY & DEMARCATE NO-GO AND WORKING AREAS

Impact Management Objective: ***Identify and demarcate no-go areas, working areas and site facilities.***			
Potential impact to avoid	• No-Go areas include aquatic habitats and public open space to remain natural. • Incorrect location of working areas and site facilities may result in environmental impacts during the construction phase. • Failure to accurately demarcate working areas may result in an increased disturbance footprint. • Failure to demarcate no-go areas may result in disturbances to these areas during construction.		
Impact Management Outcome	Future construction activities will be restricted to within the designated areas & environmentally sensitive areas (no-go areas) will be protected from disturbance.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
• The environmentally sensitive areas must be identified and be designated as no-go areas. • Demarcation of working area and no-go areas must be done in accordance with Section 8.2 of this EMPr. • Site camp facilities must be situated as far away from the No-Go areas as possible. • Ensure the relevant ECO is present for demarcation. • The buffer area must be considered as a No Go area for infrastructure.		Contractor	Pre-construction phase (prior to arrival of construction equipment, machinery, or workers on site)
Performance Indicator	No-go areas, working areas and areas for site camp facilities have been identified and appropriately demarcated to the satisfaction of the ECO, before construction activities commences on site.		

10.2 OBJECTIVE 2: ESTABLISH ENVIRONMENTALLY SENSITIVE SITE CAMP & SITE FACILITES

Impact Management Objective: ***To set up and equip the site camp and associated site facilities in a manner that will promote good environmental management.***	
Potential impact to avoid	• An inadequate location for the site camp facilities may result in impacts to sensitive resources.

	• Failure to properly demarcate and set up site facilities may result in disorganised construction activities and unnecessary disturbance to the site. • Failure to provide the necessary site facilities and/or failure to equip these facilities with the necessary equipment/materials may impede good environmental management & compromise ability to respond to emergencies.
Impact Management Outcome	Site camp facilities do not impact significantly on environment. The equipment required to implement the provisions of the EMPr are provided on site.

IMPACT MANAGEMENT ACTIONS

Mitigation measure	Responsible party	Time period
• The site camp and associated site facilities must be set-up and managed in accordance with the general environmental management measures specified in Chapter 8 of this EMPr. • The site camp must be strategically set up, away from freshwater resources, in a manner that will promote good environmental management during construction/ demolition, and to respond to potential emergencies (including fires, spillage of hazardous substances etc.) that may arise. • The site camp, storage facilities, stockpiles, waste bins, 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. • Frequent stormwater outlets must be designed to prevent erosion at discharge points. • It is recommended that the stormwater management plan be developed with appropriate ecological input and be developed based on Sustainable Drainage Systems (SUDS). • 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. • 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.	Contractor / George Local Municipality	Pre-construction phase (prior to start of construction activities)

Performance Indicator	Appropriate, well organised, and properly equipped site facilities are available on site prior to commencement of construction activities. The location and set up of the facilities don't impact on the natural resources.

10.3 OBJECTIVE 3: PRE-CONSTRUCTION ECO INSPECTION

It is essential that the appointed ECO be advised of the intended construction start date before construction activities commence on site, in order for the ECO to conduct an initial site inspection to assess the pre-commencement condition of the site. The ECO can also advise on the appropriate siting and demarcation of the site facilities, and the identification and demarcation of the no-go areas. The ECO may also conduct the first round of environmental awareness training at this stage, if the construction workers are present on site.

Impact Management Objective: ***Environmental Control Officer to conduct an inspection prior to the commencement of construction activities on site.***		
Potential impact to avoid	• Failure to appoint ECO or to notify ECO of commencement prior to commencement may result in non-compliance with the EA. • If a pre-commencement ECO inspection is not performed, the Construction Contractor may be held liable for environmental degradation that took place prior to the Contractor commencing work on site.	
Impact Management Outcome	• Good environmental management is promoted and enforced by the ECO during the full pre-construction and construction phases. • Site facilities are appropriately located on site. • Construction workers receive environmental awareness training before commencing work on site.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• The appointed ECO must be advised of the construction start date, before any activities commence on site so that the ECO can perform a pre-commencement inspection and plan for environmental awareness training of construction workers.	Contractor	Start of construction phase
Performance Indicator	A pre-commencement site inspection is conducted by the appointed ECO before construction activities commence on site.	

11. Environmental Impact Management: Construction Phase

A number of potential environmental impacts may arise during the construction phase of the development. These impacts have been identified and assessed during the Environmental Impact Assessment process. Environmental Management objectives and actions that will prevent the identified potential impacts from arising – or where avoidance is not possible, that will minimise and mitigate the impacts – are provided in this section.

The environmental management actions and mitigation measures prescribed in this section must be implemented throughout the construction phase and must be implemented in conjunction with the general management measures specified in Chapter 8 of this EMPr, as well as any other conditions which may be stated in the Environmental Authorisation. The Environmental Control Officer must monitor and enforce the implementation of the relevant environmental management measures and may provide guidance on the implementation of these environmental management measures as and when required.

The environmental management objectives (goals) for the Construction phase are:

- Reduce sedimentation and erosion within the Aquatic habitat
- Reduce disturbance of aquatic habitat
- Prevent pollution
- Reduce faunal impact
- Prevent flow modification
- Maintain sense of place (noise, dust and lifestyle)
- Traffic safety
- Prevent the loss of terrestrial vegetation / habitat
- Creation of multiple job opportunities & capital expenditure
- Reduce the visual impact

The environmental management actions that must be implemented in order to achieve the desired objectives and avoid/minimise potential impacts are discussed in more detail in the sections below.

11.1 OBJECTIVE 1: REDUCE SEDIMENTATION AND EROSION WITHIN THE AQUATIC HABITAT

Impact Management Objective: ***To prevent soil loss on site and prevent increased turbidity / sediment load in watercourses.***	
Potential impact(s) to avoid	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. This 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.

Impact Management Outcome	Aquatic and Stormwater systems are not impacted significantly as a result of soil erosion. Wetland habitat remains in a healthy state.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<u>General</u> • The working area and site camp must be clearly demarcated during the pre-construction phase. • Land clearing and construction activities must be restricted to within the demarcated working area to prevent unnecessary disturbance, exposure or compacting of surrounding areas. • Any erosion runnels/ gulley's/ channels that form on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures put in place to prevent recurrent erosion at that site. Rehabilitation of erosion channels should be ongoing during the construction phase and not left until the end of the construction period. ECO supervision required. • Construction must be avoided during rainy days, to prevent excessive turbidity. • Manual labour must be favoured over mechanical methods. Heavy machinery may only be used as a last resort if manual methods are not feasible or practical. • Construction work must be well-planned and well-managed so that construction work proceeds quickly and efficiently, thus minimising the duration of disturbance. • Silt fences or similar measures must be erected between the construction site and the aquatic buffer, to prevent sediment laden storm water from entering the watercourse. • All equipment and materials storage areas must (if practical, reasonable and feasible) be located at a minimum distance of 50m from the watercourse. The appointed ECO must be consulted in this regard. • Construction must be carried out during the dry season where possible and contingency plans must be in place for high rainfall events during construction. • 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. <u>Cleared surfaces</u> • 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	Contractor	Construction phase

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. • If site development does not occur soon after preparation of the site, a suitable cover crop to be established as a temporary measure. • Only the area required to accommodate construction activities within the working area should be cleared of surface covering. Unnecessary clearing/ disturbance of land and exposure of soil must be avoided. • Land clearing, earth-moving and construction activities should not take place during heavy rains, or windy conditions. • 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. 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. <u>Vegetation</u> • No aquatic vegetation or surrounding natural vegetation should be disturbed unnecessarily. If any vegetation is intended for removal that has not been covered in this assessment, it must be brought to the attention of the responsible ECO to address. • Establish key personnel to clear alien vegetation in buffer zone, in accordance with the alien vegetation management plan, identifying alien and indigenous species. <u>Stockpiles</u> • 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 (must not be located within the buffer area). All stockpiling areas must be approved by the ECO before stockpiling occurs. • 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. • Stockpiles of topsoil & spoil material must be protected from wind & water erosion. • Stockpiles of earth material may not be located within any storm-water drainage pathways and must be outside of the reach of potential flood waters. Stockpiles cannot be within the buffer area.		

