

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

THE DEVELOPMENT, OPERATION AND DECOMMISSIONING OF A TENTED CAMP ON FOUNDERS ESTATE 5, FARM 1685/5, PAARL (FE5)

*D:EA&DP Application Reference Number: Pending
DWS WULA Reference Number : Pending*

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NOTE

This Draft EMPr must be updated to:

- Incorporate conditions and specifications imposed by the Department of Environmental Affairs and Development Planning if Environmental Authorisation is granted;
- Incorporate any conditions and specifications imposed by the Department of Water and Sanitation as part of the water use authorisation process;
- Incorporate environmental conditions and specifications imposed by the Local Authorities as part of the Town Planning exercise, if applicable;
- Incorporate conditions and specifications imposed by the South African Heritage Resource Agency, if applicable; and
- Reflect the final Rehabilitation Plan for the decommissioning of the facility.

Such updates will occur without the need for a formal approval process and will be undertaken by a qualified Environmental Assessment Professional.

This EMPr must be incorporated into all tender and contract documentation.

DOCUMENT CONTROL SHEET

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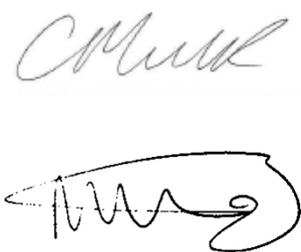
SIGNATURE OF AUTHOR:	
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TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1	BACKGROUND & SITE LOCATION.....	1
1.2	PROJECT SCOPE	2
1.3	AFFECTED ENVIRONMENT	6
1.3.1	GEOLOGY	6
1.3.2	AQUATIC ECOSYSTEM	6
1.3.3	TERRESTRIAL ECOSYSTEM.....	7
1.4	HERITAGE/CULTURAL/ARCHAEOLOGICAL ASPECTS	9
1.5	SUMMARY OF IMPACTS (SUMMARY AS IDENTIFIED DURING THE 24G APPLICATION PROCESS)	12
1.6	STATUTORY APPROVALS.....	17
1.7	COMPONENTS OF THE EMPr.....	17
2.	DESIGN & CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN	19
2.1	INTRODUCTION	19
2.2	ROLES AND RESPONSIBILITIES	19
2.2.1	<i>The Applicant / Developer</i>	20
2.2.2	<i>The Engineer / Project Manager</i>	20
2.2.3	<i>The Contractor</i>	21
2.2.4	<i>Environmental Control Officer (ECO)</i>	22
2.3	MONITORING AND REPORTING.....	23
2.3.1	<i>Site Instructions</i>	23
2.3.2	<i>Monthly Monitoring Reports</i>	23
2.4	ENVIRONMENTAL EDUCATION PROGRAMME	23
2.5	OCCUPATIONAL HEALTH & SAFETY REQUIREMENTS	24
2.6	DISPUTE RESOLUTION	24
2.7	SOCIAL RESPONSIBILITIES.....	24
3.	DESIGN & CONSTRUCTION ENVIRONMENTAL MANAGEMENT SPECIFICATIONS	25
3.1	INTRODUCTION	25
3.2	METHOD STATEMENTS.....	25
3.2.1	<i>Specific Method Statements Required</i>	26
3.3	ENVIRONMENTAL MANAGEMENT REQUIREMENTS	28
3.4	PENALTIES AND BONUSES	58
3.5	MEASUREMENT AND PAYMENT.....	61
3.5.1	<i>Basic Principles</i>	61
3.5.2	<i>Scheduled items</i>	62
4.	OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT PLAN	63
4.1	SCOPE & RESPONSIBILITY	63
4.2	OPERATIONAL SPECIFICATIONS	63
4.3	MONITORING AND AUDITING.....	68
5.	DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT PLAN	69
5.1	SCOPE & RESPONSIBILITY	69
5.2	DECOMMISSIONING SPECIFICATIONS	69
5.3	MONITORING AND AUDITING.....	71
6.	REFERENCES.....	72

FIGURES

Figure 1: Locality Map	2
Figure 2. Site Plan (Source: NM & Associates, 2021)	3
Figure 3: Foul sewer reticulation system and location of bio disks (source: Hurworth, 2021)	5
Figure 4: Stream 1 and the riparian areas (green polygons) delineated at the site (Snaddon, 2021)	7
Figure 5. Vegetation map of the project area based on data collected from field survey by Jackson & Martin (2021)	8
Figure 6. Typical communication and reporting structure	20
Figure 7: Site constraints and informants showing proposed location of trees to serve as visual screening (source Winter, 2021)	32
Figure 8: Visual representation of area where restoration should be undertaken i.e., the impacted patch of Boland Granite Fynbos (created by EAP) to be defined by specialist	34
Figure 9: No-Go Area Map	44

TABLES

Table 1 Checklist for Report Contents against the Requirements of Appendix 4 of GN No. 326 of 7 April 2017	xi
Table 2: Summary of Impacts	12
Table 3. Legislative approvals	17
Table 4: Table of Environmental Management Requirements / Specifications for the Construction Phase	29
Table 5: Table of Environmental Management Requirements / Specifications for the Decommissioning Phase	70

APPENDICES

Appendix 1: Method Statement template

Appendix 2: Curriculum Vitae –Claudette Muller and Michelle Lee

ACRONYMS

For the purposes of this document the following acronyms shall apply:

AHRMP	Archaeological Historical Residues Management Plan
CMP	Conservation Management Plan
DEA&DP	Department of Environmental Affairs and Development Planning
DWS	National Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
EO	Environmental Officer
ESA	Ecological Support Areas
FE5	Founders Estate 5
GA	General Authorisation
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LC	Least Concern
LED	Light Emitting Diode
NEMA	National Environmental Management Act
NMT	Non-Motorised Transport
MSDS	Material Safety Data Sheets

NHRA	National Heritage Resources Act
NHS	National Heritage Site
SACNASP	South African Council for Natural Scientific Professions
SAPS	South African Police Service
SAHRA	South African Heritage Resources Act
SCC	Species of Conservation Concern
SM LUPBL	Stellenbosch Municipality Land Use Planning By-law
SM ZSBL	Stellenbosch Municipality Zoning Scheme By-law

DEFINITIONS

For the purposes of this document the following definitions shall apply:

Affected Environment:

Those parts of the socio-economic and biophysical environment impacted on by the development

Batch plant:

Site for the large-scale mixing and production of concrete or plaster, and associated equipment and materials.

Bund:

Enclosure under / around a storage facility to contain any spillage.

Building and demolition waste/" builders' rubble":

Waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition, which include: (a) discarded concrete, bricks, tiles and ceramics, (b) discarded wood, glass and plastic, (c) discarded metals, (d) discarded soil, stones and dredging spoil, (e) other discarded building and demolition wastes" (DEA&DP, 2018)

Contractor:

The principal persons /company undertaking the construction of the development.

- The main contractor as engaged by the developer;
- Selected subcontractors; and
- Any other contractor from time to time engaged by the developer directly in connection with the construction part of the works.

Contaminated water:

Means water contaminated by the contractor's activities, e.g. concrete water and runoff from plant/personnel wash areas.

Construction camp:

Means the area designated for all temporary site offices, storage sheds and areas, parking areas, maintenance workshops, staff welfare facilities, accommodation, etc.

Construction Environmental Management Programme (EMPr):

The construction phase Environmental Management Programme, containing the environmental specifications for civil and building works, also forming part of the civils and building contract documentation.

Engineer:

A person representing the developer on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person, such as an architect or project manager, authorised by the developer to fulfil this role.

Environment:

Means the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth:

- micro-organisms, plant and animal life;
- any part or combination of the above and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Education Programme:

An environmental education course for the contractor's management staff and labour force, which informs them of the requirements of the EMPr. The ECO will present and co-ordinate courses.

Environmental Control Officer (ECO):

The individual or company appointed by the developer to ensure the implementation of the EMPr and suitable environmental management practices on site for the duration of the construction phase of the project.

Environmental Impact Assessment (EIA):

A process of collecting, analysing, interpreting and communicating data as it pertains to possible impacts (positive and negative) upon the environment due to a development.

Environmental Officer (EO):

The person appointed by the Contractor to ensure implementation of the EMPr on site.

General waste:

Means waste that does not pose an immediate hazard or threat to health or to the environment, and includes:

- a) domestic waste;
- b) building and demolition waste;
- c) business waste;
- d) inert waste; or
- e) any waste classified as non-hazardous waste in terms of the regulations made under section 69 (of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA)), and includes non-hazardous substances, materials or objects within the business, domestic, inert, building and demolition wastes as outlined in schedule 3 (of the NEM:WA) (NEM:WA, 2008).

Hazardous waste:

Means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles as outlined in schedule 3 of the NEM:WA (NEM:WA, 2008) (DEA&DP, 2018).

Heritage Western Cape (HWC):

The statutory provincial body responsible for heritage resource management, in the Western Cape.

Method Statement:

A written submission by the contractor to the engineer and ECO in response to the specifications or a request by the engineer, setting out the plant, materials, labour and method the contractor proposes using to carry out an activity, identified by the relevant specification or the engineer when requesting the Method Statement, in such detail that the engineer is enabled to assess whether the contractor's proposal is in accordance with the specifications and/or will produce results in accordance with the specifications.

The Method Statement shall cover applicable details with regard to:

- construction procedures,
- materials and plant to be used,
- getting the plant to and from site,
- how the plant/ material will be moved while on site,
- how and where material will be stored,
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- timing and location of activities,
- compliance/ non-compliance with the specifications,
- any other information deemed necessary by the engineer.

Mitigation:

The implementation of practical measures to reduce adverse impacts

No Go Areas:

Areas identified as being environmentally sensitive in some manner and delineated on plan, and on the site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.

Potentially hazardous substance:

Is a substance which can have a deleterious effect on the environment.

Reasonable:

Means, unless the context indicates otherwise, reasonable in the opinion of the engineer after he has consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation plans" and "environmental management plans" (both as defined in the National Environmental Management Act (No. 107 of 1998)).

Site:

The boundary and extent of development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the development to proceed successfully.

Solid waste:

Means all solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Specification:

A technical description of the standards of materials and workmanship that the contractor is to use in the works to be executed, the performance of the works when completed and the manner in which payment is to be made.

Top material:

This refers to any surface material in the construction area, whether it is soil, fine material or stones including vegetation.

Topsoil:

Means the top 100mm of soil and may include vegetation and rocks.

Waste management hierarchy:

A model that aims to prevent, reduce and manage waste through encouraging waste avoidance first and then the reduction, reuse, recycling and disposal of waste and is presented in the form of a pyramid. If the hierarchy is implemented it will assist in the reduction of greenhouse gas emissions, reduce potential pollutants, save energy, conserve resources, create jobs and stimulate the development of green technologies (DEA&DP, 2018).

Works:

The construction operations and all related and incidental works, such as site works, earthworks, installation of services, rehabilitation etc., in connection with the execution and carrying to completion of the development.

Table 1 Checklist for Report Contents against the Requirements of Appendix 4 of GN No. 326 of 7 April 2017

NO.	REQUIREMENTS:	INCLUDED IN REPORT:	SECTION REFERENCE
a	Details of the EAP who prepared the report, including the expertise of the EAP, including a curriculum vitae.	✓	Document Control Sheet
b	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	✓	Section 1.2
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;	✓	Figure 2 Figure 5 Figure 9 & Figure 4
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-	✓	Section 19
(i)	Planning and design;		
(ii)	Pre-construction activities	✓	Section 19
(iii)	Construction activities;	✓	Section 19
(iv)	Rehabilitation of the environment after construction and where applicable post closure; and	✓	Section 3.1.3 69
(v)	Where relevant, operation activities.	✓	Section 4
(f)	A description of proposed impact management actions, identifying the manner in which the impact management outcomes	✓	Table 4 & Table 5
(i)			

	contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to- 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	N/A	
(iv)	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A	
g	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f)	✓	Section 2.32.3
h	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	✓	Section 2.2
i	An indication of the persons who will be responsible for the implementation of the impact management actions;	✓	Section 2.2
j	The time period within which the impact management actions contemplated in paragraph (f) must be implemented;	✓	Section 2.3
k	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	✓	2.3
l	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	✓	2.3
m	An environmental awareness plan describing the manner in which-	✓	2.4
(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	✓	2.4 & Table 4
n	Any specific information that may be required by the competent authority.	N/A	

1. INTRODUCTION

1.1 BACKGROUND & SITE LOCATION

In 2019, a Tented Camp was built on Founders Estate 5 (FE5) which is located on Portion 5 of Farm 1685/5, Paarl. The activity was undertaken without Environmental Authorisation in terms the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and associated EIA Regulations, 2014 (as amended). An application in terms of Section 24G of the NEMA has been made in order to regularise the Tented Camp through retrospective approval.

Details on the site are summarised below:

Property location(s):	The property (Founders Estate 5) is located on Boshendal Estate within the Stellenbosch Municipality, west of the Dwars River and the R310 within the Dwars River Valley. The Founders Estates are accessed off the R310 at the Avenue 1685 access gate.
Farm/Erf name(s) & number(s) including portion(s)	Portion 5 of Farm 1685, Paarl
Property size(s) (m²)	Approximately 26.26 ha
Development footprint size(s) (m²)	Approximately 6 ha is the area designated for the Tented Camp. The total physical footprint of the development is ±13,825.49 m ²
SG21 Digit code(s)	C05500000000168500005

Refer to **Error! Reference source not found.** for the Locality Map.

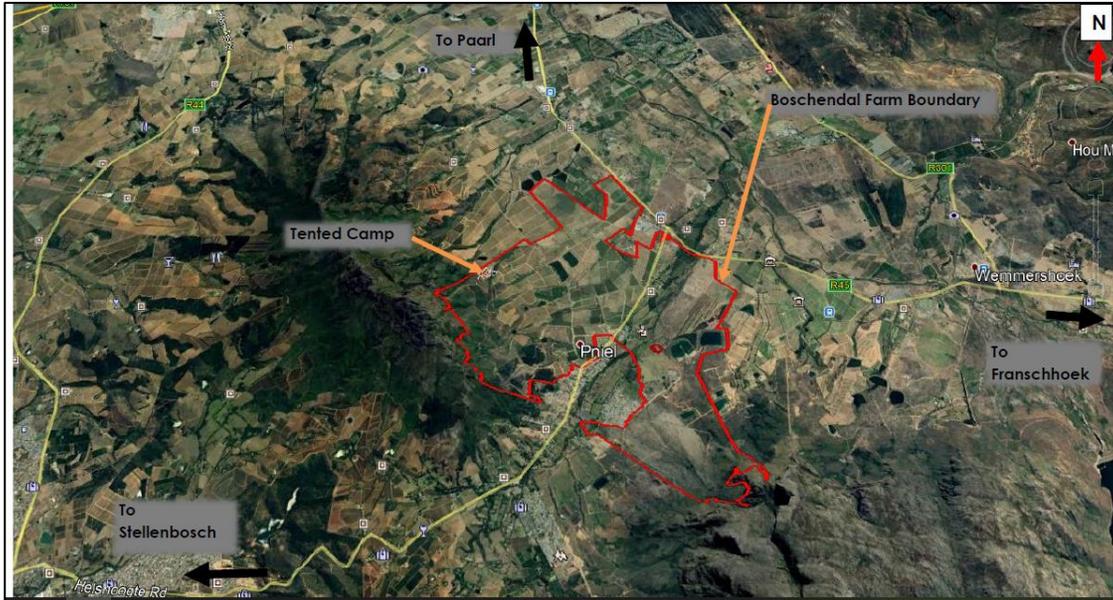


Figure 1: Locality Map

1.2 PROJECT SCOPE

The Tented Camp comprises the following (refer to Figure 1 for the site plan)

- Seven tents for accommodation of two people each serviced with their own bathrooms and limited self-catering facilities. The tents can accommodate a maximum of 14 people on the site in total. Tents are located on decks of approximately 78 to 83 m² each.
- A large mess tent where guests staying on site can congregate as a group if necessary. The tent deck is approximately 246 m² in extent.
- A guest support tent with a communal kitchen facility and toilets. The tent deck is approximately 125 m² in extent.
- A staff office tent. This is necessary to ensure at least one staff member can be available onsite while guests are staying. It has space for an office and storage. The tent deck is approximately 43 m² in extent.

Each tent structure comprises a wooden deck/ platform which rests on a steel frame supported by steel legs that are individually cemented into the ground for support. There are no buried foundations. They foundations are pre-cast concrete blocks filled with concrete placed on top of the ground, onto which the light-weight top structures are fixed. The top structures comprise of compressed wood walling covered by canvas with a stretch "gazebo-type" roof which pin to the ground around the platform (i.e., the roof tips extend beyond the platform footprint). The total area under deck is 988 m².

The seven accommodation tents are tucked into a patch of vegetation which comprises a combination of alien and indigenous species. The communal / operations related tents are located at a lower level, within the open fallow lands close to the in-channel dam.

A gravel road that circulates around the site provides access to the respective units, and the communal / operations tents. The roads have been compacted, bordered by local rocks and covered with either chips or gravel, or left uncovered. Seven parking bays for the guests will be provided on the upslope side of the accommodation, with the intention of limiting vehicular movement around the site. Parking bays will be designated informally off an existing road in groups of 2 and 3 bays.

A generator and a transformer are located downslope and north of the staff office tent. The sewage treatment infrastructure, six small bio septic tanks, is located downslope and along the northern edge of the camp. Fire hydrants are located around the periphery of the camp. A 116 m³ reservoir above the site supplies water to the camp.

All development activities have been completed apart from the designation of the five road edge parking bays at the site entrance (refer to Figure 2). There will be no new surface to demarcate the parking bays except for some gravel/bark chips. These bays will be located in an already 'transformed' zone as identified and mapped by a botanical specialist and would thus be acceptable from a botanical impact perspective (T Martin pers. comms, October 2021).

The Tented Camp is a temporary tourist facility which will be decommissioned after five years of operation, following which the site will be rehabilitated.

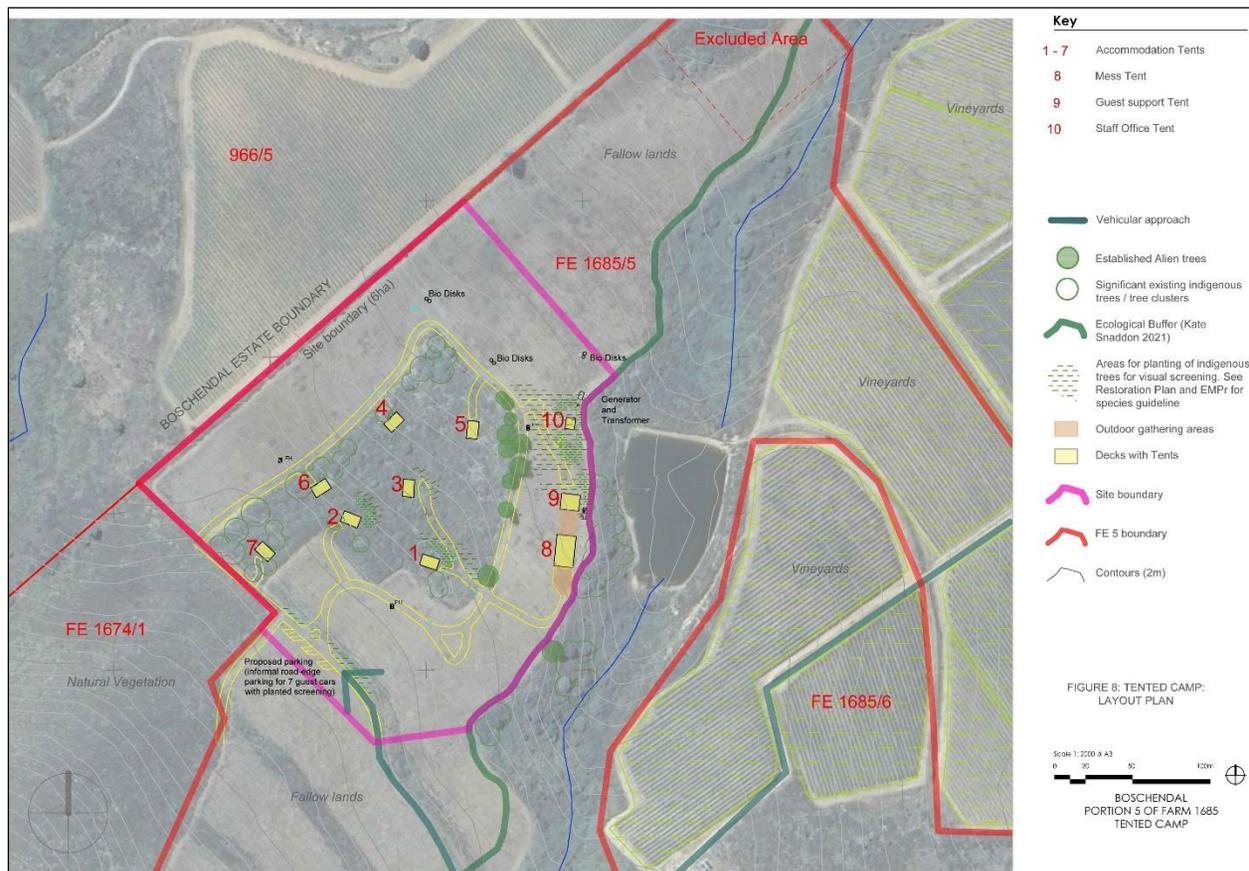


Figure 2. Site Plan (Source: NM & Associates, 2021)

Roads & Parking

The site is accessed via existing farm roads (the type which are located between vineyards/ planting blocks). However, some additional roadways have been created to provide a ring-road around the site with small sections protruding from the ring-road to access each tent structure.

The circular road network which provides access to the respective units and the communal / operations tents, is informal and follows the natural terrain and contours of the site. The roads have

been compacted, bordered by local rocks and covered with either chips or gravel, or left uncovered. Seven parking bays for the guests will be provided on the upslope side of the accommodation, with the intention of limiting vehicular movement around the site. The parking bays will be tucked informally off an existing road in groups of 2 and 3 bays (refer to Figure 2 above).