• Stockpiles should not be excessively high, particularly stockpiled sediment, these should not exceed 2m's in height. • Stockpiles must not be located within 50 metres of the wetland, dam, and riparian buffer. The furthest threshold must be adhered to. <u>Stormwater control</u> • Before any work commences, sediment control/silt capture measures (e.g. bidim/silt curtains) must be installed downstream/downslope of the active working areas. • The SuDS Stormwater management and drainage system should inform the stormwater design of developed areas. • The Storm Water Management Plan should adhere to the principles of sound storm water management. The storm water management system must be implemented on site and must be properly maintained. • Clean and contaminated storm water must be kept separate. Contaminated run-off from the construction site must be prevented from flowing into the streams. • Berms or similar measures must be implemented to slow down the speed of storm water flows into the watercourse. • 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.		
Performance Indicator	The water courses are not significantly impacted as a result of soil erosion.	

11.2 OBJECTIVE 2: REDUCE DISTURBANCE OF AQUATIC HABITAT

<u>Impact Management Objective:</u> To reduce the loss and disturbance of the aquatic habitat during construction	
Potential impact(s) to avoid	• Physical disturbance to aquatic ecosystems during the construction phase. • Increase of sedimentation/turbidity in the watercourses, which may impact biota and instream habitats. • Establishment of alien invasive species. • Encroachment within the aquatic buffer. • Reduction in aquatic biodiversity. • Soil erosion within the aquatic ecosystem. • Soil compaction within the aquatic ecosystem.
Impact Management Outcome	Construction activities do not significantly impact on the aquatic ecosystem of the Wetland.
IMPACT MANAGEMENT ACTIONS	

Mitigation measure	Responsible party	Time period
<u>General</u> • 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. • 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. • All equipment and materials storage areas must (if practical, reasonable and feasible) be located at a minimum distance of 50m from the buffer zone. The appointed ECO must be consulted in this regard. • Construction personnel, equipment and materials must be limited to the minimal practical working area. • Construction must be carried out during the dry season where possible and contingency plans must be in place for high rainfall events during construction. • Construction must be avoided during rainy days, to prevent excessive turbidity. • Construction work must be well-planned and well-managed so that construction work proceeds quickly and efficiently, thus minimising the duration of disturbance. • 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. • The buffer area must be considered as a No Go area for infrastructure. • No equipment laydown or storage areas must be located within delineated freshwater buffer zone. <u>Vegetation</u> • No aquatic vegetation or surrounding natural vegetation should be disturbed unnecessarily. If any vegetation is intended for removal that has not been covered in this assessment, it must be brought to the attention of the responsible ECO to address. • 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.	Contractor	Construction phase

Stormwater control • Stockpiles must not be located within 50 metres of the wetland, dam, and riparian buffer. The furthest threshold must be adhered to. • It is recommended that the stormwater management plan be developed with appropriate ecological input and be developed based on Sustainable Drainage Systems (SUDS). • Frequent stormwater outlets must be designed to prevent erosion at discharge points. • Stormwater exit points must include a best management practice approach to trap any additional suspended solids and pollutants originating from the proposed development. • The stormwater flows must enter the aquatic areas in a diffuse flow pattern without pollutants. • Contaminated run-off from the construction site must be prevented from flowing into the aquatic system. Please refer to the mitigation measures required to prevent the impact of "pollution and contamination". The same mitigation measures apply to reduce the risk of pollution and contamination of the watercourse(s). • Berms or similar measures must be implemented to slow down the speed of storm water flows into the watercourse. • All equipment and materials storage areas must (if practical, reasonable and feasible) be located at a minimum distance of 50m from the watercourse. The appointed ECO must be consulted in this regard.		
Performance Indicator	The aquatic system and Wetland remain within a healthy state throughout the construction period.	

11.3 OBJECTIVE 3: PREVENT POLLUTION OF THE AQUATIC SYSTEMS AND SURROUNDING ENVIRONMENT

Impact Management Objective: ***To prevent environmental pollution and contamination of soil and water resources***	
Potential impact(s) to avoid	• Fuel, oil, lubricant or other pollutants leaking from vehicles/ machinery and contaminate soil, surface water and/or ground water. • Leaking chemical toilets. • Contaminated run-off from site or site camp facilities entering soil or water resources. • Failure of on-site wastewater infrastructure leading to the pollution of watercourses • Waste (solid or liquid) from the construction site blown or washed into surrounding environment. • Alteration of aquatic parameters (pH, turbidity and nutrient levels) • Contamination of soil or water impacting the surrounding and downstream land/water users, biota and livestock.
Impact Management Outcome	The environment (including soil, surface water and groundwater) is not contaminated. Wetland remains free of pollution.
IMPACT MANAGEMENT ACTIONS	

Mitigation measure	Responsible party	Time period
<u>General Pollution Management</u> • 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. • All equipment and materials storage areas must (if practical, reasonable and feasible) be located at a minimum distance of 50m from the watercourse. The appointed ECO must be consulted in this regard. • 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. • The proposed buffer zone around the watercourse needs to be strictly adhered to. • Establish buffer zone, identify the extent of development footprint closest to the sensitive aquatic vegetation. • Construction personnel, equipment and materials must be limited to the minimum practical working footprint. • Appropriate stormwater measures must be implemented. • No Pollution may enter the buffer area. <u>Pollution management within the aquatic systems</u> • 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. <u>General Waste Management</u> • 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.	Contractor	Construction phase

• 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. • Ensure that waste receptacles are weighted down, have weighted covers, are labelled appropriately, and are cleaned by a reputable waste disposal company. Obtain a disposal/cleaning slip for this waste, to file in the Environmental File. • 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, resulting from the proposed activities must be disposed of appropriately at a licensed Waste Disposal Facility (WDF). <u>Pollution Management - Hydrocarbons (oil, fuel etc.)</u> • 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. <u>Pollution Management – Ablution facilities</u> • Chemical toilets must 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. • Toilet facilities must be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 30 workers in areas approved by the ECO, separate toilets must be supplied as per gender. • Ablutions should be further a fair distance from the aquatic buffer area. • Temporary/ portable toilets must be secured to the ground to prevent them toppling due to wind or any other cause, to the satisfaction of the ECO. • Discharge into the environment and burial of waste is strictly prohibited. The Contractor must ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site, disposal/cleaning slips must be filed in the Environmental File, to ensure that these are available for review. • Toilets shall be emptied before the Contractors' holidays or any other temporary site closure. • Ablutions should be further than 10m from aquatic buffer area. <u>Pollution Management – Hazardous Substances</u> • 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 storage and refuelling areas must be bunded with an impermeable liner to protect groundwater quality. The bunding shall be capable of handling a volume 150% the volume of the container storing the substance. • Adequate hazmat spillage cleaning kits must be readily available in the event of oil and hydraulic spills. <u>Cement Batching</u> • 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.		
Performance Indicator	The site and aquatic system remains free of any pollutants (in accordance with any necessary tests) and any spills that occur are responsibly managed and recorded on file during monitoring.	

11.4 OBJECTIVE 4: MINIMISE FAUNAL IMPACT

<u>Impact Management Objective:</u> Ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the existing fauna.		
Potential impact(s) to avoid	• Physical disturbance to terrestrial ecosystems during the construction phase. • Encroachment within the aquatic buffer. • Reduction in aquatic biodiversity. • Soil erosion. • Soil compaction. • Loss of faunal species, such as the identified amphibian, reptile, mammal and bird species currently on the site.	
Impact Management Outcome	Construction activities do not significantly impact on the faunal habitat and sufficient quality, quantity and connectivity of habitat is provided to accommodate the existing fauna.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period

• Demarcate/fence off the construction area. • Erect signage prohibiting access beyond fence line. • The labour should be educated on indigenous fauna species within the site, and surrounding site, as well as the importance and maintenance of the temporary fencing. • Development setback buffers to be implemented to avoid watercourses that are also associated with botanical sensitivity. • Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing and grubbing commences. • No clearing outside of development and infrastructure footprint area to take place. • Final siting of footprint should be undertaken in consultation with respective specialists. • Fauna may not be captured, kept, sold, or traded. • Ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population (ecological corridors). • Protect reptiles from harm during the construction phase and translocate individuals where possible. • Limit speeds of construction vehicles. • Remove alien invasive plants and rehabilitate.	Contractor	Construction phase
Performance Indicator	Aquatic ecosystem is free of alien invasive species and the ecosystem is in a healthy state.	

11.5 OBJECTIVE 5: PREVENT FLOW MODIFICATION.

***Impact Management Objective:* Maintain the hydrological integrity of the water resource.**		
Potential impact(s) to avoid	• Increased surface runoff volume and velocity • Reduced infiltration rates • Potential rill/gully erosion. • Altered water inputs from upslope disturbances. • Modification of water distribution and retention patterns will ultimately affect the hydrological integrity of water resources	
Impact Management Outcome	The hydrological integrity is maintained.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Construction personnel, equipment and materials must be limited to the minimal practical working area. • Stormwater control measures must be implemented for the duration of the project.	Contractor	Construction phase

• Silt fence must be erected between the construction activities and the watercourse to prevent sediments-laden storm water from entering the watercourse. • Berms or similar measures must be implemented to slow down the speed of storm water flows into the watercourse. • All equipment and materials storage areas must (if practical, reasonable and feasible) be located at a minimum distance of 50m from the watercourse. The appointed ECO must be consulted in this regard. • Utilize impermeable surfaces, where drainage is not directed to the wetland/watercourse system, for machinery/vehicle maintenance. It is preferable to relocate this off site. • Designate an area for storage of materials, particularly fuels/hazardous waste, demarcate, erect signage, and bund any container containing these materials. Ensure there is a cover. • Ensure that hazardous waste bins are weighted down, have weighted covers, are labelled appropriately, and are cleaned by a reputable waste disposal company. Obtain a disposal/cleaning slip for this waste, to file in the Environmental File. • Soil contaminated by spilled oil/ fuel/ lubricant must be excavated and disposed of in the hazardous waste bin. • Cement mixing must be conducted on impermeable surfaces. Utilize shutter boards/tarp, that are appropriately bunded. • Ensure stockpiles are bunded, utilize sandbags. • 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.		
Performance Indicator	• No erosion channels • Hydrological integrity of the water resource remains intact	

11.6 OBJECTIVE 6: MAINTAIN SENSE OF PLACE (NOISE, DUST AND LIFESTYLE)

***Impact Management Objective:* To maintain the sense of place associated with the surrounding area.**			
Potential impact(s) to avoid	• Avoid unnecessary noise generated during the undertaking of construction activities, which may present a nuisance to surrounding community and negatively impact the Sense of place. • Dust may cause a nuisance to the surrounding residents. • Dust may smother surrounding vegetation. • Decreased visibility for labourers and operators. • Unsettled community.		
Impact Management Outcome	The construction of the proposed development does not alter the sense of place		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
Noise • A complaints register should be available on site. • Strict operating hours for heavy vehicles and construction activities should be implemented so as to avoid times of day when noise impacts are more likely to affect adjacent landowners, ie: construction activities, including the movement of vehicle should be limited to between 07h30 and 17h30.		Contractor	Construction phase

• No construction related activities should be permitted over weekends. • 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. If deemed necessary, 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 location 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, the residents 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. <u>Dust</u> • 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. • Material loads should be properly covered during transportation. • Wetting of soils must be considered, if dust dispersal is excessive. • 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.		
Performance Indicator	Noise and dust levels on site remain within acceptable standards. No complaints are received.	

11.7 OBJECTIVE 7: TRAFFIC SAFETY.

Impact Management Objective: ***To ensure continued community on the roads during construction.***		
Potential impact(s) to avoid	• The temporary disturbance to traffic in the area. • Reduced safety on surrounding roads. • Damage to the condition of the of the existing road network. • An increase in crime.	
Impact Management Outcome	The functioning of the surrounding road network remains efficient and the state of the infrastructure isn't hampered.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• 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.	Contractor	Construction phase

• 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 the N2. • Speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. • 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. • 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. • 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. • 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. • Ensure that adjacent property owners are able to access their properties at all times.		
Performance Indicator	• The surrounding road networks infrastructure remains in its current state. • Limited congestion and traffic.	

11.8 OBJECTIVE 8: PREVENT THE LOSS OF TERRESTRIAL VEGETATION / HABITAT.

***Impact Management Objective:* Reduce the impacts caused by land disturbance and conserve the Indigenous Vegetation on site.**		
Potential impact(s) to avoid	• Unnecessary loss of Indigenous Vegetation caused by construction activities. • Unsuccessful reinstatement of topsoil • Increased susceptibility to erosion caused by construction activities. • Negligence of indigenous vegetation or topsoil that require transplanting.	
Impact Management Outcome	The loss of indigenous vegetation on site is minimised and results in no erosion. Any species of conservation concern are conserved.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period

• If site development does not occur soon after preparation of the site, a suitable cover crop to be established as a temporary measure. • Cleared areas must be rehabilitated and a suitable cover crop planted once specific phases of construction is completed. • Great care will be taken if cement is to be mixed on site, especially in the proximity of vegetation and watercourses. It will be mixed on thick plastic sheets or in large buckets and not allowed to spill onto bare ground. Any spillage will be cleaned up immediately. Cement water will also be contained in the above manner and allowed to dry out and then removed from site. Cement water, which is highly alkaline, poses a definite threat to the soil and seed banks. • Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing and grubbing commences. • No clearing outside of development and infrastructure footprint area to take place. • If removal/trimming/cutting is required, for a SCC (Species of Conservation Concern), a permit should be obtained from the Department of Forestry and Fisheries. • An Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here and will be on site regularly. • Final siting of footprint should be undertaken in consultation with respective specialists, including a botanist. • Removed topsoil should be used in rehabilitation of transformed areas that are within the open space areas. • 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*. • Alien vegetation should be removed, and disposed off-site, at a registered waste facility, disposal slips must be obtained for waste disposal. • 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. • Develop and implement fire management program	Contractor	Construction phase
Performance Indicator	• Construction team limit disturbance to the indigenous vegetation as far as possible for the duration of the construction phase. • Indigenous vegetation transplanted successfully and remains in a healthy state. • There is no evidence of erosion.	

	• Fire management program developed.

11.9 OBJECTIVE 9: CREATION OF MULTIPLE JOB OPPORTUNITIES AND CAPITAL EXPENDITURE.

Impact Management Objective: ***To create employment opportunities with potential for skills transfer, for members of the local community.***		
Potential impact(s) to be promoted.	• A number of job opportunities will be created during the construction phase of the development. • There transfer skills from more experienced workers to less experienced workers. • Increase in business for local businesses within the construction industry.	
Impact Management Outcome	The local community benefits from the employment opportunities created during the construction phase.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• George Local Municipality should establish a database of local construction companies in the area, specifically SMME's owned and run by HDI's (Historically Disadvantaged Individuals) and local individuals, prior to the commencement of the tender process for the development. These companies should be notified of the tender process and invited to bid for project related work. • George Local Municipality in consultation with the appointed contractor/s should seek to ensure that a percentage of the labour required for the construction phase is sourced from local area in order to maximize opportunities for members from the local HD communities. • Ensure specialist reports and input are available to the public and can be referenced/reviewed for future developments in the surrounding area. • 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.	George Local Municipality / Contractor	Construction phase
Performance Indicator	The majority of the construction team is from the local community, with preference given to historically disadvantaged individuals. Skills transfer from experienced to less experienced workers is actively encouraged on site.	

11.10 OBJECTIVE 10: VISUAL IMPACT MANAGEMENT.

Impact Management Objective: ***To prevent the site from presenting an unnecessary visual impact to the surrounding public.***		
Potential impact(s) to avoid	• Temporary loss of the sense of place.	
Impact Management Outcome	The site does not present a significant visual impact and the sense of place is maintained during the construction period.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Consult with the ECO when determining the appropriate site for the site camp.	Contractor	Construction phase

• The site camp must be kept neat and tidy and free of litter at all times. • Waste must be managed according to this 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. • The site camp, storage facilities, stockpiles, waste bins, 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. • 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. • Working areas, 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. • Ensure indigenous vegetation has been sourced, if not moved to site, to be established as soon as construction activity has concluded, and re-grassing of natural surfaces, ie: grassed road reserves, pathways, etc, commence as soon as possible. • Alien vegetation monitoring and clearance must be implemented.		
Performance Indicator	• Good "housekeeping" is evident on site. • The site does not pose a visual impact to surrounding community.	

12. Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase

After all construction activities have ceased, the sites must be cleared of all construction related equipment, materials, facilities and waste. In addition, all disturbed surfaces – including disturbed areas around the structures and all areas utilised for site facilities – must be stabilised, rehabilitated and provided with a suitable cover. All temporary access roads constructed must be rehabilitated and access must be restricted from the public.

The environmental management objectives (goals) for this phase are:

- Rehabilitate & stabilise disturbed areas and ensure environmentally sensitive closure of the construction sites.
- Reduce loss and disturbance of the aquatic habitat
- Reduce visual impact.
- Reduce traffic impact.
- Maintain ecological processes
- Prevent flow modification
- Prevent pollution
- Prevent sedimentation and erosion
- Provision of affordable housing.
- Provision of formal Sports Facilities and Public Spaces
- Creation of Business and Employment Opportunities.
- Broaden the Rates Base
- Improve local economic revenue.
- Maintain sense of place.
- Remain fire wise.

12.1 OBJECTIVE 1: REHABILITATE & STABILISE DISTURBED AREAS

Impact Management Objective: ***To rehabilitate all areas disturbed by construction activities in an environmentally sensitive manner.***	
Potential impact(s) to avoid	• Failure to remove all construction related waste and materials may result in environmental pollution. • Failure to remove all construction related equipment, machinery and site facilities may pose an impact to the natural environment specifically the watercourses. • Failure to stabilise disturbed surfaces may result in soil erosion and increased storm water run-off, which may limit successful revegetation of the site.
Impact Management Outcome	• The site is neat and tidy, all exposed surfaces are suitably covered/ stabilised. • There is no construction-related waste or pollution remaining on site.
IMPACT MANAGEMENT ACTIONS	

Mitigation measure	Responsible party	Time period
• On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material. • Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the ECO. • Any contaminated soil must be collected and disposed of as hazardous waste. • All construction waste, litter and rubble are to be removed from the site and re-used elsewhere, or recycled/disposed of at an appropriate facility. • Burying or burning of waste or rubble on site is prohibited. • All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities should be scarified or ripped. • Topsoil removed during the establishment of the site camp and the working area must be spread evenly over the entire site camp area and all other disturbed/ exposed areas after those areas have been ripped, scarified, shaped and contoured (as required). • Where necessary seeding and planting of vegetation can take place after the replacement of the topsoil. Hardy, drought tolerant, non-invasive plant species must be selected. If needed, a layer of mulch can be applied to the newly shaped/ landscaped and topsoiled areas. The mulch will serve to limit erosion and will promote the re-vegetation of the site by retaining moisture in the soil and providing organic material (compost) for new plant growth. • All exposed soils and recently topsoiled areas are to be re-vegetated or stabilised to the satisfaction of the ECO, to protect these areas from wind and water erosion. No areas are to be left exposed to erosive forces. Erosion protection measures that can be applied include mulching (described above), the placement of geotextile, onion bags filled with wood chips, brush-packing or other similar measures. • Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and reused elsewhere on the property or disposed of at an appropriate disposal site. • Disturbed soils must be revegetated with the local indigenous vegetation such as that which occurs at the site, or provided with other suitable cover. • Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised.	Contractor	Construction phase

Performance Indicator	• All construction-related materials, equipment, facilities, waste and contaminated soils have been removed from the site. • Compacted soils have been scarified/ ripped and stabilised. • All disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised. • No alien vegetation is evident on site.

12.2 OBJECTIVE 2: REDUCE LOSS AND DISTURBANCE OF THE AQUATIC HABITAT

Impact Management Objective: ***Management of the aquatic habitat in order to maintain a functioning ecosystem***		
Potential impact(s) to avoid	• Loss of aquatic habitat within the wetland. • Establishment of alien invasive species within the riparian zone. • Erosion within the riparian habitat	
Impact Management Outcome	• Minimal loss of Aquatic Habitat and Associated Biota	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• 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. • 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	Developer	Operational phase

water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion. • 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. • The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater. • Appropriate wastewater infrastructure must be designed to prevent any such water from entering the surrounding environment. • Implement gabions at the base of the slope, to provide slope stability/support, as well as attenuation of surface runoff. • 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. • Identify the buffer zone. Erect signage, with the relevant information: o Brief description of wetland habitat. o Prohibited activities. o Identify alien invasive species to be aware of, with photos.		
Performance Indicator	• All disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised. • A healthy aquatic habitat	

	• Minimal waste within the aquatic habitat • Minimal alien vegetation present

12.3 OBJECTIVE 3: REDUCE VISUAL IMPACT.

***Impact Management Objective*: Reduce the visual impact caused by the proposed development.**		
Potential impact(s) to be avoided.	• Change in the sense of place. • Community tension.	
Impact Management Outcome	• The proposed development once constructed blends in with the community.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• 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. • Unnecessary use of lighting should be avoided. • 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	Developer	Operational phase

and energy efficient. • The state of the onsite vegetation should be maintained and kept in a healthy state. • Collection of refuse must be maintained. • Infrastructure should be maintained. • Residential developments must utilize natural colours where possible, so as to not clash with the surrounding natural environment.		
Performance Indicator	• The proposed development forms part of the community and the visual impact is dissipated.	

12.4 OBJECTIVE 4: REDUCE TRAFFIC IMPACT.

***Impact Management Objective*: Reduce the traffic impact caused by the proposed development.**		
Potential impact(s) to be avoided.	• Damage to road infrastructure. • Community tension.	
Impact Management Outcome	• Surrounding road networks remain safe to use and free of excessive congestion.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• 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.	Developer	Operational phase
Performance Indicator	• The proposed development forms part of the community and the visual impact is dissipated.	

12.5 OBJECTIVE 5: MAINTAIN ECOLOGICAL PROCESSES

***Impact Management Objective*: Ecological processes exist within a functional state**	
Potential impact(s) to be avoided.	• Disturbance of ecological processes. • Loss of biodiversity. • Erosion. • Sedimentation. • Loss of habitat.

Impact Management Outcome	• A healthy and functioning ecosystem.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Draft and implement 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. • No clearing outside of development and infrastructure footprints to take place.	Developer / George Local Municipality	Operational phase
Performance Indicator	• A well-balanced community ecosystem and healthy community.	

12.6 OBJECTIVE 6: PREVENT FLOW MODIFICATION.

***Impact Management Objective:* Maintain the hydrological integrity of the water resource.**		
Potential impact(s) to avoid	• Increased surface runoff volume and velocity • Reduced infiltration rates • Altered water inputs from upslope disturbances. • Modification of water distribution and retention patterns will ultimately affect the hydrological integrity of water resources	
Impact Management Outcome	The hydrological integrity is maintained.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Draft and implement an alien invasive monitoring, control and eradication plan. • Stormwater control measures must be implemented for the duration of the project. • 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. • 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. • 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.	George Local Municipality.	Construction phase

• 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.		
Performance Indicator	• No erosion channels • Hydrological integrity of the water resource remains intact	

12.7 OBJECTIVE 7: PREVENT POLLUTION OF THE AQUATIC SYSTEMS AND SURROUNDING ENVIRONMENT

Impact Management Objective: ***To prevent environmental pollution and contamination of soil and water resources***		
Potential impact(s) to avoid	• Fuel, oil, lubricant or other pollutants leaking from vehicles and contaminate soil, surface water and/or ground water. • Contaminated run-off from facilities entering soil or water resources. • Failure of wastewater infrastructure leading to the pollution of watercourses • Waste (solid or liquid) from the construction site blown or washed into surrounding environment. • Alteration of aquatic parameters (pH, turbidity and nutrient levels) • Contamination of soil or water impacting the surrounding and downstream land/water users, biota and livestock. • Pollution of watercourses	
Impact Management Outcome	The environment (including soil, surface water and groundwater) is not contaminated. Wetland remains free of pollution.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• 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 wastewater 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.	George Local Municipality.	Construction phase

• 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.		
Performance Indicator	The site and aquatic system remains free of any pollutants (in accordance with any necessary tests) and any spills that occur are responsibly managed and recorded on file during monitoring.	