Electrical

The Tented Camp has a fully functional electrical reticulation system in place. The main supply is connected from the existing Boshendal Farm overhead line feeding an existing 315 kVA Transformer which supplies Kiosk "A". A 150 A 380 V 3-phase supply is fed from Kiosk "A" to an adjacent 380V / 3,3 kV step-up transformer which then feeds via an underground cable at 3,3 kV to the Tented Village Main Supply Point (Hurworth, 2021). The main supply point at the Tented Camp contains a 3,3 kV / 380 V step-down transformer which supplies a feed into a kiosk – Kiosk "B" that is connected to the changeover panel of the standby Generator. Kiosk "B" is the main feeder to the Tented Camp and contains supplies to: Staff Accommodation, Mess tent, Fire Pump Panel and a feeder to Kiosk "C". Kiosk "C" contains supplies to: Tent 5, BioDisc Panel, BioDisc Panel 2 and a feeder to Kiosk. Kiosk "D" contains supplies to: Tent, Tent 2, Tent 3 and a supply to Kiosk "Kiosk " contains supplies to: Tent 4, Tent 6 and Tent 7 (Hurworth, 2021).

Stormwater

There is no formal stormwater disposal system. The tented structures discharge stormwater onto the ground and this flows naturally into the landscape (Hurworth, 2021).

Telecommunications

The applicant has installed an internet system at the site. Ethernet cables have been placed in a reticulated 25 mm black conduit. This conduit has been buried at the "road" crossings at a shallow depth of 500 mm and loosely laid (i.e., no trenching) through the vegetation to connect to the various tents (Hurworth, 2021). A pole mounted receiver antennae disc has been placed on site.

Foul Sewer

All accommodation units including the mess tent are connected to a water-borne piped system that discharges into Kingspan Bio-Disk sewerage disposal units (Hurworth, 2021) (refer to Figure 3). Each unit is connected to a 110 mm diameter uPVC sewer main that flows under gravity flow to the Kingspan Bio-disk units located east of the site (Hurworth, 2021). The system treats the raw effluent via its patented system to liquid discharge quality within the "General Limits" for wastewater discharge into watercourses as set by the National Water Act (Act no 36 of 1998) (NWA), noting that there is no direct discharge to any watercourses. The treated water discharge currently flows into the landscape where the bio-disks are located (refer to Figure 3). The anticipated treated water discharge volume once the camp is fully operational is 75% of the anticipated water consumption, thus 1088 l/day (Hurworth, 2021).



Figure 3: Foul sewer reticulation system and location of bio disks (source: Hurworth, 2021)

Potable water system

Potable water is fed from a water storage reservoir. The reservoir is supplied from the existing farm natural spring (Hurworth, 2021). There is a constant supply of natural spring water to the reservoir that keeps the reservoir water levels constant. The reservoir supplies water under gravity flow to the tented camp via a 90 mm diameter HDPE class 12 water main (Hurworth, 2021).

An in-line aggregate filtration system and water purification system has been installed to improve water quality. A new in-line ultra-violet water purification system will be installed prior to commissioning of the Tented Camp to ensure that regulated potable water standards are achieved (Hurworth, 2021).

The reservoir supply is connected to a 63 mm diameter HDPE CL12 water ring main that is the secondary supply to the tented camp units (Hurworth, 2021).

The anticipated potable water consumption for an accommodation unit is an average of 150 l/day average (thus 1200 l/day in total). The consumption of the kitchen unit is anticipated to be an average of 250 l/day (Hurworth, 2021).

Fire ring main

The fire ring main is supplied from a high-pressure submersible borehole pump which draws water from the farm dam at the site. This abstraction only occurs in the event of a fire.

Listed Activities in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA):

With respect to the Listed Activities triggered, the following aspects of the proposed development are important:

- Five components of the Tented Camp facility encroach or partially encroach into the 32 m setback of an in-channel dam at the site:
 - The entire Staff Office tent (43 m²);
 - A portion of the Guest Support Tent (70 m²);
 - A portion of the gravel road to the Guest Support Tent;
 - Fat trap; and
 - The electrical line and the concrete platform constructed to support the generator and associated electrical components.
- The construction of the Tented Camp resulted in the clearance of 2 400 m² of Boland Granite Fynbos (Jackson & Martin, 2021) which is classified as an Endangered ecosystem.
- The informal ring road and access roadways to each tent which has been developed ranges from 3.7 m to approximately 5 m in width. There is no road reserve, and the site is located outside an urban area within an area which contains indigenous vegetation (Boland Granite Fynbos).

1.3 AFFECTED ENVIRONMENT

1.3.1 GEOLOGY

The geological formations underlying the site are mainly granite of the Stellenbosch Pluton, Cape Granite Suite. The site consists of a layer of stony colluvial material overlying a deeply weathered granite saprolite with a high clay content. The colluvium is derived from the sandstone slopes above (Winter et al., 2021).

1.3.2 AQUATIC ECOSYSTEM

The Tented Camp site is located adjacent to a stream, named Stream 1 (as mapped in 2007 and 2019 by Snaddon) – refer to Figure 4 & Figure 5. Stream 1 is a tributary of the Werda River, which ultimately flows in the Berg River. The riparian area around Stream 1 is typical of mountain streams in this area Stream 1 has good water quality (visual assessment) and seasonal surface flow (Snaddon, 2021). The stream flows through an in-stream dam.

According to Snaddon (2021), there is a clear boundary between terrestrial vegetation and riparian vegetation at the Tented Camp site. The riparian vegetation typically comprises:

- Tree species of various ages, with a few mature individuals, including *Searsia angustifolia*, *S. glauca*, *Kiggelaria africana*, *Olea europaea subsp. africana*, *Brabejum stellatifolium*.
- Grasses such as *Pennisetum macrourum*, and restios;
Shrubs such as *Leucodendron* spp., and bracken (*Pteridium aquilinum*) occur around the margins of the riparian area.

Stream 1 and the delineated riparian area for the Tented Camp site is shown in Figure 4

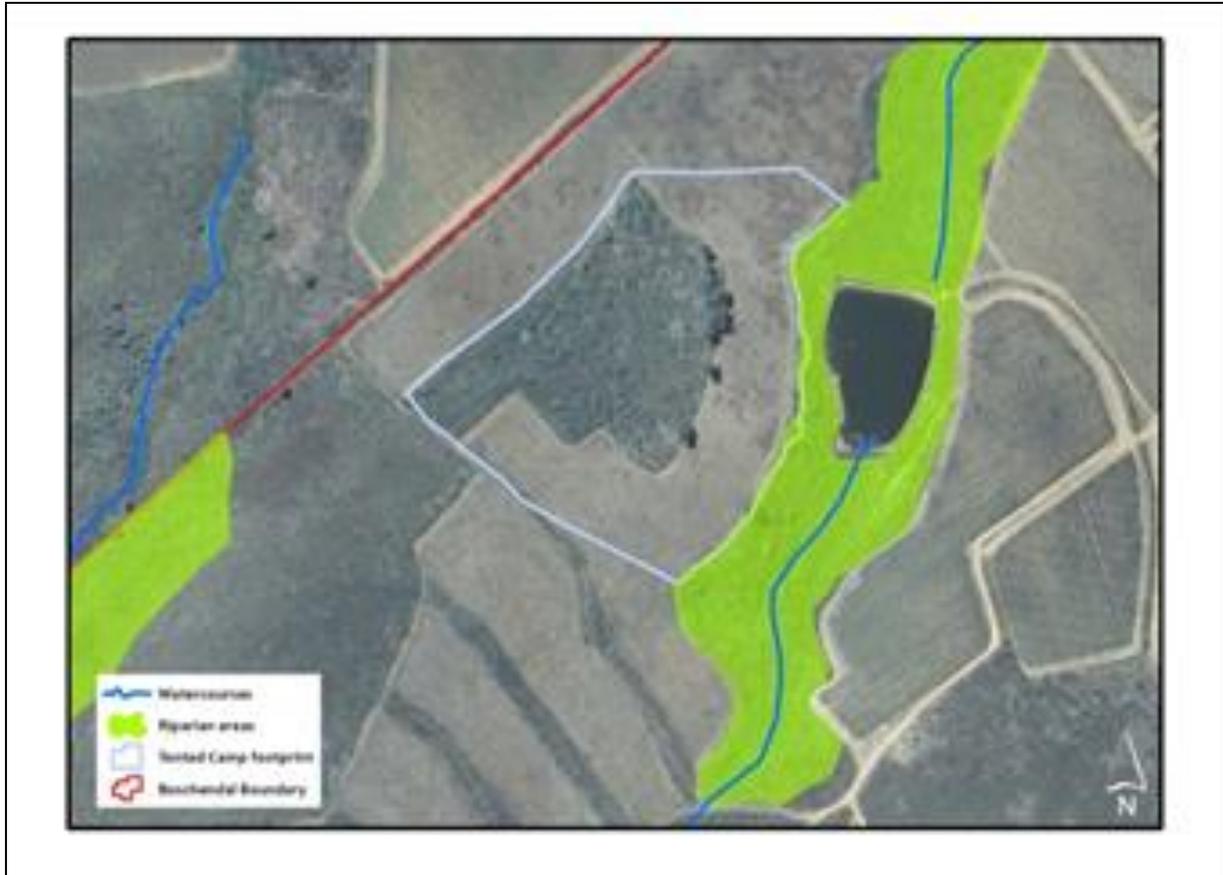


Figure 4: Stream 1 and the riparian areas (green polygons) delineated at the site (Snaddon, 2021)

Stream 1 and its riparian area are categorised as Ecological Support Areas.

Stream 1 is in good condition, apart from the impacts associated with removal of indigenous vegetation in the catchment (for agriculture) and the presence of the farm dam adjacent to the site. The upper portion of Stream 1 above the farm dam lies in an A Category for PES (thus considered to be unmodified, natural), while the lower section below the dam is an C Category meaning the section is moderately modified, and while a loss and change of natural habitat and biota have occurred, the basic ecosystem functions are still predominantly unchanged

Although no primary data were collected from the stream, the quality of the habitat is such that the Stream 1 will support populations of unique species that are sensitive to changes in water quantity and quality. The stream is an important refuge for species, and provides essential ecological corridors in a highly transformed, cultivated landscape. Stream 1 is thus of high EIS.

1.3.3 TERRESTRIAL ECOSYSTEM

The project site occurs within Boland Granite Fynbos (according to the National Vegetation Map, 2018) which is listed as Endangered with a conservation target of 30 %.

A field survey by Jackson & Martin (2021) confirmed the vegetation within the project area is comprised of

- Near intact and degraded Boland Granite Fynbos (within which the accommodation tents are located);
- Intact Boland Granite Fynbos to the west of the Tented Camp;
- Riparian vegetation to the east (as assessed by Snaddon, 2021 and discussed in the preceding section); and
- Transformed land (roads and agricultural land).

These vegetation types in relation to the tent structures are depicted in Figure 5 below.



Figure 5. Vegetation map of the project area based on data collected from field survey by Jackson & Martin (2021)

In the centre of the project area where the seven accommodation tent platforms are located, is a patch of Boland Granite Fynbos. The north-western portion of this patch (where tents 4, 6 and 7 are located) is characterised as near intact with species such as *Cliffortia ruscifolia*, *Hermannia hyssoipifolia*, *Leucadendron salicifolium*, *Osteospermum moniliferum*, *Searsia angustifolia* and *Dicerotheramnus rhinocerotis* present. *Searsia angustifolia* (a small tree species) was also present within the patch. The eastern portion of this patch is more degraded and has a higher number of alien invasive species. On the eastern edge of this patch is a stand of large pine trees (Jackson & Martin, 2021).

There are also a large number of alien/weedy species within impacted patch of Boland Granite Fynbos, specifically the degraded patch. These include species such as *Acacia longifolia*, *Pinus cf. pinaster*, *Verbena bonariensis*, *Echium plantagineum*, *Phytolacca octandra*, *Solanum mauritanium* and *Pittosporum undulatum* (Jackson & Martin, 2021).

The Mess Tent (platform 8), Guest Support Tent (platform 9), Staff Office Tent (platform 10) and power boxes are all located in an area that was previously transformed. Based on historical imagery, this area was once an agricultural field used for crops. These areas are now covered in lupins, grasses and species such as *Echium plantagineum*, *Verbena bonariensis* and *Acacia longifolia* (Jackson & Martin, 2021).

Thirty-one plant species were recorded within the project area. Of these species, seven alien invasive and/or ruderal species, two Species of Conservation Concern (SCC) and 21 indigenous species were recorded. One Species of Conservation Concern (SCC) (*Hermannia rugosa* listed as VU) was confirmed to occur within the impacted project area and one species (*Protea burchelli* listed as VU) was recorded immediately to the west of the site and is therefore likely to occur within the site (Jackson & Martin, 2021).

According to the Western Cape Biodiversity Spatial Plan (2017), the footprint of the Tented Camp falls within an Ecological Support Area (ESA) 1 area with a small portion along the eastern boundary falling within an ESA 2 along the stream and farm dam.

Although the near-intact Boland Granite Fynbos and degraded Boland Granite Fynbos has a high sensitivity due to its status of Endangered, the SEI specific to this project infrastructure, which has a small footprint and is of low impact, is rated as Medium. However, if additional clearing occurs within this patch of vegetation, this score is likely to increase to High. The intact patch of Boland Granite Fynbos to the west of the impacted site has an overall SEI of High. The agricultural land surrounding the near-intact and degraded Boland Granite Fynbos is classified as transformed and has an overall SEI of Very Low (Jackson & Martin, 2021).

It must be noted that the patch of Boland Granite Fynbos that has been impacted by the project is infested with alien invasive species. Based on the historical satellite imagery available for the site and the size of some of the established trees, this appears to have been infested prior to construction. However, the construction of the platforms and upgrading of the ring road have exacerbated this (Jackson & Martin, 2021).

The Transformed Areas are currently fallow fields covered by ruderal species and Paterson's curse. Previously these areas were used to grow crops this (Jackson & Martin, 2021).

1.4 HERITAGE/CULTURAL/ARCHAEOLOGICAL ASPECTS

The site is located within the Founders Estate National Heritage Site (NHS) and is therefore protected in terms of the NHRA (Act No 25 of 1999). The Founders' Estates development rights application was approved by SAHRA in 2008 subject to a number of conditions. According to Winter et al., (2021) these conditions have been largely satisfied including Design Guidelines. The requirement for an Archaeological Historical Residues Management Plan (AHRMP), Conservation Management Plan (CMP) and Landscape Guidelines is in the process of being addressed and will be submitted to SAHRA in due course (Winter et al., 2021). The draft AHRMP and draft Landscape Guidelines have been prepared and were taken into account by the HIA. The Tented Camp was developed without the required permission from SAHRA and without consideration of these draft plans.

A Heritage was completed by Winter et. al (2021) to report on the heritage implications of the development.

Archaeological aspects

According to Winter et al., (2021) the intensive utilisation of the Dwars River Valley in early C20th under Rhodes Fruit Farms came with extensive investment of infrastructure in the form of leiwater canals and sluice, as well as other landscape features designed to assist with irrigation and other agricultural activities (Hart and Webley 2009). These features often persist as features in the landscape, such as the stone lined irrigation canals identified on lower lying fields. There are several areas of archaeological sensitivity within the Founders' Estates, including the early industrial landscape of the Silvermine Complex, Goedehoop Farmstead and Nieuwedorp Farmstead (ACO, 2021). However, while Stone Age material might have been located on the site, this is unlikely to have been of high significance, in situ, or densely concentrated, impacts to such archaeological materials are therefore of low significance. Given the remoteness of the location from historic werfs or settlements, no early colonial archaeology is likely to have occurred on the site, and impacts are considered to be unlikely. As the area does not fall on the lower slopes where C20th agriculture was more intensive, features associated with this period are similarly unlikely (Winter et al., 2021).

In light of the extent of previous archaeological survey and assessment of the Founder's Estate (Hart and Gribble, 2021; Hart and Webley, 2009; Kaplan, 2005), confidence in these conclusions is high, and supported by the findings of the recently compiled AHRMP which indicates that no monitoring is required for Founders' Estate 5 or the site.

Visual Aspects

The property (FE 5) has high heritage value in terms of its landscape qualities being located on the upper slopes of the Simonsberg at the interface with the Simonsberg Nature Reserve. It has high visibility from surroundings, with localised ridgelines to the north and south of the tented camp shielding the visibility of the site from immediately surroundings especially from the western portion of the Founders Estates NHS (Winter et al., 2021). The visibility of the camp from across the farm dam at the site is shown in Figure 4.

A view shed analysis was undertaken of the Tented Camp by Winter et al., (2021). The key findings of this view shed are the following:

- A zone of high visibility is confined to 500 m of the tented camp affecting FE 5, FE 3 and FE6 in the north-west portion of the Founders' Estates.
- The tents are not visible from most of the Founders' Estates.
- The tents are not visible from Goede Hoop, Cottage 1685 and Nieuwedorp.
- The tents are indiscernible beyond 3 km especially with their muted colours. Rhone and Boschendal are located close to 3 km from the tented camp within a zone of low visibility. The R45 and the R310 are also located within a zone of low visibility.
- The yellow wood avenue located on axis with Cottage 1685 and linking the historic core within the Founders' Estates is located within a zone of low-medium visibility.
- The north-south linking route at the base of the Founders Estates will not be impacted by the tented camp.

Thus, at a broader landscape scale the tent structures are visually recessive in terms of their modest scale, low pitched canopies, muted colours and vegetation. At the site scale, some of the structures are visually intrusive (Winter et al., 2021).

Winter et al., (2021) concludes that a number of visual concerns need to be addressed including the treatment of roads and parking, the rehabilitation of the exposed embankment and platform created for the larger tent structures, signage and lighting, and landscaping. The suggested rehabilitation and design measures have all been included in this EMPr.

Heritage Indicators and Assessment

In terms of design considerations, the design of the Tented Camp has not been carefully considered in terms of the siting of some tented structures, technology, materials, execution and landscaping. This impacts micro-site conditions which are mitigated to an acceptable level by the temporary nature of the tented camp facility.

Winter et al., (2021) concludes the following:

"...the unauthorised work has not caused irreversible damage to heritage significance predominantly due to the tread – lightly, low visual impact and temporary nature of the tented camp. However, the unauthorised work does have heritage implications which need to be addressed in terms of remedial action/mitigation measures which are outlined in the recommendations. A primary consideration is that the property owner of FE 5 has agreed to withhold the right to develop a homestead on the Excluded Area until the Temporary Departure to regularise the tented camp from a land use and planning perspective has lapsed and the tented camp has been removed."

1.5 SUMMARY OF IMPACTS (SUMMARY AS IDENTIFIED DURING THE 24G APPLICATION PROCESS)

The identified impacts for all phases of development are summarised in the table below.

Table 2: Summary of Impacts

PHASE	Impacts	Development Alternative		No-Go Alternative	
		Significance rating of impacts <u>before</u> mitigation (Low, Medium, Medium-High, High, Very High):	Significance rating of impacts <u>after</u> mitigation (Low, Medium, Medium-High, High, Very High):	Significance rating of impacts <u>before</u> mitigation (Low, Medium, Medium-High, High, Very High):	Significance rating of impacts <u>after</u> mitigation (Low, Medium, Medium-High, High, Very High):
CONSTRUCTION PHASE	Freshwater Impacts: Storage of building materials (sand, soil, bricks etc) in or close to sensitive areas – this would damage the soil structure and would destroy or shade out plants growing in and around these ecosystems. Dump areas frequently lead to the compaction of soils, which can influence re-growth of plants.	Low (-)	No impact	Not applicable	Not applicable
	Freshwater Impacts: Leakage or spillage of fuels, oils, etc. from construction machinery – this would lead to pollution of the stream.	Low (-)	No impact	Not applicable	Not applicable
	Freshwater Impacts: Leakage or spillage of fuels, oils, etc. from construction machinery – this would lead to pollution of the stream.	Medium (-)	Low (-)	Not applicable	Not applicable
	Freshwater Impacts: Foot and vehicular traffic across the site, leading to destruction or deterioration of freshwater habitat.	Low (-)	No impact	Not applicable	Not applicable
	Freshwater Impacts: Presence of construction teams and their machinery on site – this may lead to noise and light pollution in the area, which will disturb aquatic and terrestrial fauna and flora	Low (-)	Low (-)	Not applicable	Not applicable.
	Freshwater Impacts: Topsoil or sand brought onto the site, for filling and landscaping can lead to the introduction of alien or invasive seedbanks. Whole Estate and downstream	Medium (-)	Low (-) (possibly even low positive, if IAPs are consistently removed from the site)	Not applicable	Not applicable
	Ecological Impact: Loss of extent near-intact Boland Granite Fynbos and degraded Boland Granite Fynbos The clearing of vegetation for the construction of seven tent platforms (three in near-intact granite fynbos and four within degraded granite fynbos) and associated access paths has	Moderate (-)	Moderate (-)	Negligible	Negligible

	resulted in the permanent loss of 0.24 ha of vegetation. This accounts for 15% of the total impacted patch of natural vegetation and 0.08% of the total remaining extent of this vegetation type within the Western Cape Province.				
	<p>Ecological Impact: Loss of Plant Species of Conservation Concern There are two confirmed SCC (one within the site and one directly adjacent to the site) that were recorded during the field survey as well thirteen SCC that have a high likelihood of occurrence within or adjacent to the site. The clearing of vegetation within the impacted Boland Granite Fynbos has resulted in the loss of biodiversity and may have resulted in the loss of some SCC.</p>	Moderate (-)	Low (-)	Low (-)	Low (-)
	<p>Ecological Impact: Disruption of Ecosystem Function and Process Habitat fragmentation occurs when a large expanse or strip of habitat is transformed such that the natural landscape is cut into smaller patches that are isolated from each other resulting in a reduction in ecological functioning, species diversity and species richness. This impact occurs when areas are cleared resulting in reduced movement due to the absence of ecological corridors. The impacted patch of Boland Granite Fynbos has been exposed to some habitat fragmentation and edge effects prior to the construction of the project infrastructure as the area surrounding it has been previously used for agriculture. The clearing of an additional 15% of this patch will have further contributed to fragmentation. However, it should be noted that clearing for the construction of access roads and the tent platforms appears to have been kept to a minimum as the vegetation surrounding these areas is well established indicating minor impacts. Further to this, the platforms are raised off the ground allowing for free the movement of faunal species and dispersal of seeds. So, although some habitat fragmentation has occurred this has been minimised by the low-impact design of the tent platforms.</p>	Low (-)	Low (-)	Low (-)	Low (-)
	<p>Ecological Impact: Infestation of Alien Plant Species These are common in areas that have been recently disturbed such as along the access roads, paths and around the tent platforms. There is also evidence of alien invasive species tree species such as <i>Acacia longifolia</i> and <i>Pinus pinaster</i> within the patch. It is highly probable that this patch was already infested with alien species given the size of some of these and because areas adjacent to the site show evidence of infestation. Nevertheless, the construction of the infrastructure within this patch has exacerbated the level of infestation.</p>	Moderate (-)	Low (-)	Low (-)	Low (-)