12.8 OBJECTIVE 8: REDUCE SEDIMENTATION AND EROSION WITHIN THE AQUATIC HABITAT

***Impact Management Objective:* To prevent soil loss on site and prevent increased turbidity / sediment load in watercourses.**		
Potential impact(s) to avoid	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.	
Impact Management Outcome	Aquatic and Stormwater systems are not impacted significantly as a result of soil erosion. Wetland habitat remains in a healthy state.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• 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.	George Local Municipality.	Construction phase

Performance Indicator	The water courses are not significantly impacted as a result of soil erosion.

12.9 OBJECTIVE 9: PROVISION OF AFFORDABLE HOUSING.

***Impact Management Objective*: The proposed development will increase the amount of housing within the George Local Municipality, and address the housing backlog.**		
Potential impact(s) to be promoted.	• Improved quality of life. • An increase in the rates base for the municipality.	
Impact Management Outcome	• Improved quality of life.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Positive impact therefore mitigation is not required. Should be noted that it can be further enhanced by establishing a community group who can engage with stakeholders and maintain an open line of communication to ensure that the community is functioning optimally.	Developer / George Local Municipality	Operational phase
Performance Indicator	• A well-balanced community living in a safe and healthy community.	

12.10 OBJECTIVE 10: PROVISION OF FORMAL SPORTS FACILITIES AND PUBLIC SPACES

***Impact Management Objective*: The proposed development will increase the amount sports facilities and public spaces available, improving comment cohesion.**		
Potential impact(s) to be promoted.	• Improved quality of life. • An increase in the rates base for the municipality. • Preservation and enhancement of natural assets. • Enhanced Access to 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.	
Impact Management Outcome	• Improved quality of life.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
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.	Developer / George Local Municipality	Operational phase
Performance Indicator	• A well-balanced community living in a safe and healthy community.	

12.11 OBJECTIVE 11: BROADENING THE RATES BASE

***Impact Management Objective:* Increased economic revenue for local municipality**		
Potential impact(s) to be promoted.	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.	
Impact Management Outcome	• Financial stability improved for Local Municipality.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Positive impact, therefore to further enhance this impact.	Developer / George Municipality	Operational phase
Performance Indicator	• Increase in employment of local community members and utilization of local businesses and suppliers.	

12.12 OBJECTIVE 12: IMPROVE LOCAL ECONOMIC REVENUE.

***Impact Management Objective:* Increased economic revenue for local businesses and industries.**		
Potential impact(s) to be promoted.	• Increase in local economic revenue. • Decreased unemployment levels.	
Impact Management Outcome	• Creation of Business and Employment Opportunities.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Positive impact, therefore to further enhance this impact, the Local Municipality is encouraged to source local labour, particularly those of Historically Disadvantaged Backgrounds, given that they have the necessary skills or experience, as well as utilize local suppliers and businesses.	Developer / George Municipality	Operational phase
Performance Indicator	• Increase in employment of local community members and utilization of local businesses and suppliers.	

12.13 OBJECTIVE 13: MAINTAIN SENSE OF PLACE.

***Impact Management Objective:* Ensure that the development does not retract from the sense of place.**		
Potential impact(s) to be promoted.	• Increase in local economic revenue. • Decreased unemployment levels.	
Impact Management Outcome	• Creation of Business and Employment Opportunities.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Appropriate signage to indicate speed limits, and establishment of speed bumps, to reduce noise from traffic.	Developer / George Municipality	Operational phase

• Road network should be considered in municipalities future planning, for expansions, etc. • The development is predicted to have minimal nuisances in terms of sense of place, as the development will match the surrounding residential land uses.		
Performance Indicator	• A functioning community.	

12.14 OBJECTIVE 14: CREATION OF BUSINESS AND EMPLOYMENT OPPORTUNITIES.

Impact Management Objective: ***Creation of Business and Employment Opportunities***		
Potential impact(s) to be promoted.	• Increase in local economic revenue. • Decreased unemployment levels.	
Impact Management Outcome	• Creation of Business and Employment Opportunities.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Positive impact, therefore to further enhance this impact, the developer is encouraged to source local labour, particularly those of Historically Disadvantaged Backgrounds, given that they have the necessary skills or experience as well as utilize local suppliers and businesses. • The developer should inform local community leaders, organisations and councillors of the potential job opportunities associated with the different components associated with the operational phase of the development.	Developer / George Local Municipality	Operational phase
Performance Indicator	• Increase in employment of local employees from the surrounding communities. • Increase in small businesses/services.	

12.15 OBJECTIVE 15: REMAIN FIRE WISE.

Impact Management Objective: ***Reduce the potential for the spreading and starting of a wildfire***		
Potential impact(s) to be avoided.	• Loss of vegetation and habitats (Wetland habitat). • Risk to human life. • Risk to infrastructure.	
Impact Management Outcome	• Development remains fire wise. • Development protected from wildfires. • Implementation of the National Veld and Forest Fire Act (Act No. 101 of 1998)	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period

• Removal of dead vegetation. • Draft and implement an alien invasive monitoring, control and eradication plan • Detract from growing bushes, climbers and trees close to windows, glass doors, wooden decks or beams. • Ensure that gas is stored according to industry standards. • Maintain fire hoses and extinguishers. • Appoint a Fire Wise Committee and encourage community to join the Southern Cape Fire Protection Association. • No burning of garden waste is permitted. • Treat wooded decks with fire-retardant. • Erect signage.	Developer / George Local Municipality / Community	Operational phase
Performance Indicator	• No alien vegetation present. • No dead vegetation present. • Fire Wise Committee appointed. • Increase in small businesses/services.	

13. Emergency Preparedness

13.1 Emergency response procedures

The potential environmental risks that may arise as a result of construction activities, or during the maintenance of the structures must be identified, and appropriate emergency response procedures must be compiled for each emergency scenario. Potential environmental emergencies that require an emergency response include, but are not limited to, unplanned fires, sewage spills, spills of hazardous chemicals, snake bites etc.

- The construction contractor is responsible for identifying potential significant environmental risks that may arise as a result of pre-construction, construction and rehabilitation activities, and the contractor must formulate emergency response procedures for these potential incidents.
- The ECO, the contractor and the Holder are responsible for ensuring that all construction workers are aware of the emergency procedures and are properly trained on how to identify and respond to an emergency incident during construction.
- An emergency procedure must clearly indicate who will take charge during an emergency, and the roles and responsibilities of workers and authorities during an emergency.
- The construction contractor is responsible for ensuring that the requirements of the Occupational Health & Safety Act (OHSA) are adhered to during the construction phase. The Holder is responsible for ensuring compliance with the OHSA during the undertaking of maintenance activities.

13.2 Emergency preparedness

The following measures must be implemented, as appropriate, to ensure effective responses to emergencies:

- All workers on site during the construction and operational phase must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. "Refresher" training sessions on emergency procedures must be held if needed.
- All workers must ideally be given basic fire-awareness training, as well as be advised on basic firefighting and safety techniques. Fire-fighting equipment must be available on-site during construction and maintenance activities (see section 8.3).
- All workers must be trained on how to respond in the event of a spill of a hazardous substance (fuel, chemicals etc.), if hazardous substances are to be used on site.
- A spill kit for containing and/or neutralising spills of hazardous substances (e.g. hydrocarbons) must be available on site at all times, when hazardous substances are present.
- Any incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO must then (depending on the nature of the spill) notify the relevant authorities, if needed. During the operational phase of the development, the Holder is responsible for notifying the relevant authorities of any pollution incidents that arise as a result of maintenance activities.
- A first aid kit must be available on site at all times.
- Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.
- All emergency incidents must be recorded in a site incident log. The cause of the incident, the measures taken in response to the incident and the efficacy of those measures must also be recorded. This information must be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again

14. Potential Human-Wildlife Conflict

Given how the proposed development will transform the area, consideration and where necessary mitigation measures, will have to be implemented in terms of potential conflict between humans and wildlife.

Human-wildlife conflict occurs when the behaviour or requirements of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact on the needs of wildlife. Management of human-wildlife conflict requires an integrated or holistic approach towards solving these challenges.

Although ecosystem-based connectivity approaches such as the development of ecological corridors (between natural areas) offer improved protection and movement for many wildlife species, they also present opportunities for interaction and conflict between local people and wildlife. The Kat River, which runs from the Outeniqua Reserve along the western edge of the dam, provides a connectivity opportunity for wildlife movement through the open space provisioned in the development. This opportunity for wildlife movement has the potential for human-wildlife conflict.

Baboon and vervet monkey activity in residential areas near the urban edge is the most common form of human-wildlife conflict encountered in the George, Sedgefield and Knysna urban settings. However, wildlife such as bushbuck, duiker, bushpig, porcupine and even otters have been known to trigger conflict along the urban edge.

One should consider a systematic approach when dealing with human-wildlife conflict. See Diagram 1, illustrating a systematic approach of best practice when approaching human-wildlife conflict (CapeNature).

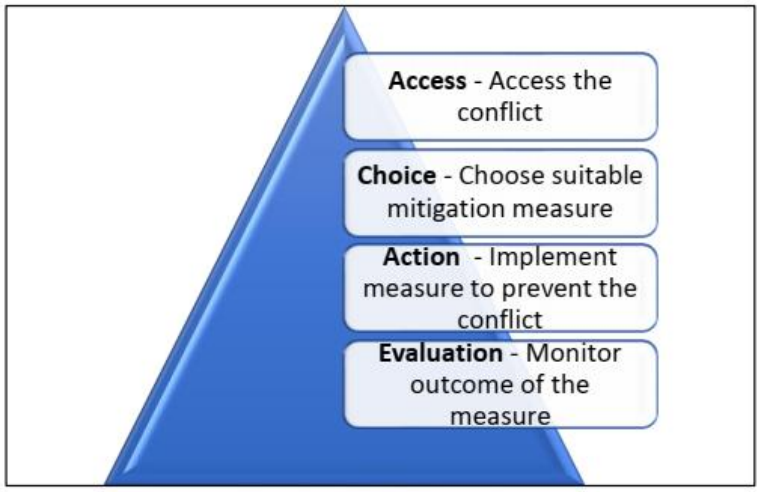

Figure 9: Systematic approach when dealing with human-wildlife conflict.

Table 3: Potential human-wildlife conflict and proposed mitigating measures

Species	Potential human wildlife conflict	Mitigating measure
Baboons and vervet monkeys	Baboons / monkeys damaging gutters, down pipes, thatched rooves.	• Install electrical strand along roof edge, gutters and down pipes. • Electric fence around development / property. • Cover thatch in chicken mesh.

Species	Potential human wildlife conflict	Mitigating measure
	Baboons / monkeys gaining access to house damaging possessions, eating food and defecating.	• Keep doors and windows closed if baboons are in the area. • Have baboon-proof burglar bars on windows so windows can remain open.
	Raiding of fruit trees, vegetable gardens, compost heaps.	• Cover compost heaps, erect netting over vegetables and fruit trees.
	Raiding of dustbins / wheelie bins.	• Only use baboon-proof wheelie bins with catches and keep wheelie-bin tied to a pole or in the garage. • Manage refuse responsibly
	Baboons that lose their fear of humans can become aggressive and can attack humans, causing injury.	• Do not feed baboons or monkeys or encourage interaction. • If human-wildlife conflict becomes unmanageable consider employing a baboon monitoring program
Bushbuck and duikers	Antelope browse growth points of young trees and other plants.	• Suitable fence or electric strand around property or young trees or beds. • Place Tubex tree guards around young saplings. • LED lights and other deterrents.
Bushpigs	Raiding of refuse or wheelie bins.	• Use wildlife proof dustbins and wheelie bins and manage refuse responsibly.
	Churning up of flower beds, sports fields and lawns.	• Place electric strands around affected areas. • LED lights and other deterrents. • Do not feed wildlife.
Porcupine	Feeding on bulbs, tubers and roots.	• Protect flower beds with electric strands and chicken mesh. Dig mesh in at least 300mm below ground.
	Gnawing on young bark of trees.	• Place plastic piping around young trees
	Gnawing on PVC water pipes and electrical plastic-coated wires	• Bury water piping and electrical cables at least 300mm below ground or elevate above ground by >500mm
Otters	Evidence of fish predation on fish located in ponds	• Place netting over ponds

15. Method statements

The Competent Authority and/or the ECO may require the Holder or Construction Contractor to submit Method Statements for one or more construction-related activity, or any aspect of the management of the site, before the activity is undertaken or during the performance of the activity, if the activity is causing or may cause significant environmental damage, or pose a health and safety risk.

Method Statements need not be complex and lengthy, but must clearly state **how**, **when** and **where** the activity concerned will be undertaken, and must specify **who** will be responsible for undertaking each component of that activity. Method Statements must be prepared by the Construction Contractor and submitted to the ECO for approval before undertaking the activity concerned.

The ECO and / or Competent Authority have the authority to request method statements for activities, including but not limited to:

- Establishment of site camp and stockpile area.
- Cement/ concrete batching, disposal and emergency contingencies.
- Topsoil and sub-soil storage/ stockpiling.
- Storage of fuels and hazardous chemicals and emergency contingencies.
- Waste management system.
- Storm water management and control.
- Alien invasive plant species management.
- Fire Control & Fire Emergency Plan.
- Emergency preparedness plan / emergency response procedure (see Chapter 14).
- Post-construction rehabilitation.

The ECO has the authority to prevent activities from being undertaken until such time as a satisfactory Method Statement has been submitted to the ECO and approved by the ECO.

16. Roles and Responsibilities

This EMPr, once approved by the competent authority (DEA&DP), must be seen as binding to the Holder, and any person acting on the Holder's behalf, including but not limited to agents, employees, associates, contractors and service providers.

The Holder and all other persons who may be directly involved in the development are also bound by their general Duty of Care, as stated in Section 28 of the National Environmental Management Act, 1998:

> ***Duty of Care:***
> *"Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment"*

16.1 Duties and Responsibilities of the Holder

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The Holder is ultimately responsible for ensuring that the environmental management measures specified in this EMPr, as well as any other conditions specified by the competent authority, are implemented and adhered to during the construction and operational phase (maintenance activities) of the proposed development

The Holder or delegated party is responsible for monitoring and maintenance during the operational phase. The Holder must ensure that all appointed service providers, contractors and maintenance workers are capable of complying with all statutory requirements of this EMPr and the conditions of the Environmental Authorisation. The Holder is responsible for ensuring that this EMPr and the conditions of the Environmental Authorisation are implemented and adhered to during construction.

The Holder or appointed consultant is responsible for identifying emergency situations that may arise during operational and maintenance activities and must formulate appropriate emergency response procedures for these emergency scenarios.

16.2 Duties and Responsibilities of the Contractor

The "Construction Contractor" is the entity responsible for undertaking the physical construction of the residential development. The construction contractor is responsible for ensuring that all environmental management measures specified in this EMPr and in the EA are implemented during the pre-construction, construction and post-construction rehabilitation phases, unless agreed otherwise with the Holder. The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring effective environmental management during construction. The contractor must therefore make adequate financial provision for the implementation of all prescribed measures.

It is strongly recommended that the Construction Contractor appoint an Environmental Site Officer (ESO), who will act as the Contractor's representative to monitor and enforce compliance with the conditions of this EMPr, throughout all phases of construction.

In addition to the above, the Construction Contractor is responsible for the following:

- Identify emergency situations that may arise as a result of construction activities, and formulate appropriate emergency response procedures.
- Ensure that all construction workers, including sub-consultants and service providers, undergo environmental awareness training prior to commencing work on site, or as soon as possible thereafter.
- Compile the required method statements, which must be to the satisfaction of the ECO, before commencing with the activity to be governed by the method statement.
- Respond to concerns or issues identified by the ECO, as relates to environmental management, and implement the appropriate management or remediation measures, at the Contractor's own expense (unless agreed otherwise)
- Should third parties be called to the site to perform clean up and rehabilitation procedures, the Construction Contractor will be responsible for all associated costs.

Note that failure to comply with the requirements and conditions of this EMPr and the Environmental Authorisation may result in fines or other penalties being levied against the Construction Contractor by the Competent Authority.