	<p>Ecological Impact: Disturbance to terrestrial faunal species due to construction of the tented camp Habitat clearing for the construction of the tent platforms and access paths would have created a disturbance to faunal species using the site for foraging, shelter and breeding.</p>	Low (-)	Not applicable	Negligible	Negligible
	<p>Socio Economic Impact: Creation of temporary, short-term employment opportunities as a result of construction/decommissioning of the facility.</p>	Low (+)	Low (+)	Not applicable	Not applicable
	<p>Nuisance Impacts: Dust & Noise Generation The land clearing and other construction activities would have resulted/ will result in the generation of dust and noise which may have been/ will be a nuisance to surrounding land users whilst construction/decommissioning is ongoing.</p>	Low (-)	Very Low (-)	Not applicable	Not applicable
	<p>Depletion of Natural Resources: Depletion of natural resources through use as material in the development/construction phase (such as water, resources for the generation of energy, construction materials etc.).</p>	Low (-)	Low (-)	Not applicable	Not applicable
	<p>Visual impacts / Sense of Place: The visual impact of the development has been assessed by the HIA (refer to Appendix H (v)) which notes that the Tented Camp is located on the steep upper slopes well above the 320m contour line which is at variance with the heritage indicators and approvals for the Founders Estates. However, consideration is given to the fact that the development can be considered as "nature-orientated tourism" and considered acceptable in this location due its tread lightly and temporary nature of development, and how it relates to the wilderness landscape qualities of the Simonsberg Nature Reserve. In addition, following the results of the viewshed analysis of the site which found that a zone of high visibility is confined to 500 m of the tented camp (which means that the tents are not visible from most of the Founders' Estates and other heritage sites) and since the tents are indiscernible beyond 3 km especially with their muted colours the overall visual impact is described as 'Low negative.'</p>				
	<p>Cultural-Historical Aspects: The tented camp is located outside of the 0.8-hectare developable area and comprises a site development area of approximately 6 hectares, i.e. 23% of the landholding. This together with the positioning of the tented camp directly above the FE 5 homestead will have cumulative impact on the principle of Founders' Estates, i.e. one homestead per farm unit. A key mitigation is to withhold the right to develop a homestead on the Excluded Area of FE 5 until the Temporary Departure as lapsed and the tented camp has been removed. The design of the tented structures has not been well-considered in terms of the siting of some of the structures, tent architecture, technology, materials, execution and landscaping. This negatively impacts the landscape qualities of the site. This impact is however mitigated by the temporary nature of the facility. The tented camp has also not resulted in the removal of any landscape features of heritage value. Winter et al. (2021) concludes that the unauthorised work has not caused irreversible damage to heritage significance predominantly due to the tread – lightly, low visual impact and temporary nature of the camp. However, the unauthorised work does have heritage implications which need to be addressed in terms of remedial action/mitigation measures.</p>				
OPERATIONAL PHASE	<p>Freshwater Impact: Stormwater discharge into natural areas – water quality impacts.</p>	Medium (-)	Low (-)	No impact	No impact
	<p>Freshwater Impact: Stormwater discharge into natural areas – water quantity impacts.</p>	Medium (-)	Low (-)	No impact	No impact
	<p>Freshwater Impact: On-site treatment and/or storage of wastewater – impacts on water quality.</p>	Medium (-)	Low (-)	Not applicable	Not applicable
	<p>Freshwater Impact: Proximity of tents and human activity to the stream.</p>	Medium (-)	Low (-)	Low (-)	No impact
	<p>Freshwater Impact: Clearing of vegetation and disturbance of soils for maintenance/landscaping/gardening and disturbance of soils for landscaping/gardening</p>	Medium (-)	Low (-)	Not applicable	Not applicable

	Socio-Economic Impact: Creation of temporary employment opportunities as a result of operation of the facility for five years. Note that additional indirect stimulus as a result of attracting more tourists to the area would also result.	Low (+)	Low (+)	Not applicable	Not applicable
DECOMMISSIONING PHASE	Freshwater Impacts: Storage of demolition materials (sand, soil, bricks etc) in or close to sensitive areas – this would damage the soil structure and would destroy or shade out plants growing in and around these ecosystems. Dump areas frequently lead to the compaction of soils, which can influence re-growth of plants.	Low (-)	No impact	Not Applicable	Not Applicable
	Freshwater Impacts: Leakage or spillage of fuels, oils, etc. from demolition machinery – this would lead to pollution of the stream.	Low (-)	No impact	Not Applicable	Not Applicable
	Freshwater Impact: Leakage or spillage of fuels, oils, etc. from demolition machinery – this would lead to pollution of the stream.	Medium (-)	Low (-)	Not Applicable	Not Applicable
	Freshwater Impact: Foot and vehicular traffic across the site, leading to destruction or deterioration of freshwater habitat.	Low (-)	No impact	Not Applicable	Not Applicable
	Freshwater Impact: Presence of teams and their machinery on site – this may lead to noise and light pollution in the area, which will disturb aquatic and terrestrial fauna and flora	Low (-)	Low (-)	Not Applicable	Not Applicable
	Freshwater Impact: Topsoil or sand brought onto the site, for filling and landscaping can lead to the introduction of alien or invasive seedbanks.	Medium (-)	Low (-) (possibly even low positive, if IAPs are consistently removed from the site)	Not Applicable	Not Applicable
	Freshwater Impact: Disturbance of soils and vegetation as a result of removal of tents and infrastructure	Medium (-)	No impact, to Low (+) significance (depending on the success of rehabilitation)	Not Applicable	Not Applicable
	Ecological Impacts: Loss of extent near-intact Boland Granite Fynbos and degraded Boland Granite Fynbos: The decommissioning of the tented camp and removal of tent platforms and infrastructure will require laydown areas and will disrupt vegetation that has re-established around the areas that were disturbed during the construction phase. Given the nature of the tents and the platforms, it is anticipated that the removal of these can be done with limited impact to the surrounding vegetation.	Low (-)	Low (-)	Not Applicable	Not Applicable
	Ecological Impacts: Infestation of Alien Plant Species: There are seven alien invasive species present within the site. These are common in areas that have been recently disturbed such as along the access roads, paths and around the tent platforms. There is also evidence of alien invasive species tree species such	Moderate (-)	Low (-)	Not Applicable	Not Applicable

	as <i>Acacia longifolia</i> and <i>Pinus pinaster</i> within the patch. Disturbance associated with the decommissioning of the site can lead to further infestation of existing alien invasive species.				
	Ecological Impacts: Disturbance to terrestrial faunal species due to construction and operation of the tented camp: Habitat clearing for the decommissioning of the tent platforms and access paths would have created a disturbance to faunal species using the site for foraging, shelter and breeding.	Low (-)	Low (-)	Not Applicable	Not Applicable
	Socio – Economic Impact: Creation of temporary, short-term employment for labourers during decommissioning of the facility.	Low (+)	Low (+)	Not applicable	Not applicable
	Nuisance Impacts: Dust & Noise Generation Decommissioning activities will result in the generation of dust and noise which may be a nuisance to surrounding land users whilst decommissioning is underway	Low (-)	Very Low (-)	Not applicable	Not applicable

1.6 STATUTORY APPROVALS

The required approvals in terms of applicable legislation are tabled below. It must be ensured that all required approvals are in place.

Table 3. Legislative approvals

LEGISLATION	ADMINISTERING AUTHORITY	TYPE Permit/ license/ authorisation/comment
National Water Act (Act No. 36 of 1998)	The Department of Water & Sanitation (DWS)	General Authorisation
South African Heritage Resources Act (Act No. 25 of 1999)	South African Heritage Resource Agency (SAHRA)	Comment and instruction on way forward regarding unlawfully commenced development without the necessary heritage permit.
Stellenbosch Municipality Land Use Planning By-law of 2015 (SM LUPBL) & Stellenbosch Municipality Zoning Scheme By-law (ZSBL) of 2019	Stellenbosch Municipality	Temporary Departure application in terms of section 15 (2) (c) of the SM LUPBL (2015) (at the same time having regard for the parameters in terms of Chapters 20 and 25 of the Stellenbosch Municipality Zoning Scheme By-law of 2019 (SM ZSBL).)

1.7 COMPONENTS OF THE EMPr

The EMPr consists of the following components:

Section 1: Introduction	Provides background information regarding the site, the proposed development and the EMPr.
Section 2: Implementation of the EMPr	Provides details of the communication and organisational structures within which the EMPr will be implemented, responsibilities of key role players, and provides the terms of reference for the ECO.
Section 3: Environmental Management Specifications for Construction Phase	Provides all construction phase environmental management requirements applicable to the principal construction contractors, and their subcontractors.
Section 4: Environmental Management Specifications for Operational Phase	Provides all operational phase environmental management requirements applicable to the Tented Camp.

Section 3: Environmental Management Specifications Decommissioning Phase	Provides all construction phase environmental management requirements applicable to the principal construction contractors, and their subcontractors.
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2. DESIGN & CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

2.1 INTRODUCTION

This section of the EMPr describes mitigation measures and identifies specific people or organisations to undertake particular tasks in order to ensure that impacts on the environment are minimised during any further construction on site.

The EMPr is applicable to all works comprising the project. It is an open-ended document implying that information gained during construction activities and/or monitoring of procedures on site could lead to changes in the EMPr.

The appointed Environmental Control Officer (ECO) will monitor compliance with the EMPr and other Conditions of Approval contained in the Environmental Authorisation issued by the D:EA&DP, as they relate to environmental matters. This EMPr gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts.

Non-compliance penalties are described in this EMPr and are thus to be included into the official contract documentation. The contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr. The ECO in turn will immediately inform the Engineer and Developer and, if necessary, the environmental authorities of such events.

2.2 ROLES AND RESPONSIBILITIES

The key role-players during the various phases of the project, for the purposes of environmental management on site, include but are not limited to: the Applicant (developer), the engineer (if applicable), the main contractors (direct appointments including civil works contractor, building contractor, landscape contractor etc.) the Environmental Control Officer and representatives of the relevant Authority/ies.

Details of the responsibilities of each of the key role-players have been provided in sections 2.2.1 to 2.2.4. Lines of communication and reporting between the various parties are illustrated in Figure 6 below.

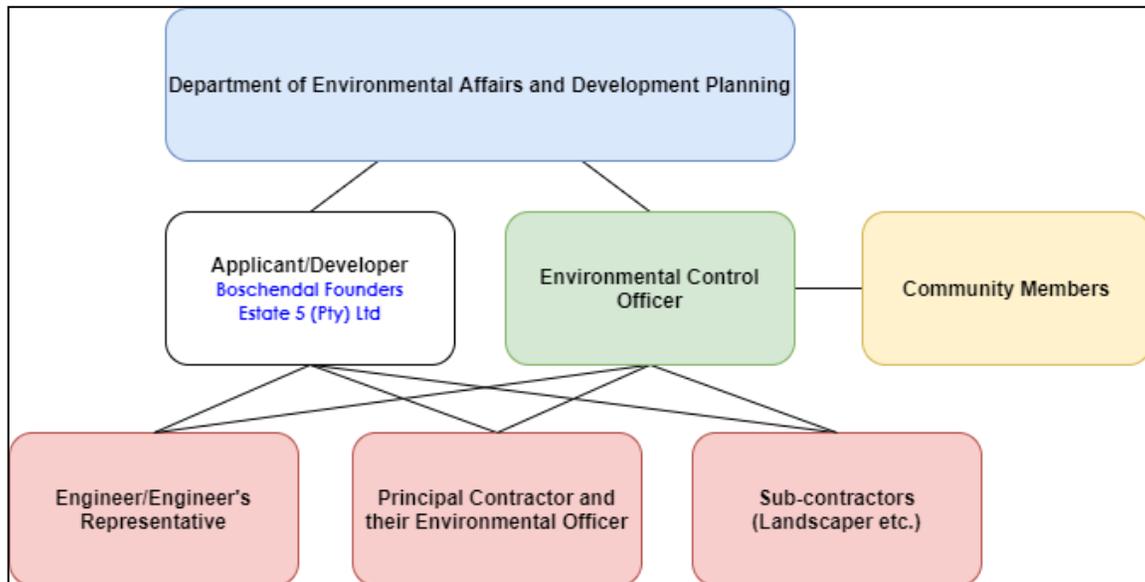


Figure 6. Typical communication and reporting structure

2.2.1 The Applicant / Developer

With respect to the construction and decommissioning phase of the Development, the Applicant / Developer is to:

- Ensure that all relevant approvals and permits have been obtained;
- Ensure that D:EA&DP have been notified of the date on which construction and decommissioning activities will be starting, one week prior to commencement of the activities (or as per the requirement of the Environmental Authorisation);
- Ensure that construction activities start prior to the expiration date of the Retrospective Environmental Authorisation issued by the D:EA&DP, failing which the approval of the development by the department would lapse unless an extension is applied for;
- Appoint a suitably qualified or experienced Environmental Control Officer prior to the start of construction and decommissioning activities on site, for the duration of the decommissioning/construction contract; and
- Appoint a suitably qualified and experienced freshwater and terrestrial ecologist to compile a rehabilitation plan for the site as well as to provide guidance and oversight of rehabilitation activities where needed and as prescribed in this EMPr.

2.2.2 The Engineer / Project Manager

For the purposes of this document, "The Engineer" refers to the engineer / project manager for the development, or any other person authorised by the Developer, to be responsible for the technical and contractual implementation of the works to be undertaken.

The responsibilities of the Engineer are to:

- Ensure that the requirements as set out in this EMPr and by the relevant Authorities are adhered to and implemented;
- Assist the ECO in ensuring that the conditions of the EMPr are being adhered to and promptly issue instructions requested by the ECO, to the Contractor. All site instructions relating to environmental matters issued by the Engineer are to be copied to the ECO;
- Assist the ECO in making decisions and finding solutions to environmental problems that may arise during the various phases of the development;

- Review and approve construction Method Statements with input from the ECO;
- Order the removal of person(s) and/or equipment not complying with the specifications (as required by the ECO or otherwise);
- Issue penalties for transgressions of Environmental Specifications; and
- Provide input into the ECO's on-going internal review of the EMPr.

2.2.3 The Contractor

For the purposes of this document "The Contractor" refers to any directly appointed company or individual (by the Developer) undertaking the implementation of the works. The Contractor will be responsible for the day-to-day implementation of the EMPr. During the course of construction and decommissioning regular compliance audits will need to be undertaken, which must be undertaken by an appropriately qualified environmental practitioner.

The Contractor is to:

- Compile the required Method Statements for submission to the Engineer and the ECO for approval;
- Ensure implementation of all applicable Environmental Management Specifications, including all additional requirements related to approved method statements, during all works on site, failing which penalties, as outlined in the EMPr may be imposed by the ECO via the Engineer;
- Ensure that all of its sub-contractors, employees, suppliers or agents etc. are fully aware of the environmental requirements detailed in the Environmental Specifications of this EMPr (the main contractor will be held liable for any penalties incurred by sub-contractors);
- Liaise closely with the Engineer and the ECO and ensure that the works on site are conducted in an environmentally sensitive manner;
- Nominate a member of personnel as the contractors' Environmental Officer who will be responsible for enforcing the EMPr specifications on a daily basis. This individual shall liaise closely with the ECO and inform the Engineer, as well as the ECO, should environmental issues on site arise, e.g. dumping, pollution, littering and damage to vegetation;
- Carry out instructions issued by the Engineer, on request of the ECO, required to fulfil his/her compliance with the EMPr;
- Investigate and comply with all existing regulations and laws/by-laws unless the relevant authority grants specific written compliance with any legislation;
- Comply with the Occupational Health and Safety Act (Act 85 of 1993) and in particular the requirements of the current Construction Regulations; and
- Make provision for inspections of the site by any Authority and/or any party authorised by the Engineer or the ECO.
- Comply with the "Duty of Care" principle (section 28 of NEMA, 1998) to avoid and prevent any pollution incidents from occurring on site.

Upon failure by the contractor or contractor's employee to show adequate consideration to the environmental aspects of this contract, monetary penalties for breach of the EMPr (and thus the contract) may be imposed by the ECO via the Engineer or to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

2.2.4 Environmental Control Officer (ECO)

A suitably qualified ECO must be employed throughout the duration of any further construction on site:

During this time, the ECO is to:

- Ensure that the Contractor has a copy of the EMPr and all agreed Method Statements;
- Ensure that the approved design and development footprint of the Tented Camp is implemented;
- Assist the Engineer in identifying the need for or applying for special or required permits if applicable;
- Undertake **fortnightly** site inspections (frequency may change as required), to audit compliance of all parties with the requirements of the EMPr during construction on site including landscaping and restoration;
- Ensure that the required oversight actions by a freshwater and terrestrial consultant are undertaken as stipulated in this EMPr, if required;
- Advise/recommend on actions or issues impacting on the environment to the Engineer, who shall issue any required site instructions to the contractor;
- Environmentally educate and raise the awareness of the Contractor and his staff as to the sensitivity of the site and facilitate the appropriate attitude during works on site;
- Review and approve construction Method Statements together with the Engineer;
- Assist the Contractor in finding environmentally responsible solutions to problems;
- Recommend to the Engineer the issuing of a penalty for any environmental damage caused on site, or non-compliance with the Environmental Specifications;
- Recommend to the Engineer the removal of person(s) and/or equipment not complying with the Specifications;
- Act as the contact person between the Developer, D:EA&DP and the public with regard to environmental matters;
- Report to D:EA&DP, where required and in terms of the Conditions of Approval of the Retrospective Environmental Authorisation, regarding the implementation of the EMPr, compliance with the Conditions of Approval contained in the Environmental Authorisation and implementation of the relevant mitigation measures contained in the EMPr;
- Keep a register of complaints and record and manage any community comments or issues, having reported these first to the Engineer;
- Undertake photographic monitoring of the construction site;
- Keep records of all activities/ incidents on site concerning the environment in a site diary;
- Complete a permanent site closure report following the decommissioning of the site;
- Take immediate action on site to stop works where significant and irreparable damage is being inflicted on the environment, and inform the Engineer immediately of the occurrence and action taken; and
- Undertake a continual internal review of the EMPr and make recommendations to the Engineer and Developer. This includes monitoring of construction and decommissioning activities and compiling reports on performance relative to this EMPr.

The ECO has the authority to recommend to the D:EA&DP that works be stopped, if in his/her opinion serious harm to, or impact on, the environment is imminent, is likely to occur or has occurred. Furthermore, the ECO may also recommend that works be stopped if such actual or potential harm or impact is in contravention of this EMPr and which is, or may be, caused by construction, decommissioning or related works.

Upon failure by the contractor or contractor's employees to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the Engineer and the project management team to have the contractor's representative, or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

2.3 MONITORING AND REPORTING

2.3.1 Site Instructions

Site Instructions, stipulating recommended actions required to improve compliance with the EMPr by the Contractor will be issued by the ECO to the Engineer, who in turn will ensure that the Contractor is informed of the said instruction.

Comments made by the ECO are advisory and all site instructions required may only be issued by the Engineer. Site Instructions will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activity(ies) of the Contractor deemed to pose immediate and serious risk of unnecessary damage to the environment.

2.3.2 Monthly Monitoring Reports

The ECO will compile a monitoring checklist to facilitate checking against the requirements of the EMPr. Monthly monitoring reports will be compiled in which events, concerns and general compliance of the Contractor with the EMPr will be recorded. This report will be submitted to the Engineer and if it is deemed necessary, to the authorities (i.e. D:EA&DP).

During construction works on site, the ECO must report to the D:EA&DP, where required, regarding the implementation of the EMPr, compliance with the Conditions of Approval which would be contained in the Retrospective Environmental Authorisation and implementation of the relevant mitigation measures contained in the EMPr.

Should the EMPr require further updates, the manner and frequency for updating the EMPr must be done as follows:

An application for amendment to the EMPr must be submitted to the Competent Authority if any further amendments are to be made to the EMPr, other than potential amendments mentioned in the retrospective environmental authorisation, water use authorisation and/or the town planning approvals. Further changes may only be implemented once the amended EMPr has been authorised by the competent authority.

2.4 ENVIRONMENTAL EDUCATION PROGRAMME

The Contractor in consultation with the ECO shall arrange for a presentation to site staff to familiarise them with the environmental aspects of the EMPr within seven days from the commencement date of construction and/or decommissioning. This presentation should take cognisance of the level of education, designation and language preferences of the staff. General site staff would commonly receive a basic environmental awareness course highlighting general environmental "do's and don'ts" and how they relate to the site. Management on site e.g. site agents and foremen, who require more detailed knowledge about the environmental sensitivities on site and the contents and application of the construction phase of the EMPr document itself, will benefit from a separate presentation

dealing with these issues. The ECO may call upon the services of a specialist environmental education translator should this be required.

Environmental awareness training courses shall be run for all personnel on site. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participants' names, a copy of which shall be filed in the (site) environmental file.

The Contractor's general site staff shall attend an initial presentation of approximately 45 minutes, and approximately half an hour a month thereafter for the duration of the contract shall be allowed for employees to attend any follow-up lectures, should this be deemed necessary by the ECO. In addition, all new staff and sub-contractor's employees that spend more than 1 day a week or four days in a month are to attend the environmental education program within 1 (one) week of commencement of work on site. The Contractor shall on request of the ECO provide documented proof (signed attendance registers) that all employees have received such training.

Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the sentiments of the EMPr to all personnel involved with the works.

The initial environmental awareness training course shall be presented by the ECO. Subsequent courses to be held as and when required should be presented by the Contractor's Environmental Officer or the Health and Safety Officer.

2.5 OCCUPATIONAL HEALTH & SAFETY REQUIREMENTS

The Occupational Health and Safety Act (Act 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with but fall beyond the scope of this EMPr.

2.6 DISPUTE RESOLUTION

Any disputes or disagreements between role players on site (with regard to environmental management) will firstly be referred to the Engineer. If no resolution on the matter is possible then the matter will be referred to D:EA&DP for clarification.

2.7 SOCIAL RESPONSIBILITIES

The Developer and Contractor(s) shall encourage and implement wherever possible the procurement of locally based labour, skills and materials.

3. DESIGN & CONSTRUCTION ENVIRONMENTAL MANAGEMENT SPECIFICATIONS

3.1 INTRODUCTION

The Environmental Specifications contained in this section of the EMPr cover the requirements for controlling the impact of design, construction and decommissioning activities on the environment.