16.3 Duties and Responsibilities of the ECO

The appointed Environmental Control Officer (ECO) is responsible for undertaking regular site visits to monitor and report on the implementation of the EMPr and adherence to the conditions of the Environmental Authorisation during the pre-construction, construction and post-construction rehabilitation phases. The ECO is not required to monitor the site during the operational (maintenance) phase of the development.

16.3.1 Competency of the ECO

The ECO must be independent of the Holder, Engineer, Construction Contractor and their service providers. The appointed ECO must be suitably qualified and experienced, and must be able to demonstrate that he / she is of sufficient competency to undertake the required task. The ECO must preferably be a resident in close proximity to the development area to ensure quick response if required. The ECO must work in close co-operation with the Construction Contractor, resident engineer or ESO (where applicable) and all contractors in order to identify potential problems before they occur, and provide suitable guidance as to how the identified problems (environmental impacts) can be avoided.

16.3.2 Duties of the ECO

The duties of the ECO include, but are not limited to:

- Conduct a pre-construction site inspection to ascertain the pre-commencement condition of the site (i.e. the status quo);
- Conduct environmental awareness training, which must include;
    - A brief description of the surrounding environment
    - Importance of the EMPr
    - Roles and responsibilities
    - Identified environmental risks
    - Mitigation measures to be implemented
    - No-go areas
    - Emergency procedures (Hydrocarbon spill)
- Undertake regular site visits to monitor compliance with all mitigation, monitoring and management measures contained in the EMPr and the Environmental Authorisation, during the pre-construction, construction and rehabilitation phases of the development;
- Evaluate the achievement of the performance indicators associated with each impact management objective specified in this EMPr;
- Liaise with site contractors, engineers and other members of the development team with regard to the requirements of the EMPr;
- Provide guidance as and when required regarding the implementation of the environmental management measures contained in the EMPr and EA, so as to assist the Holder and contractor in remaining compliant with these measures;
- Assist in finding environmentally acceptable solutions to construction problems;
- Ensure that the working areas, site camp facilities, access roads and no-go areas are properly demarcated;
- Ensure that proper topsoil management practices are adhered to on site;
- Ensure that proper waste management & pollution prevention strategies are practised on site;
- Examine method statements, where required;
- Recommend additional environmental protection measures, should this be necessary;
- Furnish contractors with verbal warnings in case of contravention of the EMPr;
- Recommend that the competent authority furnish errant contractors with predetermined fines, when verbal and / or written warnings are ignored;

- Ensure satisfactory rehabilitation of disturbed areas on site, after construction is complete;
- Keep detailed records of all site activities that may pertain to the environment, and produce compliance-monitoring reports (ECO Reports) for submission to the Holder, and the Competent Authority at regular intervals during the construction phase;
- Submit a final post-construction inspection report, within 6 months of completion of the construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.
- All ECO Reports and Inspection Reports must be submitted to the Holder and Competent Authority.

16.3.3 Frequency of ECO visits

The ECO must conduct **weekly** site visits during the construction phase, in addition to the start-up and closure inspections.

The ECO has the discretion to undertake additional visits if he / she feels this is justified due to the actions of the contractors, and to make *ad hoc* visits in order to ensure compliance.

The ECO must also undertake a **final inspection (audit) 6 months of completion of construction activities**. The purpose of this final inspection is to ensure that the rehabilitation measures applied at the conclusion of the construction phase have been sufficient to promote the successful rehabilitation of the site, and to identify any further issues that require attention or follow-up.

16.3.4 Authority of the ECO

The ECO has the authority to recommend to the authorities that they suspend all works (or part thereof) occurring on site, should any action being undertaken on site not comply with the environmental requirements, and where such actions pose a serious threat to any element of the surrounding environment.

The ECO has the authority to issue instructions to the Construction Contractor and/or Holder, regarding measures that must be implemented on site in order to ensure compliance with the EMPr and Environmental Authorisation, and/or to prevent environmental degradation or pollution from occurring.

The ECO has the authority to issue verbal and written warnings to contractors. Should verbal and written instructions and/or warnings be ignored, the ECO has the authority to request the Competent Authority to issue pre-determined fines or other penalties.

The ECO has the authority to report incidents of non-compliance to the Competent Authority at any time.

16.4 Environmental Liaison Committee

In order to ensure this is done in an inclusive manner and that the conditions as per the Environmental Authorisation (EA) are adhered to, the various sporting bodies are encouraged to become part of the Environmental Liaison Committee (ELC). This ELC would be invited to attend meetings during construction to help unpack the conditions of the EA so that the right structures are implemented at the right time and that appropriate monitoring takes place so that the Environmental Management Programme (EMPr) is adhered to.

17. Environmental Awareness Plan

Environmental Awareness Training must be conducted prior to the commencement of construction activities. It is the holder's responsibility to familiarise himself/herself with the content and requirements of this EMPr. The holder is also responsible to ensure that the contractor and all labourers working on site during the construction phase are familiar with the content of this EMPr.

The following actions must be taken to ensure that all relevant parties are aware of their environmental role and duties:

1. This EMPr must be kept on site at all times.
2. The provisions of this EMPr and the conditions of the Environmental Authorisation must be explained in detail to all staff during Awareness Training.
3. Training booklets will be handed out to all labourers and must be explained to them.
4. Weekly checks to be done by the Holder's environmental representative who must be on site at all times.
5. The ECO to conduct frequent site visits.
6. Monthly monitoring reports to be compiled by the ECO. These reports will be circulated to all parties involved (including the holder, contractor and the competent authority).

The Construction Contractor must make allowance for all construction site staff, including all subcontractors that will be working at the site, to attend environmental awareness training sessions (undertaken by the ECO) before commencing any work on site. During this training, the ECO will explain the EMPr and the conditions contained therein. Attention will be given to the construction process and how the EMPr fits into this process. Other items relating to sound environmental management which must be discussed and explained during the environmental awareness training sessions include:

- The demarcated "No-Go" areas;
- General do's and don'ts of the site;
- Making of fires;
- Waste management, use of waste receptacles and littering;
- Use of the toilets provided;
- Use and control of construction materials and equipment etc.;
- Control, maintenance and refuelling of vehicles;
- Methods for cleaning up any spillage;
- Access and road safety;
- Emergency procedures (e.g. in case of fire, spillage etc.)
- General "best practice" principles, with regards to the protection of environmental resources.

Environmental awareness training and education must be ongoing throughout the construction phase, and must be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMPr), or as new workers come to site. Translators must be utilised where needed.

18. Monitoring, Record Keeping and Reporting

18.1 Environmental Auditing

In accordance with the requirements of the Environmental Impact Assessment Regulations, 2014 (as amended), the holder of the Environmental Authorisation must, for the period that the Environmental Authorisation is valid, appoint a suitably qualified independent person to conduct an environmental audit to audit compliance with the conditions of the Environmental Authorisation and the EMPr.

The holder is responsible for appointing, managing and remunerating the appointed auditor. The auditor may be the appointed Environmental Control Officer (ECO), provided the ECO is sufficiently qualified and experienced to fulfil the auditing requirements specified below.

The appointed auditor must undertake regular environmental audits according to the frequency specified in the Environmental Authorisation. Following each audit the environmental auditor must submit an audit report to the Competent Authority (in this instance the DEA&DP).

- Environmental auditing and environmental audit reports must adhere to the requirements of the amended 2014 Environmental Impact Assessment Regulations, in particular Section 34 (*Auditing of Compliance with Environmental Authorisation, Environmental Management Programme*) and Appendix 7 (*Objective and Content of Environmental Audit Report*)
- The audit report must provide verifiable findings on the level of compliance with the provisions/ conditions of the Environmental Authorisation and the EMPr, and must also comment on the ability of the measures contained in this EMPr to sufficiently avoid, manage and mitigate environmental impacts.
- Where the findings of the audit report indicate that the impact management measures stated in the EMPr are insufficient to adequately address environmental impacts, recommendations as to how the EMPr must be amended so as to address the identified shortcomings must be made and submitted to the competent authority together with the audit report.

18.2 Construction phase monitoring, reporting and record keeping

The appointed Environmental Control Officer (ECO) is responsible for monitoring the site at regular intervals during the construction phase, in order to ensure that the provisions of this EMPr and the Environmental Authorisation are adhered to and that sound environmental management is ensuing on site.