This section of the document describes mitigation measures in detail, and is partly prescriptive, identifying specific people or organisations to undertake specific tasks to ensure that impacts on the environment are minimised during the construction and decommissioning phases of this project. This section of the EMPr is applicable to all works associated with the design, construction and decommissioning for the development of a tented camp on Founders Estate 5, Farm 1685/5, Paarl (FE5). It is an open-ended document implying that information gained during construction and decommissioning activities and/or monitoring of procedures on site could lead to changes in the EMPr.

The appointed Environmental Control Officer (ECO) will monitor compliance with section 3 of the EMPr and other Conditions of Approval contained in the Environmental Authorisation issued by the DEA&DP, as they relate to environmental matters. This EMPr gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts.

Non-compliance penalties are described in this EMPr and are thus to be included into the official contract documentation with contractors. The Contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr. The ECO in turn will immediately inform the Engineer and Applicant and, if necessary, the environmental branch of the Local Authority, of such events.

It is noted that construction activities for the development of the Tented Camps had already commenced on site prior to this EMPr being compiled. The below environmental management requirements must be implemented and adhered to should any further construction activities take place on site (as authorised) including landscaping and restoration works. These specifications must also be referred to during the decommissioning of the camp.

3.2 METHOD STATEMENTS

The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the EMPr, when called upon to do so by the Engineer or ECO.

A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the ECO/project management team, as circumstances unfold. All Method Statements will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMPr.

Note that a Method Statement is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Engineer to understand the Contractor's intentions. For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable);
- **When** - the sequencing of actions with due commencement dates and completion date estimates;
- **Who** - The person responsible for undertaking the works described in the Method Statement; and
- **Why** - a description of why the activity is required.

The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project deemed to pose environmental risks. Changes to, and adaptations of Method Statements should be made in response to changes in construction methods or where effectiveness of environmental management measures requires improvement.

The Engineer / ECO may request a Method Statement for any activity he believes may impact on the environment. The Engineer / ECO may also require changes to a Method Statement if the proposal does not comply with the Specification or if, in the reasonable opinion of the Engineer, the proposal may result in, or carries a greater than reasonable risk of damage to the environment in excess of that permitted by the Specifications.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

3.2.1 Specific Method Statements Required

The following Method Statements shall be provided by the Contractor and submitted to the ECO at least seven working days before any activities commence on site:

- **Site Establishment/De-establishment and Site Camp Division**

The location, layout and method of establishment of the construction camp (including all no-go areas, buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be detailed and presented in a drawing. Cognisance must be taken of the environmental management requirements set out in this EMPr in developing this plan.

- **Fuel Storage and Use**

The design, location and construction of the fuel storage and service areas as well as for the filling and dispensing from storage tanks and management of drip trays.

- **Solid Waste Management**

Expected solid waste types, sorting methods, quantities, methods and frequency of collection and disposal, as well as location of disposal sites. Include details of the proposed recycling program.

- **Contaminated Water**

Methods of minimising, controlling, collecting and disposing of contaminated water.

- **Stormwater management**

Methods of managing, controlling, stormwater runoff during construction.

- **Cement and Concrete Batching**

Location, layout and preparation of cement / concrete mixing areas including the methods employed for the mixing of concrete, particularly the containment of runoff water from such areas and the method of transportation of concrete.

- **Dust**

Details on the methods employed for reducing dust on the site.

- **Emergency Procedures**

Emergency procedures for fire, accidental leaks and spillages of hazardous substances (including fuel and oil). Include details of risk reduction measures to be implemented including fire-fighting equipment, fire prevention procedures and spill kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons).

- **Noise mitigation methods**

Detail the steps to be implemented to reduce/avoid noise impacts on the surrounding area.

- **Additional Method Statements required**

Any additional Method Statements that may be required by the Engineer and ECO during the course of construction are to be provided by the Contractor within a minimum of 10 working days prior to the commencement of works or activities to which they apply.

The ECO may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the ECO, the proposal may result in, or carries a greater than reasonable risk of damage to the environment in excess of that permitted by the specifications or any legislation.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel and Sub-contractors. The Contractor shall carry out the works in accordance with the approved Method Statement. Approval of the method statement shall not absolve the Contractor from any obligations or responsibilities in terms of the contract. No claim for delay or additional cost incurred by the Contractor shall be entertained should the inadequacy of a method statement be the cause.

3.3 ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The environmental management requirements take account of the findings of the 24G Environmental Impact Report (EIR) and specialist studies, together with the typical measures needed to prevent or at least minimise potential adverse environmental effects associated with construction activities. Method Statements must take account of these requirements. Additional measures may be identified during the course of construction and Method Statements would be required in this regard. Environmental management requirements cover the following:

- Design & Remediation Measures;
- Waste management;
- Soil, Freshwater & Groundwater pollution management;
- Protection of natural features, fauna and flora;
- Protection of any paleontological and archaeological resources;
- Noise management;
- Dust management;
- Aesthetics;
- Site access, access routes, and traffic management;
- Labour relations, facilities and site health and safety;
- Incident management;
- Resource use (raw materials and natural resources); and
- Site clean-up and rehabilitation.

Table 4: Table of Environmental Management Requirements / Specifications for the Construction Phase

ISSUE	MANAGEMENT / MITIGATION MEASURES
<p>DESIGN & REMEDIATION MEASURES:</p> <p><u>Management Statement and objective:</u> To ensure that the final site designs are in line with the recommendations made in the environmental assessment phase. To ensure that all required remediation and restoration measures are implemented.</p> <p><u>Impact Management Outcomes:</u> No deviations from the below.</p>	
<p>General Requirements</p>	<ul style="list-style-type: none"> • No further construction activities may occur until Environmental Authorisation has been received and the required permits are in place (Jackson & Martin, 2021). • No infrastructure must be placed in areas of high sensitivity (Jackson & Martin, 2021). • Any future infrastructure required for this site must be located within the transformed area (fallow land) (Jackson & Martin, 2021). • Clearing of indigenous vegetation is not permitted (Jackson & Martin, 2021 & Snaddon, 2021). • No further clearing within the impacted Boland Granite Fynbos patch may occur for additional roads or tents (Jackson & Martin, 2021).
<p>Heritage considerations</p>	<ul style="list-style-type: none"> • The lifespan of the Tented Camp must be temporary as specified by the Temporary Departure application (5 years) in terms of section 15 (2) (c) of the SM LUPBL (Winter et. al., 2021). • No expansion of the Tented Camp may be undertaken without a permit from SAHRA in terms of Section 27 (18) of the NHRA (Winter et. al., 2021). • A homestead on the Excluded Area of FE 5 may not be constructed until the Temporary Departure to regularise the tented camp from a land use and planning perspective has lapsed and the tented camp has been removed (Winter et al., 2021).
<p>Roads and Parking</p>	<ul style="list-style-type: none"> • Further roads, tracks or cleared areas should be avoided, if possible, to minimise visual scars in the landscape (Winter et. al., 2021). • Access roads on site should not be widened (Jackson & Martin, 2021). • Where sections of access roads / tracks are no longer required, these must be revegetated, or narrowed down to single-track paths (Winter et. al., 2021). • Excavations for parking or turn-arounds must be avoided, especially where the underlying saprolite will be exposed (Winter et. al., 2021).

	<ul style="list-style-type: none"> • Cars should be parked in groups of not more than 2 or 3 alongside the access roads in unobtrusive positions as identified on the site plan (Winter et. al., 2021). • Imported material or paving for roads and parking should be avoided, except for stone chips and mulch (Winter et. al., 2021). • Parking areas should preferably be constructed using permeable materials to allow for infiltration of water (Snaddon, 2021). • Bicycle paths through the riparian area around the stream must be limited, and no new paths constructed (Snaddon, 2021).
<p>Signage and Lighting</p>	<ul style="list-style-type: none"> • Signage should be kept to a minimum. Signage is restricted to a maximum height of 1,2 m and must have dark backgrounds as per existing signage on site (Winter et. al., 2021). • No advertising signage, flags or banners will be permitted to avoid visual intrusion on the surroundings (Winter et al., 2021). • Outdoor lighting must be kept to a minimum and consist of low-level bulkhead or bollard type lighting with reflectors that cast the light downwards, and where the light source is not visible (Winter et. al., 2021). • Lighting must be directed away from all sensitive natural areas (Snaddon, 2021 & Jackson & Martin, 2021). • The existing lights fixed to the outside of the tents should be fitted with reflectors or replaced with bulkhead lights as described above (Winter et. al., 2021). • All unnecessary lighting must be removed from site (Hawkes, 2021). • Wherever possible all fluorescent (including compact fluorescent), high pressure sodium vapour, mercury vapour and metal halide fittings should be exchanged for low pressure sodium vapour or monochrome yellow/orange LED fittings. Alternatively, filters should be fitted to eliminate all UV and blue components of the light emitted (Hawkes, 2021). • Lighting not in use should be switched off immediately (Hawkes, 2021). • Installation of motion-detector controls (Hawkes, 2021). • Omni-directional light fittings should be avoided, and all directional fittings should be correctly oriented so that light is restricted to where it is needed, without unnecessary spill into the surroundings. If external lighting of structures is essential (e.g. for security reasons), light sources should be directed inward toward the structure/building, so as to light up the structure and result in this becoming a large diffuse light source, rather than having bright point sources directed from the structure/building outward into the natural environment (Hawkes, 2021). • Non-directed, partially directed or omnidirectional light sources should be shielded so that light is prevented from reaching the surrounding environment. Internal lighting should as far as possible be shielded by blinds/curtains (Hawkes, 2021). • Light fixtures comprising enclosures within which insects can become trapped after being attracted by the light should be rendered insect-proof by being properly sealed. Where complete sealing is not possible due to resulting heat build-

	<p>up and danger of equipment failure or fire, the fixtures should be replaced, or sealed using metal gauze to allow airflow but prevent ingress by insects (Hawkes, 2021).</p> <ul style="list-style-type: none"> • Research into alternative monochrome LED sources that avoid peak firefly sensitivity wavelengths should be encouraged (Hawkes, 2021). 																																	
<p>Landscaping</p>	<ul style="list-style-type: none"> • Further clearing or excavations that expose the saprolite must be avoided on site (Winter et. al., 2021). • Existing exposed embankments must be revegetated if a low dry-packed stone wall or gabion is constructed at the foot of the embankment and backfilled with any available colluvial soil from the site (Winter et. al., 2021). • The clayey ground surface around the mess and kitchen, which becomes sticky in winter and hard in summer, should be covered with a geofabric and stone chips to create a more trafficable and visually pleasing surface (Winter et. al., 2021). • No gardenesque planting layouts or exotic plant material is permitted to be planted (Winter et. al., 2021). • All invasive exotic vegetation, such as pine seedlings, Port Jackson and bugweed, must be cleared from the farm portion relating to the camp on an ongoing basis. This will also help to reduce fuel load in terms of fire hazard (Winter et al., 2021). • The mature Monterey pines, which are spreading seedlings on the mountain slopes, must be removed on a phased basis over the next 5 years, as the indigenous vegetation takes over (Winter et al., 2021). • Suitable fast-growing indigenous trees should be planted adjacent to the more visually exposed tents (refer to Figure 7). The below tree list must be followed (Winter et. al., 2021 & Jackson & Martin, 2021): <table border="1" data-bbox="680 778 1980 1198"> <thead> <tr> <th>SPECIES NAME*</th> <th>COMMON NAME</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr> <td><i>Apodytes dimidiata</i></td> <td>White pear</td> <td>Useful for screening</td> </tr> <tr> <td><i>Brabejum stallaifolium</i></td> <td>Wild almond</td> <td>Grows along water courses on the Founders' Estate. Bushy, spreading habit. Useful for visual screening.</td> </tr> <tr> <td><i>Cassine peragua</i></td> <td>Bastard saffron</td> <td>Small shrubby tree of mountain slopes and water courses. Fruit attracts birds.</td> </tr> <tr> <td><i>Metrosideros angustifolia</i></td> <td>Lance-leaf myrtle</td> <td>Small bushy evergreen tree mainly found along water courses. Useful for visual screening.</td> </tr> <tr> <td><i>Olea europaea subsp. africana</i></td> <td>Wild olive</td> <td>Common evergreen tree adapted to woodland and stony or sandy hillslopes. Useful for visual screening, windbreaks and bank stabilisation.</td> </tr> <tr> <td><i>Olea capensis</i></td> <td>Ironwood</td> <td>Small to medium bushy tree occurring in scrub or evergreen forest.</td> </tr> <tr> <td><i>Olinia ventosa</i></td> <td>Hard pear</td> <td>Medium-size tree occurring in evergreen forest or scrub and rocky hillslopes. Fruit attracts birds. Fairly fast growth.</td> </tr> <tr> <td><i>Salix mucronata</i></td> <td>Cape willow</td> <td>Small to medium bushy tree. Occurs mainly along stream banks. Useful for visual screening and bank stabilisation.</td> </tr> <tr> <td><i>Tarchonanthus camphoratus</i></td> <td>Camphor bush</td> <td>Small bushy tree occurring in a variety of habitats. Useful for erosion control.</td> </tr> <tr> <td><i>Virgilia oroboides</i></td> <td>Keurboom</td> <td>Small, bushy pioneer tree with fragrant pea-like flowers. Makes fast growth, but is short-lived.</td> </tr> </tbody> </table> <p>* Note per specialist ecological report: Due to the Boland Granite Fynbos occurring in the area being listed as Endangered, avoid species that are not indigenous to this vegetation type, spreading into it and becoming a problem. For this reason, avoid species that easily self-seed. These species should only be transplanted in the areas that are considered transformed. Only indigenous species to the area should be used for the restoration of the patch of Boland Granite Fynbos.</p>	SPECIES NAME*	COMMON NAME	COMMENTS	<i>Apodytes dimidiata</i>	White pear	Useful for screening	<i>Brabejum stallaifolium</i>	Wild almond	Grows along water courses on the Founders' Estate. Bushy, spreading habit. Useful for visual screening.	<i>Cassine peragua</i>	Bastard saffron	Small shrubby tree of mountain slopes and water courses. Fruit attracts birds.	<i>Metrosideros angustifolia</i>	Lance-leaf myrtle	Small bushy evergreen tree mainly found along water courses. Useful for visual screening.	<i>Olea europaea subsp. africana</i>	Wild olive	Common evergreen tree adapted to woodland and stony or sandy hillslopes. 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- No fertilizer may be used on the site (Snaddon, 2021).
- Landscaping requiring ongoing maintenance around the tents must be kept to a minimum, especially within the ecological buffers (Snaddon, 2021).

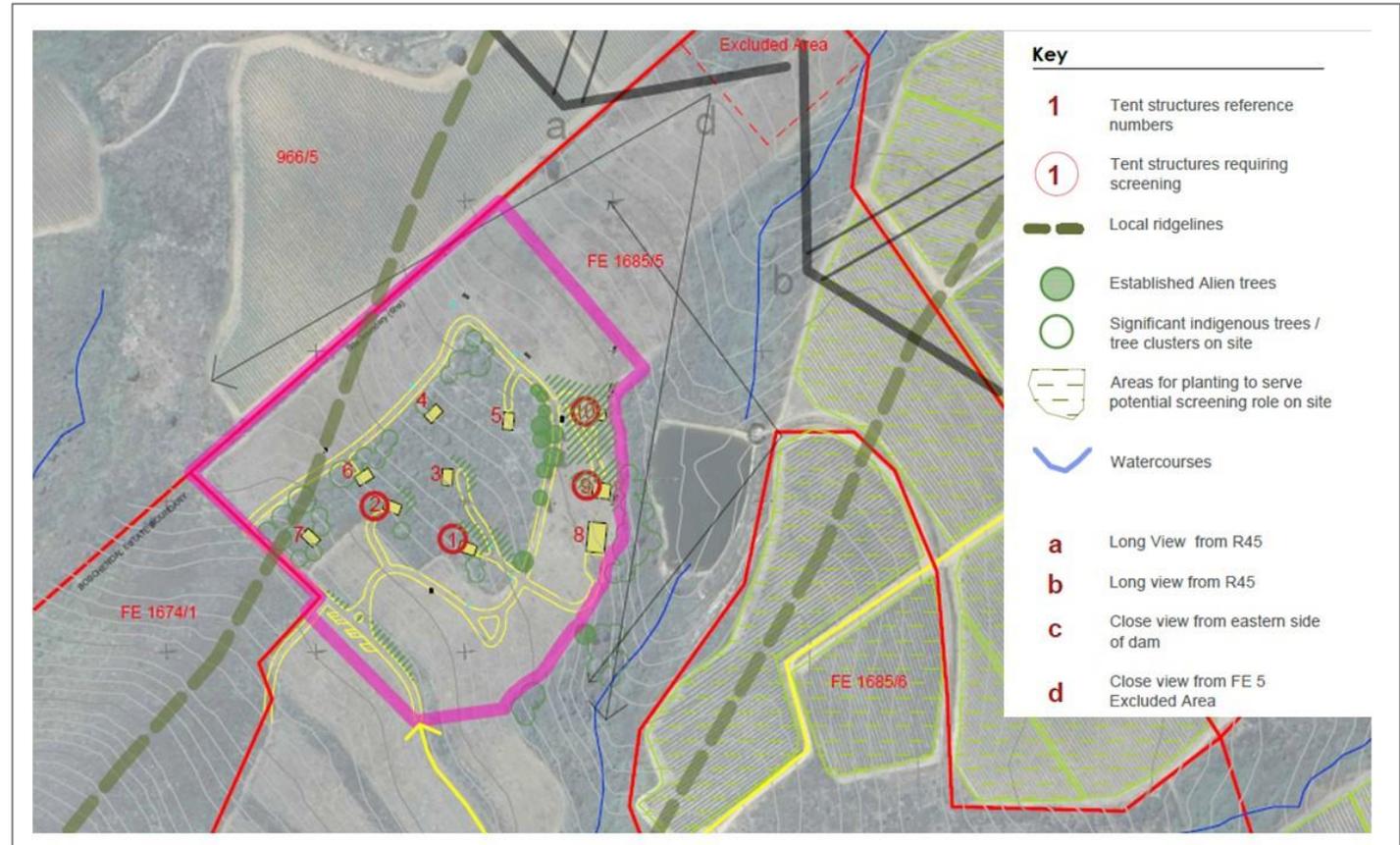


Figure 7: Site constraints and informants showing proposed location of trees to serve as visual screening (source Winter, 2021)

Restoration Plan

- The 1.6 ha patch that the project infrastructure is located within must be restored to represent natural Boland Granite Fynbos (refer to Figure 8: Visual representation of area where restoration should be undertaken i.e., the impacted patch of Boland Granite Fynbos (created by EAP). This includes removal of aliens and re-introduction of representative species (Jackson & Martin, 2021).

	<ul style="list-style-type: none">• Only species indigenous to the vegetation associated with the Simonsberg Mountain must be planted within the Boland Granite vegetation type (Jackson & Martin, 2021).• Vegetation located around the tent platforms must be restored using species indigenous to Boland Granite Fynbos in order to increase diversity. No exotic species should be planted (Jackson & Martin, 2021).• It is recommended that <i>Protea burchelli</i> and <i>Hermannia rugosa</i> are replanted within the impacted patch of Boland Granite Fynbos (Jackson & Martin, 2021).• Eco-logs must be placed in areas that are bare of vegetation or that are being rehabilitated, in order to trap sediment, water and seeds (Snaddon, 2021).• Any invasive alien vegetation identified on site must be cleared and removed from site according to an alien invasive management plan (Jackson & Martin, 2021) - refer to operational phase EMP• With the exception of the large pine trees on the north-eastern corner of the site which could be heritage trees (to be confirmed) all category 1b species must be removed from site. The removal will need to be managed and maintained until these species have been eradicated. It is suggested that locally indigenous species specific to this vegetation type are planted in the gaps left by the removal of alien invasive plants (Jackson & Martin, 2021).• Restoration must be undertaken by a qualified fynbos restoration specialist/qualified botanist in line with the specifications contained in this EMPr. Exact areas and methods for restoration must be defined by the specialist.
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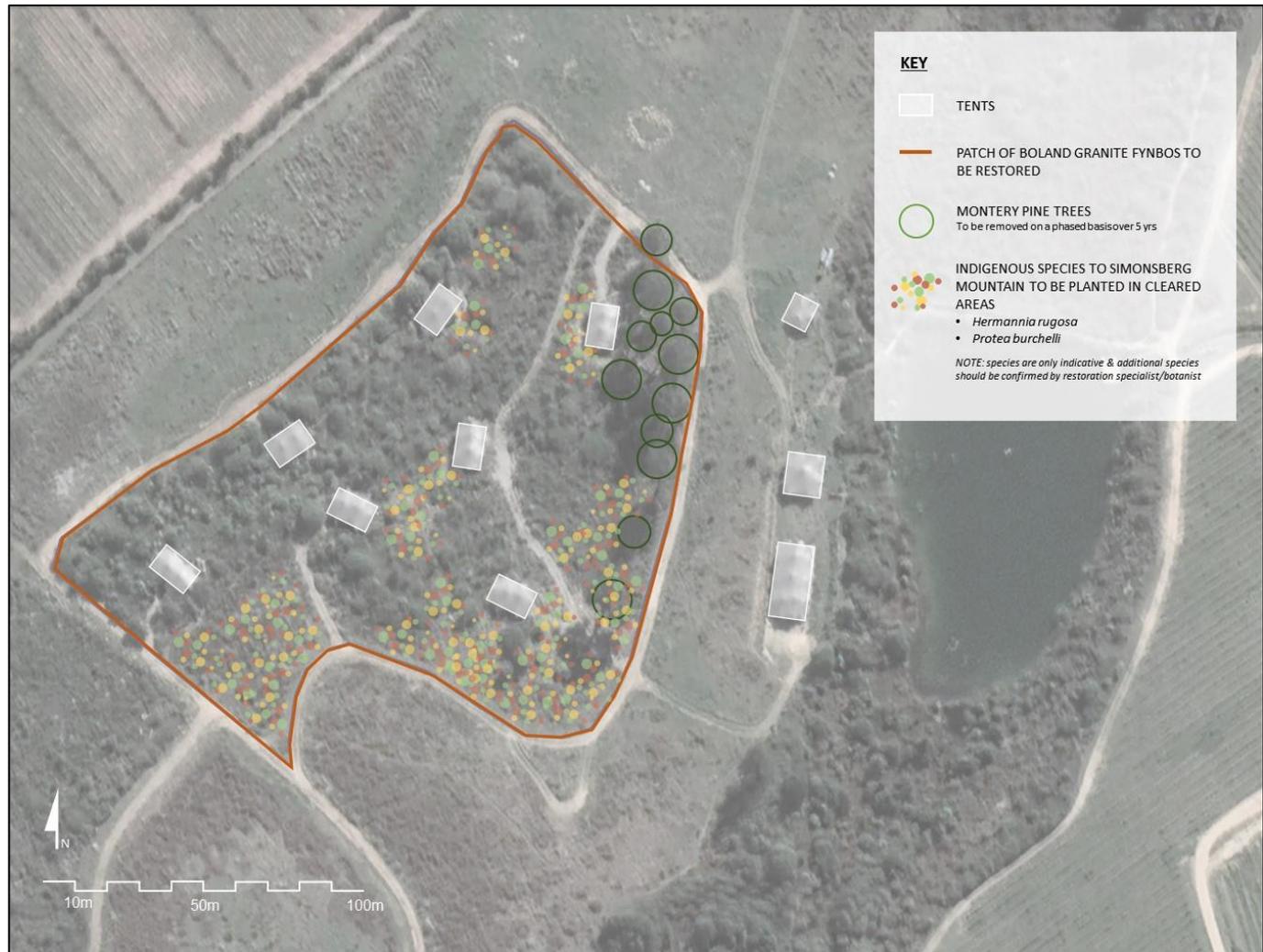


Figure 8: Visual representation of area where restoration should be undertaken i.e., the impacted patch of Boland Granite Fynbos (created by EAP) to be defined by specialist

Stormwater & run-off design and management	<ul style="list-style-type: none"> • All hardened areas within the site should be associated (where possible) with vegetated filter strips (broad, sloped vegetated areas that accept shallow runoff from hardened surfaces), bioswales (landscaped areas that are designed to remove silt and a number of pollutants from runoff, through ensuring that water flows slowly along these gently sloping (<6% slope) features, often planted with grass or other plant species, mulch or riprap), and / or bio-retention systems (vegetated areas where runoff is filtered through a filter media layer, e.g. sand, as it percolates downwards), all of which are designed to reduce the quantity of runoff leaving a hardened surface and entering the stormwater system (Snaddon, 2021). • Stormwater should not be conveyed directly (eg. by pipe or drain) into the stream but must flow along unlined swales, permeable areas and bioswales (Snaddon, 2021). • Effort should be made to minimise the hardening of surfaces across the whole site. Natural areas, gardens and road verges are areas where water can filter into the ground (Snaddon, 2021). • New hardened surfaces (impermeable) must be limited to the developable area outside the stream's riparian area (i.e. outside the ecological buffer) (Snaddon, 2021). • Runoff from hardened surfaces must be allowed to filter into the soil (Snaddon, 2021). • Pathways through the stream's riparian area must be permeable (Snaddon, 2021). • Parking areas should preferably be constructed using permeable materials to allow for infiltration of water (Snaddon, 2021).
Sewer design	<ul style="list-style-type: none"> • The area immediately around the sewage treatment units should be protected with a berm, which would catch surface water flowing out of any of the components (Snaddon, 2021). • Treated wastewater should be directed to a soakaway downslope of each Unit, and not discharged to the stream, or used for irrigation on the site (Snaddon, 2021).