The ECO must compile a monthly ECO report detailing the ECO's observations on site, any instances of non-compliance and any issues or aspects that require attention, follow-up or remedial action. The ECO reports must be submitted to the Holder and to the Competent Authority is so requested by that authority. The ECO inspection reports must include both photographic and written records.

18.2.1 ECO Inspections - Photographic Records

The condition of the surrounding natural environment must be monitored regularly in order to ensure that construction and management activities are not impacting negatively on the condition of the landscape and any sensitive ecosystems. The most effective way to achieve this is by means of a detailed photographic record. In this way, a record of any shift in ecosystem condition can be maintained and potential impacts be detected at an early stage. It is thus recommended that fixed-point photo-monitoring sites could be set up, and photographs must be taken at these sites during each ECO inspection. Where necessary, the entire working area must be well documented and photographed.

18.2.2 ECO Inspections - Written Records

The following record-keeping during the pre-construction, construction and rehabilitation phases of the development is recommended:

- The ECO must complete an ECO Checklist after each ECO site visit.
- The ECO must compile an ECO monitoring report and submit this to the Holder, the Contractor and the Competent Authority (the latter only if required by the Competent Authority). The monthly reports must be a summary of the ECO inspections from the preceding month, and must highlight the key concerns/ issues on site, instances of non- compliance with the EA and EMPr, all instructions issued to the contractor, actions taken and aspects that still require attention.
- All ECO reports and ECO instructions must be retained on file at least for the duration of the construction period (retaining reports for a period of at least 5 years is recommended, in the event that the Competent Authority must request information).
- A record (minutes) of construction site meetings, liaison site meetings between the ECO and resident engineer or contractor, monitoring reports, ECO instructions and ECO observations must be clearly documented and filed on a master file off-site for safe keeping.
- It is recommended that a site register (incident register) be kept on site at the site office for the recording of any environmental incidents (e.g. fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the resident engineer. Actions taken to remedy the incidents must also be recorded.
- A complaints register must be kept on site in which complaints by any member of the public must be logged.
- The ECO must compile a final post-construction audit report, within 6 months of completion of each construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.

18.2.3 Construction Phase Record Keeping

A copy of the approved EMPr, the Environmental Authorisation and any relevant construction method statements must be kept on site at all times during pre-construction, construction and rehabilitation activities. The ECO Reports must be retained by the Holder for a period of at least 5 years, and must be provided to the Competent Authority upon request.

The set up and organisation of the site camp is paramount to ensuring compliance. An environmental file is to be created by the contractor and be situated within the site camp throughout the construction phase and with the applicant thereafter. The environmental file is to include the following;

- A copy of the Environmental Authorisation
- A copy of General Authorisation or any other relative permits
- A copy of the approved EMPr
- Updated Waste slips
- Disposal slips or cleaning slips (ablution cleaning)
- All EMR's (Environmental Monitoring Reports) and ECO instructions
- Copies of Environmental induction register/s
- The Protocol for chance Palaeontological Findings
- A complaints register
- Updated method statements
- Any and all emergency procedure/s applicable to site activities
- An Incident Register

19. Penalties, Claims and Damages

The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring that all procedures required to rehabilitate the site are implemented. If third parties are called to the site to perform clean up and rehabilitation procedures, the contractor will be responsible for all costs. The competent authority may impose penalties on the Holder or any of the contractors if conditions contained in this EMPr are contravened. This would be based on an agreement or contract between the Holder and the contractor.

Penalties could be imposed in terms of Chapter 11 of the Western Cape Bill on Planning and Development as published in the Extraordinary Provincial Gazette No 5183, 3 October 1997, and would be applicable for any action which leads to damage to the natural environment. Please note that the payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

In cases where severe environmental damage occurs, the competent authority law enforcement division may take legal action against the responsible parties. The reasons for this could include, among others:

- Not implementing the conditions of the EMPr;
- Spillage that result in environmental damage;
- Incorrect handling and storage of construction materials and chemicals;
- Sensitive areas that are not clearly demarcated;
- Performing ablutions in areas other than facilities provided for such actions; and
- Occurrence of unattended and out of control fire.

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ECO to issue the contractor with penalty / fine as described in the following section.

The following offences, level of severity and value of the financial fines have been drafted according to the sensitivities on the proposed site, the mitigation measures proposed, and the construction methods proposed. It must be noted that the level of severity is at the discretion of the ECO and any offences or fines will be recorded in the ECO's monitoring report. The fineable offences are not limited to the table below, additional offences may be applied by the ECO with prior agreement with the EA holder.

The following fine structure shall apply:

Table 6 Fines and offences.

Finable Transgression	Min Fine	Max Fine
Failure to notify the ECO of the commencement of construction or pre-construction activities, prior to the commencement of such activities.	R1 000	R2 000
Failure to comply with the provisions relating to the demarcation of the working area, site camp and associated facilities, and the maintenance of the demarcated boundaries.	R1 000	R5 000
Failure to demarcate the buffer area	R1000	R5 000
Failure to comply with the provisions relating to the demarcation of all "no-go" areas, and the maintenance of the demarcated boundaries.	R2 000	R5 000

Finable Transgression	Min Fine	Max Fine
Failure to provide secured ablution facilities (1:30 ratio) on site.	R500	R15 000
Failure to comply with the provisions relating to the clearance of vegetation on site.	R2 000	R5 000
Clearance of indigenous vegetation (regardless of the density of alien vegetation present) outside of the demarcated boundaries of the working area and site camp.	R2 500	R15 000
Failure to apply herbicide to alien vegetation when required to do so.	R500	R2 000
Failure to adhere to designated access routes and/or the driving of vehicles through undeveloped vegetation outside of the demarcated working area or site camp.	R1 000	R5 000
Movement of vehicles and/or construction workers in no-go areas;	R1 000	R10 000
Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, within designated "no-go" areas.	R1 000	R10 000
Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, outside of the areas demarcated for such parking/storage.	R500	R5 000
Failure to comply with the provisions relating to the management of topsoil and subsoil.	R1 000	R5 000
Excessive excavation of material in areas not depicted for such purpose / activity on the approved design plans.	R2 500	R10 000
Failure to comply with the provisions relating to waste management on site i.e. recycling of wastes.	R500	R5 000
Failure to comply with the provisions relating to the storage, use and management of hazardous substances and fuels on site and/or the spillage of hydrocarbons or hazardous substances on site leading to environmental damage.	R1 000	R10 000
Mixing cement or concrete on bare ground and/or failure to comply with any other provision regarding cement/ concrete batching.	R1 000	R5 000
Failure to provide adequate fire-fighting equipment (in working order) on site at all times and/or failure to comply with the provisions relating to fire prevention and/or the occurrence of unattended or out of control fires.	R500	R5 000
Refueling of vehicles, machinery or equipment outside of the designated refueling area.	R500	R2 000
Maintenance of vehicles, machinery or equipment outside of the designated maintenance yard, except in emergencies.	R500	R2 000
Failure to undertake refueling or repairs over a drip tray or other impermeable bunded surface to collect spilled hydrocarbons (fuels, lubricants, oils etc.) and other hazardous substances; failure to provide drip trays under fuel burning	R500	R2 000

Finable Transgression	Min Fine	Max Fine
equipment (including pumps and generators) where there is a risk of hydrocarbon leakage.		
Failure to produce a required method statement/s to the engineer's and ECO's satisfaction prior to undertaking the activity concerned and/or failure to adhere to an approved method statement.	R1 000	R5 000

The above does not absolve the transgressor from being prosecuted in terms of the ***National Environmental Management Act (Act 107 of 1998)*** which may result in further penalties and other actions by State Departments.

20. Conclusion

The recommendations and mitigation measures prescribed in this EMPr have been formulated with the intention of addressing potential pre-construction, construction and operational phase impacts on the environment. It is likely that if the conditions, requirements and recommendations of the above EMPr are implemented as described and the relevant stakeholders adhere to the various mitigation measures, then the project will be completed without unforeseen negative environmental impacts.

Familiarity with the contents of this EMPr by the contractors and other individuals involved in the development project will assist in achieving "environmental best-practice", which ultimately ensures that the project arrives at a sustainable outcome.