ISSUE	MANAGEMENT / MITIGATION MEASURES
WASTE MANAGEMENT <u>Management Statement and objective:</u> To prevent pollution/contamination associated with the generation and temporary storage of general waste, hazardous waste construction rubble and litter generated by the workforce on site during construction/decommissioning. <u>Impact Management Outcomes:</u> No non-conformances and no pollution of soil, groundwater and/or stormwater/freshwater as a result of waste generation and management activities.	
General requirements	<ul style="list-style-type: none"> • Construction related waste will typically include general waste (such as plastic packaging, strapping, and lunch wrappers.), rubble (like broken bricks, tiles, waste concrete) and limited quantities of hazardous waste items (e.g. paint tins, oily rags etc.).

	<ul style="list-style-type: none"> • The Contractor shall be responsible for the establishment of an integrated waste management system that is acceptable to the Engineer and ECO, and a Method Statement is required in this regard. The Method Statement must include a description of the estimated quantity and types of waste, a description of the services required to store, collect, transport and dispose of waste and a procedure for separating recyclable and non-recyclable material. The local authority must be notified of any changes to the estimated quantities and types of waste. • No refuse, demolition rubble or waste material will be disposed of by burying. • Construction and demolition waste must be sorted into recyclable and non-recyclable waste. • The Contractor will be responsible for ensuring the removal of the waste to municipal-approved recycling facilities (where possible), as well as the final disposal of non-recyclable wastes at a registered landfill facility. • On-site waste segregation shall take place. Waste shall be sorted into the following categories: <ul style="list-style-type: none"> - Paper / cardboard; - Metals; - Non-recyclable general waste; - Glass; and - Hazardous waste. • Contact the following numbers for information on recycling collection points: <ul style="list-style-type: none"> - Plastic containers: Plastics Federation (021) 591 5512; - Cans and tins: Collect-a-Can (021) 534-7010; - Glass: Consol Glass (021) 888 4000; - Motor and cooking oils: Oilkol (086) 110 1961; - Paper: Nampak 0800 018 818; and - Organic waste: Reliance Compost (021) 872 5962. • Small local businesses offering waste management services should be supported, where feasible.
<p>Storage, handling and disposal of general waste</p>	<ul style="list-style-type: none"> • All waste shall be sorted in the waste handling / storing area. The location of the waste storage area shall be located at least 50 m from the riparian area and must be approved by the ECO (Snaddon, 2021). • Waste may be temporarily stored on site in a central waste storage area that is weatherproof and scavenger-proof, and which both the Engineer and the ECO have approved. • Colour-coded or clearly marked skips / bins will be utilised in order to differentiate the various waste types suitable to each receptacle. • General waste must be removed from the site at least once every two weeks provided that it does not pose a risk to human health.

	<ul style="list-style-type: none"> • Waste may only be disposed of at a licenced landfill site approved by the Engineer and the ECO or to legitimate recycling facilities. • Waste disposal certificates must be obtained and filed in the environmental file and submitted with the monthly audit reports. • As far as possible, materials used or generated by construction shall be recycled. <p style="text-align: center;">Recycling ensures that we do not waste valuable resources</p> <p style="text-align: center;">Recycling can also create employment opportunities</p>
Litter prevention and housekeeping	<ul style="list-style-type: none"> • Litter and general waste materials (excluding rubble and hazardous waste materials) shall be disposed of into scavenger- and weather-proof bins. • The Contractor shall provide sufficient bins with lids on site to store the waste produced on a daily basis. Bins shall not be allowed to become overfull and shall be emptied as required, but at least weekly, to prevent overtopping. • The Contractor shall provide dedicated resources to clean up the Contractor's camp and working areas daily and ensure that refuse is placed within the central waste storage area to prevent spreading as a result of wind. • Empty cement bags must be collected from the construction area by the end of every day and before rain events and shall be stored in bins that are either placed under cover or have been fitted with lids. • Wind-blown litter beyond the site boundary that are in the opinion of the ECO emanating from works on site must be cleared as part of the waste management of the site.
Storage, handling and disposal of hazardous waste	<ul style="list-style-type: none"> • Hazardous waste must be stored separately and in a location a minimum of 50 m from the riparian area and stream. Hazardous waste containers must be stored in a secure area with bunding / secondary containment. The location of the storage area is to be approved by the Engineer and the ECO. • All hazardous waste must be placed in drums / containers labelled for this purpose. These containers must be kept securely closed when not in use and must be protected from the ingress of rain. • Hazardous waste may not be disposed to a General Landfill site and waste must be removed by a registered hazardous waste Contractor for disposal to a licensed hazardous waste landfill. This must be done at least once every three months in accordance with the limit applicable to the temporary storage of hazardous waste, provided that it does not pose a risk to human health. • Records of hazardous waste disposal must be maintained. The Contractor shall retain copies of receipts from such waste disposal sites to the Engineer and ECO as proof of proper disposal. • Storage and disposal of waste items are also controlled through other relevant legislation which must be complied with e.g. Occupational Health & Safety Act.

<p>Storage, handling and disposal of vegetative waste</p>	<ul style="list-style-type: none"> • Cleared vegetative material is not to be disposed anywhere and must be chipped and/or composted at a licensed facility. • Any invasive alien plant species, which are removed from the site, are not to be chipped for mulch if they are in a seed-bearing state. Such material is to be disposed of at a suitable waste disposal site. • Plant material removed from the site is not to be burnt for disposal on site.
<p>Storage, handling and disposal of builders and demolition rubble</p>	<ul style="list-style-type: none"> • In accordance with the integrated waste management approach to be followed through the construction and decommissioning phases of the development, materials used or generated by construction, or the construction areas shall be re-used as far as possible (either on site or on a different site) • All builders'/demolition rubble is to be removed from the works area on a weekly basis and taken to the temporary storage area at the site camp. • The Contractor shall provide resources to clean up the Contractor's camp and working areas of rubble generated in the course of construction work at least twice a week, or more frequently if specifically required. • Rubble shall be temporarily stockpiled in a waste skip or a central stockpile and shall be removed from site to an approved landfill site as soon as it constitutes a practical load for removal and before temporary closure of the site. • No plastics, shrink wrap, paint buckets or any other debris that do not constitute clean building rubble, shall be stored at such stockpile sites.

ISSUE	MANAGEMENT / MITIGATION MEASURES
SOIL, FRESHWATER & GROUNDWATER POLLUTION MANAGEMENT	
<p><u>Management Statement and objective:</u> To prevent impacts on the riparian area, to prevent groundwater, soil and freshwater pollution / sedimentation associated with the handling storage and use of hazardous materials or materials that have the potential to cause environmental harm.</p>	
<p><u>Impact Management Outcomes:</u> No non-conformances, no evidence of sedimentation and no pollution of soil, groundwater and/or stormwater or any water courses as a result of the construction/decommissioning activities.</p>	
<p>Prevention of impacts on the watercourse and riparian area at the site</p>	<ul style="list-style-type: none"> • The stream and riparian areas that are outside of the approved development footprint should be demarcated as “no-go” areas prior to commencement of construction and decommissioning activities. No vehicles, machinery, personnel, construction material, cement, fuel, oil, bitumen or waste should be allowed into these no-go areas, unless express permission is granted by the Environmental Control Officer (ECO) for specific activities. Refer also to Figure 9 for a No-Go Area map. • No spoil material, including excavated soil, should be temporarily stockpiled within any stream and riparian areas and all soil stockpiles should be covered (e.g. with geotextile or plastic sheeting) and not exceed a maximum height of 1.5 m (Snaddon, 2021). • The site office and construction camp, and all temporary toilets and solid waste disposal facilities, should be located at least 50 m from the edge of the stream and riparian areas (Snaddon, 2021). • During construction and decommissioning activities, the stream and riparian areas adjacent to the site should be inspected at least weekly by the DEO for signs of disturbance, sedimentation and pollution. If signs of disturbance, sedimentation or pollution are noted, immediate action should be taken to remedy the situation and, if necessary, a Freshwater Ecologist should be consulted for advice on the most suitable remediation measures.

<p>Hydrocarbon storage & handling</p>	<ul style="list-style-type: none"> • Bulk storage of fuel/hydrocarbons is strictly prohibited, and the temporary storage of such substances will be limited as far as possible. Note that storage of fuel in volumes greater than 200litres is subject to a flammable substance permit, obtainable from the local fire chief. All storage areas for such substances shall be bunded, covered and have an impermeable surface and shall be located in areas approved by the ECO, at least 50 m from the edge of riparian area on site. • The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut. • Machinery prone to oil or fuel leakage must be located at least 50 m away from the edge of the riparian area, with the area adequately bunded in order to contain leakages (Snaddon, 2021). • All construction machinery and vehicles should be checked for oil and fuel leaks daily. • Servicing of vehicles, machinery, plant or equipment is strictly prohibited on the site. • Refuelling and fuel storage areas, and areas used for the emergency repair or parking of vehicles and machinery, should be located on impermeable bases and should have bunds around them to contain any possible spills. • All maintenance of plant shall be performed off site. If it is necessary to do emergency repairs on site, the Contractor shall obtain the approval of the Engineer and ECO prior to commencing activities and ensure that there is no contamination of the surrounding soil or vegetation by using drip trays to collect waste oil and other lubricants. • Drip trays shall be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles). Drip trays shall be inspected and emptied daily and serviced when necessary. In particular, drip trays shall be closely monitored during rain events to ensure that they do not overflow. Drip trays must be free of cracks/ holes / punctures to ensure no spillage from these receptacles. • Stationary equipment (such as generators, water pumps, cement mixers etc.) must also be placed inside drip trays whilst in use to contain oil and fuel leaks. Drip trays must be checked and cleaned daily (Snaddon, 2021). • When parked, a drip tray must be placed under the temporary fuel storage tanker (bowzer) to contain incidental drips and spills. • Refuelling of plant/equipment must be undertaken on a concrete platform with secondary containment. The necessary decanting equipment must be used to prevent spills and leaks whilst refuelling.
<p>Hazardous chemical substances storage and handling</p>	<ul style="list-style-type: none"> • If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials. • Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. • No storage of hazardous or chemical substances is permitted within 50m of the edge of the riparian area. • The relevant Material Safety Data Sheets (MSDS) shall be available on site. • Procedures detailed in the MSDSs shall be followed in the event of an emergency situation. • No paint products and chemical additives and cleaners such as thinners and turpentine, may be disposed of on site

<p>Spills and spill control</p>	<ul style="list-style-type: none"> • A Method Statement must be put in place for the handling of spills and leaks. The Contractor shall ensure that his employees are aware of the procedure to be followed in this regard and shall make the necessary materials and equipment for dealing with spills and leaks available on site at all times. Clean-up and remediation must occur immediately after a spill incident. • All fuel, oil or hydraulic fluid spills are to be reported to the Engineer or ECO immediately. • In the event of a hydrocarbon spill, the source of the spillage must be isolated, and the spillage contained. Should a leak emanate from equipment (such as earth moving equipment), the machinery shall be parked on a hard surface until such time as a repair can be made, to prevent contamination of bare ground. • The Contractor shall ensure that there is always a supply of appropriate material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle the volume of a spill similar to the volume of the largest container on site used for storage of such substances that are not stored and / or used inside a bunded area. This material must be approved by the Engineer prior to any refuelling or maintenance activities. • Refer also to the Incident Management specification table.
<p>Cement handling</p>	<ul style="list-style-type: none"> • Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. The permitted location of the batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the site layout plan and approved by the ECO. • Mixing of concrete must occur at least 50m away from the riparian area (Snaddon, 2021). • Cement is to be stored in a secure weatherproof location to avoid contamination of the environment. • All runoff from batching areas shall be strictly controlled so that contaminated water does not enter stormwater, or groundwater or any water courses. Dagga boards and mixing trays should be used at all mixing and supply points. • Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment. • Settling tanks for the evaporation of contaminated water should be constructed with an impermeable surface. Settling tanks must be stored at least 50m away from the riparian area. Sediment should be left to dry out before being removed to the hazardous waste skip.

<p>Prevention of soil and ground water pollution (contaminated water handling)</p>	<ul style="list-style-type: none"> • The Contractor shall prevent pollution of surface or ground water as a result of construction activities. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, water from excavations, construction water, water carrying soil or other particles or waste products, etc. • No residues from cleaning activities or any other form of contaminated water may be released onto bare soil or into vegetated areas. Such wastewater must be appropriately contained and disposed. • Any incident that may result in the pollution of a water resource must be reported to the ECO and the Department of Water and Sanitation immediately. • No watercourse in the greater area shall be used for disposal / dumping of any material or substance under any circumstances, even temporarily. • The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. • Wash areas for domestic use shall ensure that the disposal of contaminated “grey” water is sanctioned by the Engineer. • Water containing potential pollutants such as cements, concrete, lime, chemicals, fuels and hydrocarbons shall be contained and discharged into an impermeable storage facility for evaporation and ultimate removal from the site or for recycling. This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from hydrocarbon storage areas. Under no circumstance may contaminated water be discharged into the watercourse at the site or in the greater area. • Contaminated runoff should be prevented from entering stormwater, groundwater and freshwater systems. • Washing of vehicles, machinery, plant or equipment is strictly prohibited on the site.
<p>Erosion prevention and sedimentation control</p>	<p>Erosion and sedimentation can occur due to the loss of vegetation, compaction of soils due to excavations, trampling by construction personnel and movement and storage of materials and machinery during the construction. The following mitigation measures must be put in place:</p> <ul style="list-style-type: none"> • Exposed surfaces should be compacted as quickly as possible. • The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities. Where erosion and/or sedimentation occurs, whether on or off the site, despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the Engineer. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Engineer. • The Contractor shall be vigilant during periods where strong winds prevail (especially during the dry summer months) to manage dust generation in accordance with the Dust Control Regulations. No potable water shall be used for dust suppression purposes while water restrictions apply. Refer also to the Dust Management specification table.

ISSUE	MANAGEMENT / MITIGATION MEASURES
<p>PROTECTION OF NATURAL FEATURES, FAUNA AND FLORA</p> <ul style="list-style-type: none"> • <u>Management Statement and objective:</u> To ensure that no vegetative cover is removed and/or impacted on outside of the approved works area. To protect any protected plant species on the property and prevent impacts on fauna found on the site. To preserve the top layers of soil for use in rehabilitation. Appropriate temporary storage and stockpiling of topsoil to prevent erosion, sedimentation, and dust pollution. To avoid intrusion into the adjacent natural areas and prevent related impacts. • <u>Impact Management Outcomes:</u> No removal of vegetation and/or other impacts on any vegetative cover. No damage or defacing of any natural features situated in or around the site. No negative impacts on the breeding seasons of fauna found in the vicinity of the site No harm or destruction of faunal habitats or the death of any animals on the site or as a result of actions of removing fauna off site. 	
<p>Site camp division and No-go areas</p>	<ul style="list-style-type: none"> • A Method Statement detailing the layout and method of establishment of the construction/decommissioning camp (including all buildings, offices, lay down yards, wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) and indicating these in a drawing shall be submitted to the ECO for review and approval. • All site camps, laydown areas etc. must be located in already transformed areas (i.e. not within riparian or biodiversity sensitive areas). No further clearing of the Granite Fynbos vegetation and Boland Fynbos vegetation is permitted on site (Jackson & Martin, 2021). • All construction areas must be clearly demarcated and the area outside of this to be labelled as "no-go areas" so as to prevent encroachment into areas not required for construction. • The edge of the riparian area must be clearly demarcated and fenced off (using temporary fencing and danger tape) before any work or site preparation begins. These areas are defined as the no-go areas during construction/decommissioning phases (Snaddon, 2021). • The Contractor shall restrict all activities, materials, equipment and personnel to within the area specified. • Movement of vehicles and personnel, stockpiling, dumping or storage of equipment or materials outside the designated working areas, termed as "no-go" areas, will not be permitted without written authorisation of the Engineer and ECO. • No-go areas will be demarcated to the satisfaction of the Engineer and the ECO so as to prevent unauthorised entry into these areas. • The recommended buffer for Stream 1 (above the dam) is 42 m for the Construction Phase reducing to 36 m below the dam (Snaddon, 2021). • Storage of materials must occur at least 50 m away from any sensitive areas within bunded areas (Snaddon, 2021). • Pathways and access roads for construction, demolition and decommissioning must avoid the stream and its riparian area (Snaddon, 2021).

- No-go areas for this project include the riparian buffer area of stream 1, the intact Boland Granite Fynbos vegetation and watercourse to the west of the site and all areas within the impacted patch of Boland Granite Fynbos except for disturbed tented platform areas and internal roads and pathways (refer to the no-go area map in Figure 9.)

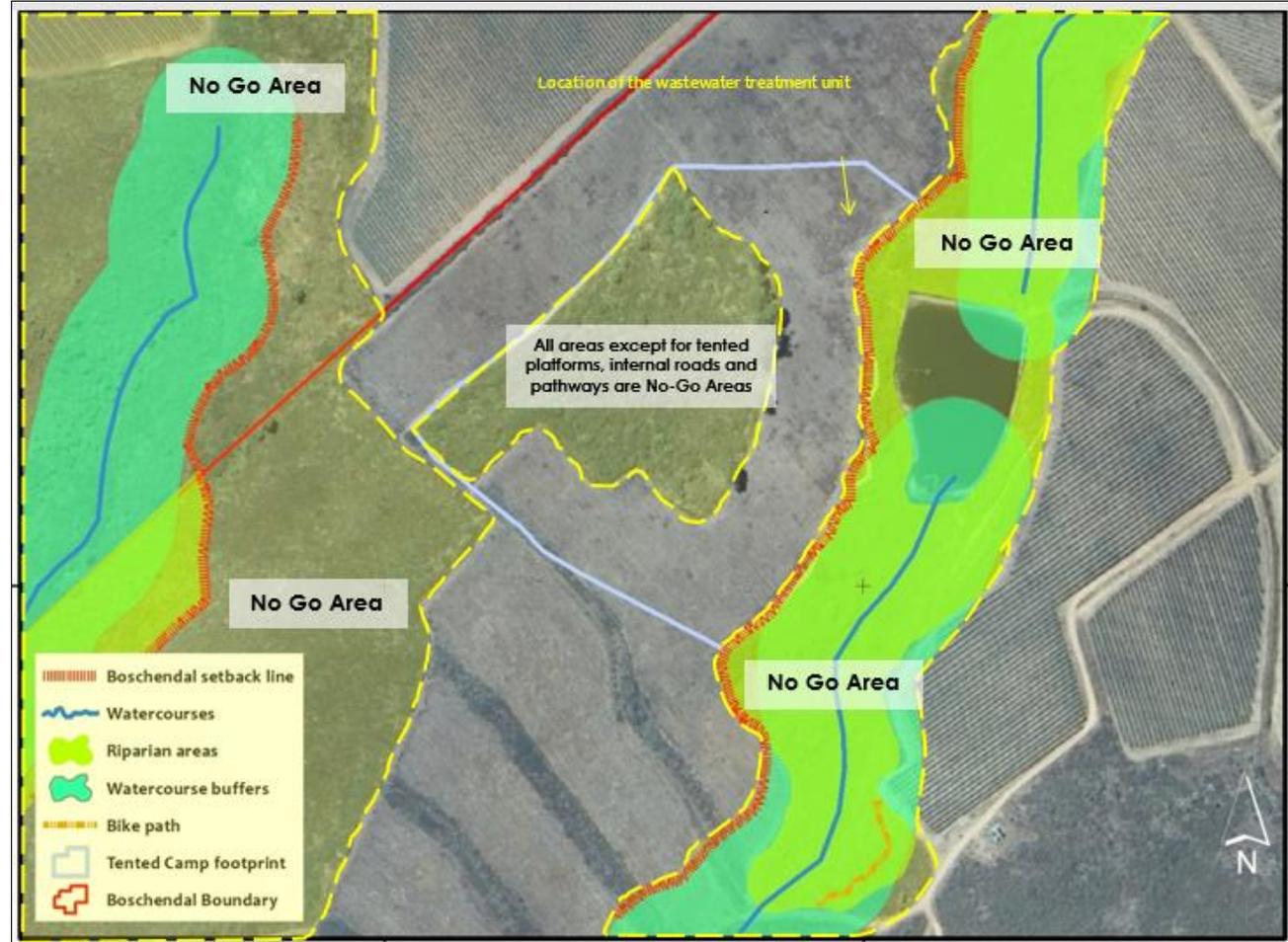


Figure 9: No-Go Area Map

Management of potential disturbance to fauna	<ul style="list-style-type: none"> • If animal species are encountered in the course of construction/decommissioning activities the ECO or the Site Engineer (if the ECO is not on site) must be consulted so that any animals vulnerable to injury can be moved. • Hunting of any animal species is strictly prohibited. • If any dangerous species are encountered, the ECO must be consulted regarding their removal and all contractor employees shall be moved away from the area until a professional can remove the animal in a safe manner. • There may be no interference or harassment of wild animal species. If wild animals are encountered, they should be avoided and not approached. • Assist (harmless) animals in moving: When animals are observed and they appear to be trapped or unable to escape to a safe area, they should be assisted in so doing. Animals that are potentially dangerous should be moved with the help of knowledgeable and experienced persons. It is recommended that the Cape Reptile Club (Secretary: Marcel Witberg: 082 784 7314) be approached for the contact details of a local person who would be able to be on site at short notice, should a situation arise. This person should be put on standby for the period of site clearance. • Do not leave holes and trenches open for extended periods of time. Holes and trenches should be left open for as short a period of time as possible, because such cavities act as pitfall traps for small animals.
Management of potential disturbance to flora	<ul style="list-style-type: none"> • Constant monitoring of the construction/demolition site by the Site Engineer and ECO must occur, and all alien plant species removed from or destroyed on the site (Snaddon, 2021). • No materials containing invasive plant seeds, litter or contaminants may be imported. The Supplier shall be informed of the sites of origin of imported gravel, sand, stone, etc. and shall have the authority to reject imported material if deemed necessary. • Topsoil and sand imported on site must be inspected for seedlings throughout construction and decommissioning phases. All identified seedlings must be removed regularly from site (Snaddon, 2021). • If any SCC are to be impacted, these must be relocated to nearest appropriate habitat (Jackson & Martin, 2021).

ISSUE	MANAGEMENT / MITIGATION MEASURES
PROTECTION OF ANY PALEONTOLOGICAL AND ARCHAEOLOGICAL RESOURCES <u>Management Statement and objective:</u> Protection of archaeological and/or palaeontological resources on, or adjacent to the site. <u>Impact Management Outcomes:</u> No non-conformances in terms of the specifications contained in the EMPr and no impacts on such resources.	
General	<ul style="list-style-type: none"> • The supervisor/foreman must be encouraged and informed of the need to watch for potential fossil and buried archaeological material.

	<ul style="list-style-type: none"> • Should any heritage resources, including evidence of grave, human burials, archaeological material, and paleontological material be discovered during the excavation of activities above, all works must be stopped immediately, and the ECO notified who should notify Heritage Western Cape (HWC) without delay. Failure to notify the ECO of a find will result in a penalty. The ECO should also notify a relevant specialist (e.g. palaeontologist) to determine the way forward. The appropriate procedures for the relevant fossil-finds as detailed below must be followed, should anything of an archaeological nature be found on site by the Contractor (or any other party). • This aspect must be carefully explained to workers during the Environmental Education Programme undertaken by the ECO. • The ECO will advise on demarcation of this area and notify a relevant specialist to view material and ascertain whether further study of the area is required. • If any human remains are discovered during earth moving activities, they are to be treated with respect and the South African Police Service contacted immediately. Should the SAPS indicate that the remains are older than 60 years, SAHRA should be notified. An archaeologist should be contracted to remove such remains at the expense of the developer. <p>A maximum of 30 days should be set-aside in the construction program for the recovery of archaeological material where/if discovered. The contact details for the SAHRA are as follows:</p> <p>111 Harrington Street, Cape Town, 8001 P O Box 4637, Cape Town, 8000 Tel: (021) 462 4502 Fax: (021) 462 4509 Email: director@sahra.org.za</p>
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ISSUE	MANAGEMENT / MITIGATION MEASURES
NOISE MANAGEMENT	
<p><u>Management Statement and objective:</u> To avoid and/or minimise impacts on the adjacent land-users. To provide a forum for any Interested and/or Affected Parties to raise their concerns and log complaints for remediation action and prevention of similar incidents.</p> <p><u>Impact Management Outcomes:</u> No disruptions or nuisance to adjacent land-users caused by noise from the construction/decommissioning of the site. Effective complaints handling. No repeat complaints received.</p>	
<p>Management of potential noise disturbance</p>	<p>Noise, at a level typically associated with construction activities, would be experienced by surrounding land users as well as the users of the road during the course of construction and decommissioning works</p> <ul style="list-style-type: none"> • Noise generated on site from all the proposed activities must comply with the Western Cape Noise Control Regulations Provincial Notice 200/2013.

	<ul style="list-style-type: none"> • The Contractor's attention is drawn to the Noise Regulations as promulgated in terms of the Environment Conservation Act and relevant Local Authority bylaws. • All noise and sounds generated by machinery must adhere to SABS 0103 specifications for the maximum permissible noise levels for construction in residential areas. • In terms of noise legislation, a noise exemption permit needs to be obtained if the limits as contemplated in legislation will be exceeded for any given period of time. This requires obtaining of signatures from affected parties within a 150 m radius of a site. • Working hours must be restricted to normal daily working hours considered in the construction regulations. Should works be necessitated outside of these hours, surrounding residents must receive timeous notification. • Machinery to be fitted with silencers and no sound amplification equipment such as sirens, loud hailers and hooters may be used on site except in emergencies. • No amplified music shall be allowed on site. • No noise generating work may take place at night unless prior approval was granted by the local municipality and notification was sent to the surrounding residents. • The Contractor shall take preventative measures, such as screening, muffling, timing and pre-notification of affected parties to minimise complaints regarding noise. • The Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes/haul roads, so as not to cause an undue environmental damage.
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ISSUE	MANAGEMENT / MITIGATION MEASURES
DUST MANAGEMENT	
<p><u>Management Statement and objective:</u> No unacceptable levels of dust. To avoid and/or minimise impacts on adjacent land-users to ensure that any such impacts are appropriately dealt with to prevent further impacts in the longer term. To prevent wind and water erosion and/or sedimentation of any natural features. To provide a forum for any Interested and/or Affected Parties to raise their concerns and log complaints for remediation action and prevention of similar incidents.</p> <p><u>Impact Management Outcomes:</u> No disruptions to surrounding land-use activities, no nuisance to adjacent land-users caused by dust. Effective complaints handling. No repeat complaints received.</p>	
Prevention of dust nuisance	<ul style="list-style-type: none"> • Dust generated from all the phases of the proposed activities must comply with the NEM: AQA, National Dust Control Regulations (Government Notice No. R. 827) of 1 November 2013, all Local Authority Bylaws as well as the National Dust Control Regulations, Notice R.827 of 2013 and must be adhered to. These regulations prohibit a person from conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust, or dust fallout, has a detrimental effect on the environment, including human health.

	<ul style="list-style-type: none"> • All potential air pollutants on site must be monitored and if causing significant emissions must be mitigated strictly as per this EMPr • The Contractor shall take all reasonable measures to minimize any dust nuisance, pollution of streams and inconvenience to or interference with the public (or others) as a result of the execution of the works. A Method Statement will be required in this regard as determined by the Engineer and ECO. • During windy and dry conditions, dust suppression methods must be employed. NOTE: The use of potable water for dust suppression is not permitted when water restrictions are in place and discouraged even when water restrictions are not in place. • Stockpiles of materials as well as the loads on all trucks transporting any material that could lead to dust pollution should be covered with a tarpaulin or similar cover to minimise dust / windblown sand. • All stockpile of building materials (e.g. sand) must be protected so as to prevent erosion by wind and water. • In extreme cases, a dust suppression product (e.g. dustex) should be used. The product used must receive prior approval from a freshwater consultant. • During extremely high winds, dust generating activities should be avoided. • Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present. • All access and haul routes/ roads shall be cleared from sand and/or mud or debris deposited by construction vehicles associated with this project. • The Contractor shall be responsible for any clean-ups resulting from the failure by his employees or suppliers to properly secure transported materials. • The Contractor shall take preventative measures, such as screening, dust control, timing and pre-notification of affected parties to minimise complaints regarding dust. • If, in the reasonable opinion of the ECO, excessive dust is noted or complaints regarding dust exceed 1 complaint a week, the ECO may request dust fallout monitoring to be undertaken to determine the need for additional control measures.
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ISSUE	MANAGEMENT / MITIGATION MEASURES
AESTHETICS (VISUAL) <u>Management Statement and objective:</u> To ensure that visual impacts are avoided as far as possible, and where these cannot be altogether avoided, that it is reduced to acceptable limits.	

Impact Management Outcomes: No unacceptable visual impacts occur as a result of construction activities.

Site Housekeeping

- The Contractor shall take appropriate measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.
- Should it be deemed necessary, the ECO may request that activities which may have a high visual impact be suitably screened off to the surrounding environment. Site construction hoarding / fencing should be dark in colour and free of excessive branding.
- The Contractor shall supply and maintain adequate and suitable sheds or containers for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weather-proof, adequately ventilated and provided with raised floors.
- All site establishment/de-establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the area disturbed.
- The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection.
- The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area. Site lighting should be kept to a minimum and should not be flood type lighting where possible.
- Neon, spot or up lighting are visually inappropriate. Light sources should be screened and filtered as far as possible.
- Construction signage should not be excessively sized or located along sensitive visual corridors.
- Machinery and trucks should be stored and kept out of sight of surrounding residential areas and scenic routes where possible.
- Site lighting during construction should be kept to a minimum and be directed away from sensitive vegetation and riparian areas.
- Machinery and trucks entering and leaving the site should take care not to leave rubble, sand, rock, branches and the like on roads linking to the site.

ISSUE	MANAGEMENT / MITIGATION MEASURES
<p>SITE ACCESS, ACCESS ROUTES AND TRAFFIC MANAGEMENT</p> <p>Management Statement and objective: To avoid and/or minimise impacts on the adjacent road network and road users any such impacts are appropriately dealt with to prevent further impacts in the longer term. To avoid construction related impacts associated with the movement of construction/demolition vehicles on adjacent residents.</p> <p>Impact Management Outcomes: No disruptions to traffic or adjacent residents, no damage to vehicles and related claims and no nuisance to adjacent communities caused by dust.</p>	
<p>General</p>	<ul style="list-style-type: none"> • Pathways and access roads for construction, demolition and decommissioning must avoid the stream and its riparian area (Snaddon, 2021) (refer to no-go area map included in Figure 9). • Existing access routes and roadways should be used. • The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no-go" areas) and required to comply with the specifications. • The Contractor shall ensure that delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the specifications. • Access to the site must be carefully managed to avoid unauthorised entry onto the site, and to prevent loitering of construction contractors beyond the development area. • The Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and comply with all relevant laws and specifications. In addition, such vehicles and plant shall be so routed and operated as to minimise disruption to regular users of the routes not on the site. • All construction vehicle movement shall as far as possible be limited to off-peak hours wherever possible. Delivery of materials or collecting waste shall be scheduled outside of peak periods. • The vehicles of the Contractor and his suppliers shall not exceed the 40 km/h speed restriction within the site and surrounding road network. • Where necessary, additional traffic control measures should be implemented. • Construction/demolition of the infrastructure is to be undertaken as part of one construction contract of a limited duration to prevent protracted construction impacts to parties along the affected section of the road. • Subsequent to construction works, all access routes must be inspected and any repairs necessary as a result of the construction of the roadway must be undertaken.

ISSUE	MANAGEMENT / MITIGATION MEASURES
<p>LABOUR RELATIONS, FACILITIES AND SITE HEALTH AND SAFETY</p> <p>Management Statement and objective: To ensure the safety of all site personnel as well as the adjacent land users.</p> <p>Impact Management Outcomes: No injuries / incidents on site and emergency situations managed effectively. No safety breaches.</p>	
Employment	<ul style="list-style-type: none"> • Make use of previously disadvantaged individuals for the bulk of the unskilled labour as well as for skilled labour, where feasible.
General safety	<ul style="list-style-type: none"> • Environmental awareness training courses shall be run for all personnel on site. All new staff and sub-contractors employees that spend more than 1 day a week or four days in a month must attend the environmental education program within 1 (one) week of commencement of work on site. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant's names, a copy of which shall be handed to the engineer. • Telephone numbers of emergency services, including the local firefighting service, shall be posted conspicuously in the Contractor's office near the telephone.
General site security	<ul style="list-style-type: none"> • No unauthorised firearms are permitted on site and access to the work site by unauthorised persons is to be prevented by the Contractor as far as is practical. • The work site is to be secured and access by members of the public is to be prevented. • The Occupational Health and Safety Act (Act 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with. • With the possible exception of any security staff who may be required to stay overnight at the Contractor's camp, no personnel will be permitted to live on site. • Security staff must be provided with heating and cooking facilities (in order that they do not need to light fires), access to toilet facilities and communication equipment. • Any security lighting at the Contractor's Camp is to be placed in such a way as to not cause a nuisance to residents of the area or interfere with road and traffic on adjacent roads or the adjacent natural areas.
Trenching	<ul style="list-style-type: none"> • Any trenching required for the provision of services to the site shall be done in an environmentally sensitive manner. • Trenching for services should be done in accordance with the engineering specifications (SANS 1200DB). • Trenching shall be kept to a minimum. • The planning and selection of trench routes shall be undertaken in liaison with the Engineer and cognisance should be given to minimising the potential for soil erosion.

	<ul style="list-style-type: none"> • Trench routes within permitted working areas shall be clearly defined and marked beforehand with, for example, painted stakes. • Trench lengths shall be kept as short as practically possible before backfilling and compacting. • Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an appropriate manner. • Where there is a particularly high erosion risk, anti-erosion measures shall be implemented e.g. a fabric such as Geojute (biodegradable). In addition, the ECO must be consulted if the removal of any landscape planting is unavoidable. • Measures should be instituted to safeguard workers in service trenches from collapse of the sidewalls of the trenches (see safeguarding measures below). • Trenches should be safeguarded against the collapse of sidewalls by means of support plates against the walls which in turn is mounted with support arms. The support plates / panels should be adjustable to accommodate trenches of various depths. • Subsurface services should be designed and constructed so that they are located sufficiently far from buildings that their backfilled trenches do not interfere with the foundations of other structures.
<p>Ablution facilities</p>	<ul style="list-style-type: none"> • No staff members are permitted to commence with work on a site without suitable toilet and wash facilities available for them (Snaddon, 2021). • One chemical toilet is to be provided on site for every 30 contract personnel at each working area. These toilets must have doors and locks and shall be secured to the ground to prevent them blowing over. Toilet paper shall always be provided. • Sanitary facilities shall be located within 150m from any point of work, but not closer than 50m from any riparian area. • Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. • The Contractor shall provide suitable sanitary arrangements at the Contractor's Camp and approved points around the designated work area to allow easy access to all employees on site. • Toilets are to be emptied at least once a week and always prior to builders' holidays (Snaddon, 2021). • The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site. • Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. • The Contractor shall maintain the toilets in a clean, neat and hygienic condition. If the Contractor fails to provide and/or maintain all site sanitation facilities in a clean and hygienic condition, the Engineer may order the Contractor to suspend any or all work on the site until these requirements are met. No payment shall be made for any delays or disruption of the works caused thereby nor shall extensions of time be granted for such delays.

Eating Areas	<ul style="list-style-type: none"> The Contractor shall designate eating areas to the approval of the Engineer which shall be clearly demarcated. Sufficient tamper- and wind- proof bins shall be present in this area. The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters shall be erected at the eating areas and any other locations specified by the Engineer.
Drinking Water	<ul style="list-style-type: none"> The Contractor shall ensure that drinking water is available for all staff on site. If no potable water source is available on site, then the Contractor shall import drinking water to the site.
Working Hours	<ul style="list-style-type: none"> Working hours must be restricted to normal daily working hours considered in the construction regulations and the National Building Standards SANS 10400:1990. If works are to take place outside of normal working hours, the ECO and the Engineer are to be notified and disturbance to the surrounding land users is to be prevented. Note that legislation requires the Contractor to obtain approval for carrying out works at night. This entails obtaining signatures from everyone within a 150m radius of a site. Furthermore, the Engineer will, where required, notify the Relevant Authority of work done outside of normal working hours.

ISSUE	MANAGEMENT / MITIGATION MEASURES
INCIDENT MANAGEMENT	
<p>Management Statement and objective: To guide the way in which emergencies and/or environmental incidents are handled on site and remediate any damage appropriately. To prevent the starting of fires on site.</p> <p>Impact Management Outcomes: No non-conformances and no adverse impacts on the environment as a result of emergency situations and/or environmental incidents. No fires started on the site.</p>	
General	<ul style="list-style-type: none"> Method Statements are required for the management of fire incidents as well as for accidental leaks and spills.
Prevention of fires	<ul style="list-style-type: none"> No fires shall be permitted on site. Notices are to be prominently displayed that no fires are allowed. Any fires that occur, shall be reported to the Engineer immediately. Burning is not permitted as a waste disposal method. Smoking shall only be permitted in designated smoking areas, depicted by the appropriate signage. Such areas shall not be located close to fire hazards. Notices are to be prominently displayed prohibiting smoking in areas that are deemed fire hazards. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame.

	<ul style="list-style-type: none"> • The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. • A fire evacuation route is to be clearly demarcated and kept clear of obstruction at all times. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire. • The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Engineer for his approval seven days prior to the date of the environmental awareness training course. • The Contractor shall supply all site offices, kitchen areas, workshop areas, materials, stores and any other areas identified by the ECO with tested and approved firefighting equipment. Firefighting equipment is to be maintained in good working order. • Welding, gas cutting or cutting of metal will only be permitted within specifically designated and adequately marked areas on the site. These sites are to be approved by the ECO. • All flammable material is to be stored in a suitable lockable storage area and combustible materials may not accumulate on site. • Symbolic safety signs depicting "No Smoking", "No Naked Lights" and "Danger" are to be provided, and are to conform to the requirement of SABS 1186. The volume capacity of any fuel tanks shall be displayed. The product contained within the tank shall be clearly identified; using the emergency information system detailed in SABS 0232 part 1. Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product. • In the event of a fire emergency: <ul style="list-style-type: none"> ○ The site supervisor or worker should sound the fire alarm; ○ The site supervisor or worker should notify the Stellenbosch municipality (021 808 8888); ○ All workers on site should go to the designated emergency assembly point; ○ The Fire Officer shall do a head count of all workers and ensure all personnel are present; and ○ When the Fire Brigade arrives, the Fire Officer shall provide them with all the information they require regarding the incident.
<p>Accidental Leaks and Spillages</p>	<ul style="list-style-type: none"> • The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities. • Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer. • The site shall have a suitable number of spill kits available. A spill kit (with the supply of absorbent material) shall be readily available at works areas to absorb any emergency hydrocarbon spills, and where possible be designed to encapsulate minor hydrocarbon spillage. There are a number of products on the market, which are designed and suitable as absorbents and encapsulators of hydrocarbons. The following are examples of those products used to contain incidental spillage:

	<ul style="list-style-type: none"> - Spill-Sorb – oil and chemical absorbent and encapsulating products - Drizzat Pads - Enretech Powder – absorbent and encapsulator - Peat moss
	<ul style="list-style-type: none"> • Treatment and remediation of spill areas shall be undertaken to the satisfaction of the ECO. In the event of a spill: <ul style="list-style-type: none"> - The source of the spillage shall be isolated. - The Contractor shall contain the spillage using sand berms, sandbags, pre-made booms, and sawdust or other absorbent materials. - Cordon off and ensure safety of the spillage area. - Notify the Engineer, ECO and the Pollution Control Inspectorate (if serious spillage has occurred in a sensitive environment). - The ECO (in consultation with the Pollution Control Inspectorate where necessary) shall determine the need for further remedial actions. - All cleared materials will be treated as hazardous waste and disposed of as such, in accordance with the waste management specifications of this EMPr. - Where spillage into stream, riparian areas or sensitive vegetation occurs, the ECO, Site Manager, DEA&DP, DWS and the Stellenbosch Municipality Environmental branch should be notified immediately.

ISSUE	MANAGEMENT / MITIGATION MEASURES
RESOURCE USE (RAW MATERIALS AND NATURAL RESOURCES)	
Management Statement and objective: To prevent excessive and unnecessary use of natural resources and wasting of natural resources during the construction and decommissioning phases.	
Impact Management Outcomes: Development of an attitude towards a reduction in natural resources consumption where feasible and possible	
Water Use	<ul style="list-style-type: none"> • Conduct activities in accordance with any water restrictions set by the local Municipality in terms of the applicable By-Law which may be in place at the time. • Where the use of potable water is required, such as for mixing of cement, the Contractor must submit an application for the use of potable water on site prior to starting construction. • As far as possible, limit the use of potable water to activities which require them. • Dripping taps/ leaking pipes should be addressed immediately to limit waste of water.

Energy/Fuel Use	<ul style="list-style-type: none"> • Plant should not be left running while not in use.
Construction Materials	<ul style="list-style-type: none"> • Make use of locally supplied building materials where possible. • Reclaimed building materials should be used where possible. • In accordance with the integrated waste management approach to be followed through the construction and decommissioning phases of the development, materials used or generated by construction or the construction areas shall be re-used as far as possible. • No materials containing invasive plant seeds, litter or contaminants may be imported. The Supplier shall be informed of the sites of origin of imported gravel, sand, stone, etc. and shall have the authority to reject imported material if deemed necessary. • Durable building materials to increase the lifespan of the developments should be used. • Low VOC paints & building materials should be used. • Adequate storage facilities for raw materials should be provided in order to minimise damage during construction works. • Where possible, suppliers with a green footprint or certification are to be used.

ISSUE	MANAGEMENT / MITIGATION MEASURES
<p>SITE CLEAN-UP AND REHABILITATION</p> <p>Management Statement and objective: To prevent impacts on the environment as a result of the decommissioning activities. Rehabilitation of the site to its previous condition (prior to construction).</p> <p>Impact Management Outcomes: No non-conformances with the specifications contained within the EMPr.</p>	
<p>Site clean-up & rehabilitation following construction activities</p>	<ul style="list-style-type: none"> • All-natural areas that are to remain untransformed but that are impacted by the dumping of materials must be ripped and re-planted after construction is complete, to the satisfaction of the Environmental Control Officer (ECO) (Snaddon, 2021). • After construction activities, any areas within the footprint that have been degraded from their condition prior to construction and as a result of the construction activities must be to their former condition (Jackson & Martin, 2021). All construction scars are to be rehabilitated immediately after construction is complete. • Where appropriate, the Contractor shall employ a suitably qualified person to rehabilitate areas damaged by construction activities during the course of the project (Snaddon, 2021). • The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes are removed upon completion of the construction activities. • The site clean-up shall be to the satisfaction of the Engineer and the ECO. • The Contractor's procedure for rehabilitation shall be approved by the ECO and the Engineer and where required, the Local Authority environmental representative.

3.4 PENALTIES AND BONUSES

Where the Contractor inflicts damage upon the environment or fails to comply with any of the Environmental Specifications contained within this EMPr, they shall be liable to pay a penalty for breach of the conditions of the Environmental Specifications which form part of the works contract.

The Contractor is deemed NOT to have complied with these Environmental Specifications if:

- There is evidence of contravention of the Environmental Specifications within the boundaries of the site, site extensions and haul/ access roads;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time; or
- The Contractor fails to respond adequately to complaints from the public.

Penalties shall be issued per incident and per individual for the Contractor's responsibility. The amount of the penalty shall be determined by the Engineer, in consultation with the ECO. The Engineer shall inform the Contractor of the contravention and he shall notify the consulting quantity surveyor to deduct such a penalty from monies due under the Contract prior to the issuing of the monthly payment certificates.

Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The following penalties (not an exclusive list) shall be issued in addition to any remedial costs incurred as a result of non-compliance with the Environmental Specifications and shall be imposed by the Engineer on the Contractor for contraventions of the Environmental Specifications by individuals or operators employed by the Contractor and/or his sub-contractors. Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment, as indicated in the table below:

OFFENCE	PENALTY
A Contractor fails to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr	R 500
The Contractor fails to produce Method Statements on identified aspects of the project prior to commencement of that aspect	R 300 per Method Statement
The Contractor's Environmental Site File is incomplete/non-existent	R 500
The Contractor fails to keep activities within the site boundaries	R 1,000
Dust and/or erosion occurs because of lack of appropriate implementation of mitigation measures	R 200
Green waste is not disposed of at an approved waste site or composting facility	R400
Trespassing of people into no-go areas	R 500
Trespassing of machinery or equipment into no-go areas	R 500 – R 2 000
Delivery drivers are off-loading without supervision	R 300
Loads for transporting are unsecured or uncovered	R 500
Temporary storage of fuel used for construction purposes is not within specifications	R 100- R1,000
Fuel is dispensed with the incorrect equipment	R 400
Individuals are smoking in the vicinity of the fuel stores	R 200

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February 2022

Appropriate safety signs (e.g. Danger) are not displayed	R 200
There is a lack of firefighting equipment at the fuel stores	R 500
The storage areas fail to comply with standard fire safety regulations	R 200
Inadequate supply of material to absorb / breakdown and encapsulate minor hydrocarbon spillage	R 500- R1000
An integrated waste management system is not established	R 100- R1000
Waste is buried as a means of disposal	R 1000- R3000
There is evidence of littering	R 20 per item
Appropriate scavenger and weatherproof bins are not supplied	R 400- R1000
Bins are overflowing	R 150 per bin
Refuse is not removed or disposed of at an approved site	R 100-R1000
Empty cement bags are not removed from the construction area and placed under cover or discarded in the hazardous waste stream	R 500- R2000
Hazardous waste is not stored in an enclosed area	R 1000
Hazardous waste is not disposed of at a hazardous waste disposal facility	R 500 – R1000
Rubble is not appropriately stored in a skip or central stockpile	R 500
Materials that do not constitute clean building rubble are stored at the stockpiling site	R 200
An individual makes use of areas other than the designated facilities for ablutions	R 200
Latrine facilities and first-aid services are not in a sanitary condition	R 500
Insufficient provision of toilets	R 1000
Toilet waste (sewage) is discharged or buried in the environment	R 1000 – R2000
Potential pollutants are not stored safely away to prevent pollution of ground or surface water	R 500
Washing of vehicles or cement chutes occurs on site or in the vicinity of sensitive areas	R 800
Hazardous chemical substances are not stored in secondary containers	R 800- R2000
Paint products, chemical additives or cleaners are being disposed of on site	R 200 – R 1500
Adequate sheds/ dry containers for the storage of materials are not provided	R 500
Maintenance of plant occurs on site when only emergency maintenance is permitted	R 200
Emergency maintenance is performed without efforts to prevent contamination of the surrounding environment	R 100 – R1500
Individuals fail to repair leaking equipment immediately	R 100 per item
Drip trays are not provided in construction areas under all relevant plant/equipment	R 100 – R500 per absent drip tray
Effective silencing devices are not in use to reduce noise impacts	R 50
Amplified music is heard on site	R 50
Failure to provide environmental awareness training to all site personnel	R 200 per staff member/ worker
Necessary Information posters (procedures for ensuring compliance) are not displayed	R 500
Lighting of fires occurs on site	R 200 – R 10 000
Smoking occurs outside of designated areas	R 20 – R 50
Unnecessary spillage of cement due to inadequate prevention measures, or haphazard working procedures	R 500 – R 1 500
Spillage of cement products are not rectified to the satisfaction of the ECO	R 50 – R 1000
Cement is not stored in a suitable weatherproof location	R 500
Polluted runoff is reaching groundwater/stormwater	R 200 – R 3 000
Screening and suitable containment is not in place /constructed in the concrete batching area	R 100 – R 500
Hydrocarbon spills are not isolated, contained, cleared and rehabilitated	R 100 – R 2 000
Appropriate safety precautions are not implemented	R 20 – R 1 000

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Draft EMPr for a Tented Camp on Founders Estate 5, Farm 1685/5, Paarl (FE5)

February 2022

Unauthorised firearms are present on site	R 1 000
Personnel other than security staff are living on site	R 1 000
An individual is not attempting to protect natural features during construction	R 50 – R 2 000
Individuals are swimming or washing (clothes, equipment etc.) in natural water bodies on or near the site	R 500- R1000
An individual's activities are resulting in the removal or damage of flora	R500- R1500
Animals are being trapped, poisoned, shot or harmed	R 100 – R 1 500
Erosion or sedimentation caused by construction is not rectified	R 400 – R 2 000
The ECO is not notified of heritage or archaeological remains found	R 1 000
Trenching is conducted without the specified environmental specifications	R 1000
Failure to avoid stormwater impacts through the adequate protection of stormwater inlets	R 100 per inlet
Unapproved materials are used for landscaping (e.g. invasive plant seeds)	R 50 – R 2000
All elements of the site are not removed during clean-up for closure	R 100 – R 3000
A specialist is not employed for rehabilitation where necessary	R 500- R2000
The site not fenced and/or demarcated as required	R 300- R3000
The site is not fully secured	R 50 – R 500
Water wastage	R 100 – R 1000
Method statements not appropriately and/or fully implemented	R 50 – R 300 per Method Statement
Speed limit on site not adhered to	R 100

Note that for each subsequent similar offence, the penalty shall be doubled in value to a maximum value of R 10 000.00.

The following penalties are suggested for transgression where damage has been done to the environment:

a	Erosion	A penalty equivalent in value to the cost of rehabilitation plus 20%
b	Oil Spills	A penalty equivalent in value to the cost of clean-up operation plus 20%
c	Damage to sensitive environments	A penalty equivalent in value to the cost of restoration plus 20%
d	Damage to archaeological finds	A penalty to a maximum of R 100 000 shall be paid for any damage to any archaeological sites/finds

All monies collected through penalties shall be held an environmental fund by the Developer and be accounted for. A summary page is to be included with the monthly payment certificates as a record of penalties issued to date. A portion of these funds may be used for token monetary bonuses to individual site staff members that have shown exceptional diligence in applying good environmental practice on the site. The remaining funds shall be allocated for the purposes of contributing to environmental education efforts in the local community e.g., for environmental books for the library, posters, excursions or trees for local schools or environmental resource material for the local public library. The Developer, in consultation with the ECO, Engineer and possibly the local authority, will make a final decision regarding the precise allocation of all penalty funds. Documentation accounting for all penalty funds obtained and how these funds were utilized shall be copied to D: EA&DP, together with the environmental closure documentation on completion of the project.

3.5 MEASUREMENT AND PAYMENT

3.5.1 Basic Principles

No separate measurement and payment will be made to cover the costs of complying with the provisions of these Environmental Specifications except in the case of the points noted below and as scheduled items. Such costs shall be deemed to be covered by the rates tendered for the items in the Schedule of Quantities completed by the Contractor when submitting his tender.

Some of the important cost items have been listed below to assist the Contractor in making provision for implementation of the Environmental Specifications. This list is by no means exhaustive and should only be used as a guideline.

- a. **Protection of stock piles from blowing or washing away:** The spraying or covering of stockpiles, including the supply of the spray or cover material, as required.
- b. **Trench shielding / protection:** Including all required support structures and resources required.
- c. **Storage of fuel and oils:** The supply, construction, installation, transport, upkeep and removal of all facilities required for storage and management of fuel and oils.
- d. **Cement-laden water management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for the management of wastewater from concrete operations.
- e. **Contaminated water management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for managing contaminated water.
- f. **Stormwater and flood management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for managing storm water run-off from the site and protection of works from flooding.
- g. **Bundling and management of run-off from workshop areas and supply of drip trays for stationary and “parked” plant:** The supply, construction, installation, transport, upkeep and removal of all facilities required for bunding and managing the run-off from workshop areas as well as all drip trays required.
- h. **Prevention of harm to animals:** The supply and installation of drift fences and safe animal passages.
- i. **Dust management:** The supply, application, transport, upkeep and removal of all materials required to ensure that dust is adequately controlled.
- j. **Solid waste management:** The supply, application, transport, upkeep and removal of all materials required to ensure that solid waste is adequately controlled (including a waste sorting and recycling program).
- k. **Fire control:** The supply, transport, upkeep and removal of all material required for fire control.
- l. **Eating areas:** The supply, construction, installation, transport, upkeep and removal at the end of the construction of all eating areas structures.
- m. **Ablutions:** The supply, maintenance, regular emptying and removal of toilets.
- n. **Site demarcation:** The supply, installation and removal at the end of the construction of all temporary fences.

3.5.2 Scheduled items

(a) Provision of venue and staff attendance at the environmental awareness training course

The provision of a venue and attendance at the environmental training course will be measured as a lump sum.

The sum shall cover all costs incurred by the Contractor in providing the venue and facilities and in ensuring the attendance of all relevant employees and sub-contractors, at the training.

(b) Method Statements: additional work

No separate measurement and payment will be made for the provision of Method Statements but, where the Engineer requires a change on the basis of his opinion that the proposal may result in or carries a greater than warranted risk of damage to the environment in excess of that warranted by the Environmental Specifications, then any additional work required, provided it could not reasonably have been foreseen by an experienced Contractor, shall be valued accordingly.

A stated sum is provided in the Schedule of Quantities to cover payment for such additional work.

4. OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT PLAN

4.1 SCOPE & RESPONSIBILITY

The environmental specifications contained in this section address the requirements for controlling environmental impacts resulting from operational activities.

The responsibility of the implementation of the Operational EMP lies with the applicant/holder of the Environmental Authorisation (if issued) (i.e., Boschendal Founders Estate 5 (Pty) Ltd). The provincial environmental authorities may at any given time conduct site visits to audit compliance with these specifications.

4.2 OPERATIONAL SPECIFICATIONS

The environmental specifications pertaining to the operational phase are based on the anticipated impacts for this phase which were assessed during the 24G process most of which would essentially be mitigated through the implementation of the recommended design and remediation measures (as included in the previous section of this EMPr).

Specifications specific to the operation include are included in accordance with the anticipated impacts as tabled in Table 2.

The environmental specifications contained in this section address the requirements for controlling the environmental impacts resulting from operational activities. As such, it contains specifications for:

- Freshwater Ecosystem Impacts;
- Employment Policy; and
- Alien Invasive Species Management.

Specifications specific to the operation of the facility are outlined in the tables below.

FRESHWATER ECOSYSTEM IMPACTS:
<u>Management Statement and objective:</u> To protect the watercourse and riparian area at the site
<u>Impact Management Outcomes:</u> No impact to freshwater ecosystems during the operation of the development.
<ul style="list-style-type: none">• Lighting should face away from the stream (Snaddon, 2021).• Visitors should be discouraged from walking on the bed and banks of the stream, and into the wetter areas, through construction of walkways and benches, guiding visitors to use specific pathways and areas (Snaddon, 2021).• Bicycle paths through the riparian area around the stream must be limited, and no new paths constructed (Snaddon, 2021).• All pathways must be regularly checked for signs of erosion, and stabilised or re-routed should this occur (Snaddon, 2021).• The recommended buffer for Stream 1 (above the dam) is 42m for the Operational Phase reducing to 33m below the dam (Snaddon, 2021) and must be adhered to.• Runoff from hardened surfaces must be allowed to filter into the soil.• Pathways through the stream's riparian area must be permeable (Snaddon, 2021).

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Draft EMPr for a Tented Camp on Founders Estate 5, Farm 1685/5, Paarl (FE5)

February 2022

- Parking areas should preferably be constructed using permeable materials to allow for infiltration of water (Snaddon, 2021).
- Stormwater maintenance activities are best done during the dry season.
- No fertilizer may be used on the site (Snaddon, 2021).
- Soaps and cleaning agents must be environmentally friendly brands (Snaddon, 2021).
- Wastewater conveyance, storage or treatment infrastructure must be placed outside of the delineated ecological buffers (Snaddon, 2021).
- All sewage storage facilities must be regularly checked for leaks and overflow. Nitrate levels must be monitored regularly (every 2-3 months) and the recycle stages adapted to ensure that levels are within General Limits (Snaddon, 2021).
- Lighting not in use should be switched off immediately (Hawkes, 2021).

EMPLOYMENT POLICY

Management Statement and objective: To provide fair and equal opportunities for employment.

Impact Management Outcomes: Employment of at least 95% local staff.

- Local labour should be sourced as far as possible and the majority of the labour force must be previously disadvantaged individuals, as far as possible.

ALIEN INVASIVE SPECIES MANAGEMENT PLAN

Management Statement and objective: To bring the invasive alien plants on site under control through systematic, integrated and appropriate control methods within (1-5) years that will allow indigenous vegetation to recover, reduce fire risk, and improve water security.

Impact Management Outcomes: Recovered indigenous vegetation with little to zero alien infestation.

GENERAL SPECIFICATIONS AS PER SPECIALIST RECOMMENDATIONS:

- An Alien Invasive Management Plan must be implemented for the duration of the project and up to at least five years after decommissioning phase or up until a botanist signs off that the site has been adequately rehabilitated and infestation of alien species is no longer a threat (Jackson & Martin, 2021).
- No kikuyu grass is allowed anywhere on site (Snaddon, 2021).
- The spread of alien plant species into all-natural areas must be prevented and monitored (Snaddon, 2021).
- Road verges must be monitored for alien species, especially grasses (Snaddon, 2021).
- All invasive exotic vegetation, such as pine seedlings, Port Jackson and bugweed, should be cleared from the farm portion relating to the camp on an ongoing basis. This will also help to reduce fuel load in terms of fire hazard (Winter et al., 2021).
- The mature Monterey pines, which are spreading seedlings on the mountain slopes, should ideally be removed on a phased basis over the next 5 years, as the indigenous vegetation takes over (Winter et al., 2021).
- Alien species should be removed from the area to the west of the impacted patch to ensure that these do not spread downhill and back into the area around the tented camp (Jackson & Martin, 2021).

METHODS TO BE EMPLOYED:

- The National Environmental Management: Biodiversity Act, 10 of 2004 (NEM:BA), regulates all invasive organisms in South Africa. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEMBA. According to this act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Categories listed are:
 - **Category 1a:** Invasive species requiring compulsory control. Any specimen of a Category 1a listed species must, by law, be eradicated.
 - **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control program. These species must be removed and destroyed.
 - **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
 - **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities: import, possess, grow, breed, move, sell, buy or accept as gifts. No permits will be issued for Category 3 plants to exist in riparian zones.
- Invasive plants must be controlled in compliance with NEMBA section 75 (1-3) Duty of Care Guidelines which requires that:
 - Means and methods must be appropriate to the species
 - Clearing is conducted in such a way that it causes the least harm to biodiversity and the; Environment; and
 - IAPs offspring must be targeted (follow-up operations)
- While a comprehensive field survey was not undertaken, the species identified on site by Martin (2021) are tabled below:

SPECIES NAME	COMMON NAME	NEMBA CATEGORY	PHOTOGRAPH
<i>Acacia longifolia</i>	Sydney golden wattle, western yarrow	1b	 <p><i>Acacia longifolia</i> https://en.wikipedia.org/wiki/Acacia_longifolia</p>
<i>Pinus cf. pinaster</i>	Maritime pine, cluster pine	1b	 <p><i>Pinus cf. pinaster</i> https://www.cabi.org/isc/datasheet/41688</p>

<p><i>Verbena bonariensis</i></p>	<p>Pretty verbena, purple top vervain</p>	<p>1b</p>	 <p><i>Verbena bonariensis</i> (https://alienplantsbelgium.myspecies.info/content/verbena-bonariensis)</p>
<p><i>Echium plantagineum</i></p>	<p>Salvation jane, Paterson's curse</p>	<p>1b</p>	 <p><i>Echium plantagineum</i> (https://www.agric.wa.gov.au/biological-control/patersons-curse-what-you-should-know)</p>
<p><i>Phytolacca octandra</i></p>	<p>red ink plant, forest inkberry</p>	<p>1b</p>	 <p><i>Phytolacca octandra</i> (https://www.nzpcn.org.nz/flora/species/phytolacca-octandra/)</p>
<p><i>Solanum mauritanium</i></p>	<p>Ear leaf nightshade, Tobacco weed</p>	<p>1b</p>	

			 <p><i>Solanum mauritanium</i> (https://www.cabi.org/isc/datasheet/50533)</p>
<i>Pittosporum undulatum</i>	Sweet pittosporum, Victorian box, Victorian laurel, Australian cheese wood, Mock orange	1b	 <p><i>Pittosporum undulatum</i> (https://www.capetowninvasives.org.za/target-species/target-plants/australian-cheesewood-pittosporum-undulatum)</p>

- The most suitable clearing method for these species and the site is mechanical control i.e., manual clearing/felling
- Appropriate equipment to be used during clearing activities include tree poppers, chainsaws, bow saws, brush cutters, machetes.
- The following methods should be employed:
 - **Seedlings:** Plants to be pulled out by hand including all the roots.
 - **Sapling:** Plants to be pulled out by hand or using a tree popper.
 - **Trees:** The stem must be cut as close to the ground as possible.
- Felled and pulled material must be debranched and crosscut into manageable logs which are then stacked for chipping.
- Heaps of chipped material are spaced out at approximately 10-20 m intervals at a height not exceeding 3,5 m.
- Chips are used in composting on the farm.
- Alien biomass should not be left on site unchipped in case of potential re-infestation or for it to serve as fuel load in case of a fire.

MONITORING & CONTROL:

- Follow-up control to control new shoots from stumps, soil etc. following initial clearing should take place within 1 month of clearing

- Maintenance of the site should be incorporated into the farm wide alien control management procedures which is currently undertaken every 6-months – 1 year (approx. 500 ha) (pers. comms., N Bates, Boschendal)

4.3 MONITORING AND AUDITING

It is recommended that a single operational audit be conducted by an independent professional six months from lawful commencement of operation of the camp in order to determine whether remediation and design measures were implemented and identified operational impacts have been successfully mitigated. A report detailing the findings thereof should be provided to the DEA&DP, upon receipt of which, the DEA&DP would indicate the need and frequency for future operational audits.

It is noted that the DEA&DP may stipulate the frequency of operational audits in the Environmental Authorisation (if issued). This section should be updated to reflect this condition, if applicable.

5. DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT PLAN

5.1 SCOPE & RESPONSIBILITY

The Tented Camp must be decommissioned after five years of operation. Environmental impacts resulting from decommissioning activities must be controlled through the environmental specifications contained in this section. Note that since impacts associated with the decommissioning phase will be similar to construction phase impacts, the environmental management specifications contained in the Construction EMP must also be adhered to when the camp is demolished. The Decommissioning phase includes the complete rehabilitation of the site following the demolition of the camp.

The responsibility of the implementation of the decommissioning EMP lies with the applicant/holder of the Environmental Authorisation. The provincial environmental authorities may at any given time conduct site visits to audit compliance with these specifications.

The Roles & Responsibilities defined under section 2.2 would also be applicable during the decommissioning phase.

5.2 DECOMMISSIONING SPECIFICATIONS

The following environmental specifications contained in the Construction EMP must be adhered to during decommissioning works (refer to Table 4):

- Waste management;
- Soil, freshwater & groundwater pollution management;
- Protection of natural features, fauna and flora;
- Protection of any paleontological and archaeological resources;
- Noise management;
- Dust management;
- Aesthetics;
- Site access, access routes, and traffic management;
- Labour relations, facilities and site health and safety;
- Incident management;
- Resource use (raw materials and natural resources); and
- Site clean-up and rehabilitation.

Measures specific to the decommissioning of the facility are tabled overleaf.

Table 5: Table of Environmental Management Requirements / Specifications for the Decommissioning Phase

ISSUE	MANAGEMENT / MITIGATION MEASURES
<p>SITE DECOMMISSIONING & REHABILITATION</p> <p>Management Statement and objective: To prevent impacts on the environment as a result of the decommissioning activities. Rehabilitation of the site to its previous condition (prior to construction).</p> <p>Impact Management Outcomes: No non-conformances with the specifications contained within the EMPr during demolition works and the full rehabilitation of the site.</p>	
<p>Site decommissioning</p>	<ul style="list-style-type: none"> • Constant monitoring of the decommissioning activities must be conducted by the Site Engineer and ECO (Snaddon, 2021) – <i>this has been addressed in section 5.3</i> • The edge of the riparian area must be clearly demarcated and fenced off (using temporary fencing and danger tape) before any decommissioning and clean-up begins and should be treated as a no-go area during the decommissioning phase. (Snaddon, 2021) (Refer also to Figure 9 for the No-Go Area map). • Removal of the tents and platforms must be completed using the access path created to access each tent. The foundations of each unit must be left intact to reduce disturbance (Jackson & Martin, 2021).
<p>Site rehabilitation post-decommissioning</p>	<ul style="list-style-type: none"> • All impacted areas on the Tented Camp site and areas impacted by the associated infrastructure must be rehabilitated once the camp has been removed (Snaddon, 2021). • A Rehabilitation Plan must be compiled with input from a terrestrial and freshwater ecologist (Snaddon, 2021), and incorporated into this EMPr.

5.3 MONITORING AND AUDITING

A suitably qualified ECO must be employed throughout the duration of the decommissioning phase:

During this time, the ECO is to:

- Ensure that the Contractor has a copy of the EMPr and all agreed Method Statements;
- Undertake **weekly** site inspections (frequency may change as required), to audit compliance of all parties with the requirements of the EMPr during the decommissioning of the site;
- Compile a **weekly checklist** which reports on decommissioning activities and compliance with this EMPr;
- Advise/recommend on actions or issues impacting on the environment to the Engineer, who shall issue any required site instructions to the contractor;
- Environmentally educate and raise the awareness of the Contractor and his staff as to the sensitivity of the site and facilitate the appropriate attitude during works on site;
- Review and approve construction Method Statements;
- Recommend to the Engineer the issuing of a penalty for any environmental damage caused on site, or non-compliance with the Environmental Specifications;
- Recommend to the Engineer the removal of person(s) and/or equipment not complying with the Specifications;
- Act as the contact person between the Developer, D:EA&DP and the public with regard to environmental matters;
- Report to D:EA&DP, where required and in terms of the Conditions of Approval of the Environmental Authorisation, regarding the implementation of the EMPr, and implementation of the relevant mitigation measures contained in the EMPr;
- Keep a register of complaints and record and manage any community comments or issues, having reported these first to the Engineer;
- Undertake photographic monitoring of the site;
- Keep records of all activities/ incidents on site concerning the environment in a site diary;
- Take immediate action on site to stop works where significant and irreparable damage is being inflicted on the environment, and inform the Engineer immediately of the occurrence and action taken;
- Undertake a continual internal review of the EMPr and make recommendations to the Engineer and Developer; and
- Ensure that a freshwater and terrestrial consultant are commissioned by the Holder of the Environmental Authorisation to compile a Rehabilitation Plan for the site and that the plan is incorporated into this EMPr.

Following the decommissioning of the site, the ECO is to complete a Final Closure Audit Report. Once the site has been cleared of all construction related debris, materials and equipment the ECO will undertake an audit and report on the condition of the site and the adequacy of decommissioning efforts. The Audit must check against the methods and objectives of the Decommissioning EMPr. The construction site will be regarded as being "closed" on agreement between the ECO and the Engineer/Project manager the Contractor.

The Final Closure Report must furthermore report on the compilation of the required Rehabilitation Plan. It is noted that the Rehabilitation Plan may have further monitoring and auditing requirements which would need to be incorporated into this EMPr and followed.

6. REFERENCES

Hawkes, P.G, 2021, FE5 (Pty) Ltd Tented Camp: Terrestrial Invertebrate Assessment, Afribugs CC, Pretoria.

Hurworth, M, 2021, Civil Engineering Services Report, MH & A Consulting Engineers, Cape Town

Jackson, A & Martin T, 2021, Boschendal Tented Camp S24G Ecological Report, Biodiversity Africa, Cape Town.

Lanz, J, 2021, Site sensitivity verification and Agricultural compliance statement for NEMA 24G Application for FE5 (Pty) Ltd Tented Camp, Wynberg.

Snaddon, K, 2021, Environmental Impact Assessment of Founders Estate 5 Tented Camp, Boschendal Estate, The Freshwater Consulting Group, Kommetjie.

Winter, S, 2021, Heritage Statement: Tented Camps, Founders Estates National Heritage Site, Boschendal Farmlands, Dwars River Valley, Stellenbosch, Muizenburg.

APPENDIX 1

METHOD STATEMENT TEMPLATE

METHOD STATEMENT:

CONTRACT: _____ **DATE:** _____

PROPOSED ACTIVITY (give title of Method Statement and reference number from the EMPr):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Compiled by Chand Environmental Consultants

Draft EMPr for a Tented Camp on Founders Estate 5, Farm 1685/5, Paarl (FE5)

February 2022

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible):



Note: please give too much information rather than too little. Please ensure that issues such as emergency procedures, hydrocarbon management, wastewater management, access, individual responsibilities, materials, plant used, maintenance of plant, protection of natural features etc. are covered where relevant

DECLARATIONS

1) RESPONSIBLE OFFICER (ECO/ ESO)

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

(signed) (print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS (Contractor)

I understand the contents of this method statement and the scope of the works required of me. I further understand that this method statement may be amended on application to other signatories and that the ECO/ ESO will audit my compliance with the contents of this method statement. I understand that this method statement does not absolve me from any of my obligations or responsibilities in terms of the Contract.

(signed) (print name)

Dated: _____

3) EMPLOYER (i.e. Developer/ Owner/Project Manager)

The works described in this method statement are approved.

_____ _____ _____
(signed) (print name) (designation)

Dated: _____

APPENDIX 2

CURRILULUM VITAE:

Compiled by Chand Environmental Consultants

Draft EMPr for a Tented Camp on Founders Estate 5, Farm 1685/5, Paarl (FE5)

February 2022

LIST OF APPENDICES

Appendix 1: Method Statement template – **See above**

Appendix 2: Curriculum Vitae –Claudette Muller and Michelle Lee

APPENDIX 1

Method Statement template – **See above**

APPENDIX 2

Curriculum Vitae –Claudette Muller and Michelle Lee

CLAUDETTE MULLER CURRICULUM VITAE

KEY QUALIFICATIONS

Claudette is a senior environmental consultant and Environmental Assessment Practitioner (EAP) at Chand. She has a BSc Honours degree in Environmental Science from Rhodes University and an interdisciplinary Master's degree in Environment, Society and Sustainability from the University of Cape Town. Her extensive academic and research history in both natural and social science straddle the fields of ecology, biodiversity-use-and-trade, climate change and environmental law. This diverse background has cultivated a holistic approach to solving developmental challenges situated at the social, economic, environmental nexus, particularly in the South African context. She holds extensive knowledge of Integrated Environmental Management and is well versed in environmental legislation and associated environmental and planning processes.

She has managed a number of Basic Assessment processes and has co-authored Scoping Reports. She is proficient in report writing, synthesis of technical reports, management of specialists and leading public participation processes.

She holds 4.5 years of experience in environmental compliance monitoring and auditing and has fulfilled the role of Environmental Control Officer (ECO) during the construction phase for a range of development projects.

Other key competencies include:

- High level environmental screening and legal reviews;
- Compilation of Environmental Management Programmes (EMPrs);
- Compilation of Environmental Impact Assessment (EIA) applicability checklists;
- Amendment applications for Environmental Authorisations; and
- The management and compilation of Water Use License Applications (WULAs) and water related permitting.

APPLICABLE PROJECT EXPERIENCE

BASIC ASSESSMENTS, SCOPING & EIAs & 24G APPLICATIONS

Basic Assessment for the Proposed Development of a Block of Flats (Azalea) in Victoria Road, Clifton
Lead EAP responsible for management of Basic Assessment Process (ongoing)

Basic Assessment for the Servicing of the Founder's Estates, Boschendal
Lead EAP responsible for management of Basic Assessment Process (ongoing)

Basic Assessment for a Waste Management Licence Application for the Everite Asbestos Waste Site
Lead EAP responsible for management of Basic Assessment Process (ongoing)

Basic Assessment for the Proposed Development of Erf 29&30

Co-EAP, co-author of Basic Assessment Report and responsible for responding to I&AP comments and stakeholder engagement.

Basic Assessment for the New Retreat Residential Development at Boschendal Estate

Co-EAP responsible for management of post-application Basic Assessment Process and public participation.

Basic Assessment for the City of Cape Town IRT Phase 2A E01 Trunk Route, Gugulethu & Manenberg

Co-EAP, co-author of Basic Assessment Report and management of post-application public participation process

Basic Assessment for The Point – Kalk Bay: Proposed Rehabilitation of the Parking and Recreational Area

Co-EAP, compilation of a Basic Assessment Report, review and synthesis of specialist reports, liaison with the project team and authorities, co-ordination of specialists and management of the public participation process.

Basic Assessment for the Proposed Establishment of the King David Warehousing, Industrial and Business Development on Erf 112674, Cape Town and the Remainder of Erf 1181, Matroosfontein

Assistance in the compilation of the Basic Assessment Report including review and synthesis of specialist reports.

Proposed Phase 2 Extension of Houmoed Avenue and Upgrading of Masiphumelele Informal Settlement, Sunnyside and Masiphumelele, Cape Town

Assistance in the compilation of the Basic Assessment Report and management of the public participation process.

Scoping and EIA process for a proposed Gas (LPG) to Power Project, Saldanha

Compilation of Environmental Application and co-author of Scoping Report.

NEMA 24G Retrospection Environmental Authorisation Application Process for a Tented Camp at Boschendal

Compilation of 24G Environmental Impact Report, management of specialists and facilitation of public participation process.

PUBLIC PARTICIPATION PROCESSES

Basic Assessment for the Proposed Phase 1 Extension of Houmoed Avenue, from Buller Low Drive to Lekkerwater Road, Sunnyside, Cape Town

Management of the Public Participation Process, including liaison with I&APs and compilation of Comments and Responses report.

Basic Assessment for the Proposed Phase 2 Extension of Houmoed Avenue & Upgrading of Masiphumelele Informal Settlement

Management of the Public Participation Process, including liaison with I&APs and compilation of Comments and Responses report.

The Upgrade of Kommetjie Road, Sunnyside, Cape Town

Management of the Public Participation Process, including liaison with I&APs and project team members during the construction phase.

The Upgrade of Main Road, Kalk Bay, Cape Town

Public Liaison Officer during the construction phase.

ENVIRONMENTAL MONITORING AND AUDITING

Environmental Control Officer (ECO), The Twelve Apostles Reconfiguration of a Helipad and construction of Two Gazebos

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Plan.

Environmental Control Officer (ECO), King Air Mixed Use Development, Matroosfontein

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Building works for the Aramex Warehouse at Richmond Park

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Construction of a Traffic Circle and sidewalks at Teubes Road/Kommetjie Road. Kommetjie

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Residential Development on a Portion of Leeukoppie Estate, Hout Bay, Cape Town

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Expansion of the Evergreen Retirement Village by 22 Apartments, Bergvliet, Cape Town

ECO for the monitoring, auditing and reporting of construction activities including the compilation of required Method Statements in accordance with the conditions of the planning authorisation.

Environmental Control Officer (ECO), Expansion of the Evergreen Retirement Village by 13 Houses, Bergvliet, Cape Town

ECO for the monitoring, auditing and reporting of construction activities including the compilation of required Method Statements in accordance with the conditions of the planning authorisation.

Environmental Control Officer (ECO), Construction of IRT Phase 2A Electric Bus Charge Facility at Foreshore Staging Area and Depot Enabling Works: Khayelitsha and Mitchell's Plain.

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Audit of the Residential Development on a Portion of Leeukoppie Estate, Hout Bay, Cape Town

Conducting a six-month environmental compliance audit and assessment of the EMP for the construction phase of the development.

Environmental Audit of the Delft Symphony Housing Project, Delft, Cape Town Conducting an environmental compliance audit for the operational phase of the development.

Environmental Audit of the 12 Apostles Hotel and Spa, Camps Bay, Cape Town Conducting environmental compliance audits for the operational phase of the development.

Environmental Audit of the Avedia Energy Liquid Petroleum Gas (LPG) Handling Gas Facility, Saldanha.

Conducting an environmental compliance audit for the operational phase of the development.

WATER USE LICENCES AND WATER RELATED PERMITTING

Proposed Phase 2 Extension of Houmoed Avenue and Upgrading of Masiphumelele Informal Settlement, Sunnyside and Masiphumelele, Cape Town

Compilation of Water Use Licence Application (WULA) including review and synthesis of specialist reports.

Proposed Phase 1 Extension of Houmoed Avenue, Sunnyside Cape Town

Compilation of Water Use Licence Application (WULA) including review and synthesis of specialist reports.

The Stellenbosch Square Alternative Water Supply System, Stellenbosch

Compilation of Water Use Licence Application (WULA) and synthesis of specialist reports.

Paul Roos Gymnasium Alternative Water Supply System, Stellenbosch

Compilation of Water Use Licence Application (WULA) and synthesis of specialist reports.

Water Management Strategy for the Hospitality Property Fund and Tsogo Sun Hotels

Compilation of necessary permits and water use authorisations for different water-use management measures at various hotel properties in Cape Town/ Nelson Mandela Bay/Bloemfontein, including liaison with authorities and management of specialists,

The Proposed Spatial Development Framework for the Wellington Industrial Precinct, Erf 34, Wellington

Compilation of Water Use Licence Application (WULA) including review and synthesis of specialist reports.

The 12 Apostles Hotel & Spa water treatment facility; 12 Apostles Hotel

Compilation of Water Use Licence Application (WULA) and management of Water Services Intermediary (WSI) application process with the City of Cape Town.

The Implementation of Alternative Water Supply Facilities at various Growthpoint Properties; Growthpoint

Compilation of Water Use Licence Application (WULA) and management of Water Services Intermediary (WSI) application process with the City of Cape Town.

The Western Cape Government: Transport & Public Works Department Business Continuity Plan in Response to the Cape Town Drought

Management of Water Services Intermediary (WSI) application process for alternative water supply systems at fourteen critical infrastructure sites.

The CTICC Reverse Osmosis (RO) Plant; CTICC

Compilation of Water Use Licence Application (WULA), Water Services Intermediary (WSI) application and Coastal Waters Discharge Permit (CWDP) including liaison with authorities and management of specialists.

The Somerset Mall Reverse Osmosis (RO) Plant; Hyprop Investments

Compilation of Water Use Licence Application (WULA) and management of Water Services Intermediary (WSI) application process with the City of Cape Town.

EIA APPLICABILITY CHECKLISTS & AMENDMENT APPLICATIONS

EIA Applicability Checklist for the Proposed Nautica Development, Granger Bay Harbour.

EIA Applicability Checklist for a Proposed Mixed-Use Zoning Application at The Island, Paarden Eiland

EIA Applicability Checklist for the Proposed City of Cape Town IRT Trunk Route: E2.

Amendment Application for the Kommetjie Central Development Environmental Authorisation.

ENVIRONMENTAL SCREENING

Desktop Environmental Screener for the Proposed Upgrade of various NMT facilities by Stellenbosch Municipality.

Desktop Environmental Screener for the Proposed Storage of Dangerous Goods at Senmin, Sasolburg.

Desktop Environmental Screener for a Proposed High-Density Residential Development on various erven, Hout Bay.

Desktop Environmental Screener for a Proposed Blue Berry Farm on Boschendal Estate.

Desktop Environmental Screener for the development of a Place of Worship at 2 Liesbeek Avenue.

Desktop Environmental Screener for the Phantom Forest Re-development, Knysna.

ACADEMIC RECORD

MPhil in Environment, Society and Sustainability (University of Cape Town)

BSc (Honours) in Environmental Science (*cum laude*) (Rhodes University)

BSc in Biodiversity and Ecology (Stellenbosch University)

PUBLICATIONS

Perceptions of Climate Change and Barriers to Adaptation amongst Commonage and Commercial Livestock Farmers in the Semi-arid Easter Cape Karoo, C Muller & SE Shackleton, *African Journal of Range and Forage Science* Vol. 31:1, 2014)

MICHELLE LEE
CURRICULUM VITAE

KEY QUALIFICATIONS

Michelle is a junior environmental consultant at Chand. She has a BSc degree in Biological Sciences, majoring in Applied biology (distinction), Evolution and Ecology and Marine Biology (distinction) from the University of Cape Town and BSc (Hons) degree in Marine Science from the University of Cape Town. Additionally, Michelle is currently completing a MSc degree, focusing on Electronic Monitoring within the South African demersal fishing industry, at the University of Cape Town. Her extensive academic and research history in natural science give her key insights in the fields of ecology, biodiversity-use-and-trade, climate change and the South African resource sector. This diverse background has cultivated an integrated and holistic approach to solving resource-use challenges situated at the social, economic, environmental nexus, particularly in the South African context.

She provides essential project support to senior consultants, assisting with environmental assessments, report writing and management of specialists and has led the monitoring and compliance of several developments within the Western Cape region.

Other key competencies include:

- Stakeholder Engagement and communication;
- Data analysis;
- GIS mapping; and
- Report writing.

APPLICABLE PROJECT EXPERIENCE

BASIC ASSESSMENTS AND SCOPING & EIAs

Environmental Application, compilation of an environmental application for the Proposed IRT Phase 2a Trunk Route: Portion E1, 3.5km of Govan Mbeki Road from Intersection with Heinz/Ottery Road to Approx 130m East of Link Road, Manenberg & Gugulethu.

Environmental Application, compilation of an environmental application for the Decommissioning of the Everite Asbestos Site, Erf 18354, Brackenfell

Environmental Management Programme, compilation of an EMPr for the Boschendal Tented Camps, Boschendal, Cape Winelands

Construction Environmental Management Plan, compilation of an CEMP for the Leeukoppie Estate, Hout Bay, Cape Town

ENVIRONMENTAL MONITORING AND AUDITING

Environmental Control Officer (ECO), King Air Mixed Use Development, Matroosfontein

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Building works for the Courier Guy Warehouse, King Air Mixed Use Development, Matroosfontein

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Building works for the Morgan Cargo Warehouse, King Air Mixed Use Development, Matroosfontein

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Building works for the GetWorth Warehouse at Richmond Park

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Building works for the Takealot Phase 1 Facility at Richmond Park

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Building works for the Rubicon Facility at Richmond Park

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Building works for the Takealot DC Facility at Richmond Park

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Kommetjie Central Development, Kommetjie, Cape Town

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Boschendal Estate – Extension of existing Kropman Cottages for residential use on Farm 1685/11 (FE 11), Franschhoek, Cape Town

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Control Officer (ECO), Sawmill Packhouse – The development of a packing shed on Portion 3 of Farm 1615 in Wemmershoek, Paarl

ECO for the monitoring, auditing and reporting of construction activities in accordance with the Environmental Management Programme.

Environmental Audit of the 12 Apostles Hotel and Spa, Camps Bay, Cape Town.

Conducting environmental compliance audits for the operational phase of the development.

Environmental Audit of the Cape Precious Metals Facility Montague Gardens, Cape Town.

Conducting environmental compliance audits for the operational phase of the development.

EIA APPLICABILITY CHECKLISTS & AMENDMENT APPLICATIONS

EIA Applicability Checklist, co-authored with the EIA checklist for the Proposed Oude Moulen Mixed-Use Development, Cape Town.

EIA Applicability Checklist, co-authored with the EIA checklist for the for the Island Rock Mixed-Use Development, Cape Town.

EIA Applicability Checklist, for Mr. John Hoal on the redevelopment of RE/12/222 to a lifestyle residential facility.

ENVIRONMENTAL REPORTING

Environmental and Sustainability Report for Vangate Mall, Cape Town.

ENVIRONMENTAL SCREENING TOOL

Environmental Screening report for the proposed development at Boschendal, Western Cape.

Environmental Screening report for the proposed Impower Solar PV farm at Mooiplaas, Gauteng.

Environmental Screening report for the proposed Impower Solar PV farm at Leuzonia, Gauteng.

Environmental Screening report for the proposed Impower Solar PV farm at Langside Farm, Eastern Cape.

WASTE MANAGEMENT

Waste Management License application for the decommissioning of the Everite Asbestos Site, Erf 18354, Brackenfell

Integrated Waste Management Plan for building works for the proposed residential apartment block at Steenberg, Western Cape

Integrated Waste Management Plan for building works for the proposed Experiential Education Garden Development in the Green Point Park

Application to be an accredited waste service provider and Integrated Waste Management Plan for Martin & East Pty Ltd.

PUBLIC PARTICIPATION

Independent Public Participation Process for the Proposed memorial on Erf 95135, Delville Wood Memorial Garden in the Cape Town Company's Garden.

WATER USE LICENSES

Water Use License for the infilling of wetlands and altering of a banks for the proposed Irt Phase 2a Trunk Route: Portion E1, 3.5km of Govan Mbeki Road from Intersection with Heinz/Ottery Road to Approx 130m East of Link Road, Manenberg & Gugulethu.

Water Use License for the infilling of wetlands at the proposed Pelican Park Phase 2 Development, City of Cape Town.

Water Use License for the groundwater abstraction at Makhado Crossing Shopping Centre, Makhado, Gauteng.

Water Use License for the Development of the Wireless 2 Residential Development on Portions of Remainder Farm 1529, Kommetjie, Cape Town.

Water Use License for the Development of Residential Units on Portion of Remainder Farm 948, Wireless Road, Kommetjie, Cape Town.

Water Use License for the Abstraction of groundwater at 12 Apostles Hotel, Cape Town.

Water Use License for the Groundwater abstraction via borehole at Helderberg Centre.

Water Use License for the Construction of a retail centre building and associated infrastructure within 500m of a wetland, Cape Town.

Water Use License for the Groundwater abstraction at Park Inn by Radisson Hotel, Newlands, Cape Town.

Water Use License for the Agterdam Cottages - Refurbishment and Expansion for tourist accommodation, Cape Town.

Water Use License for the Groundwater abstraction at Cradlestone Mall in Krugersdorp, Mogale City.

Water Use License for the Groundwater Abstraction via Boreholes at King Air Industria, Cape Town.

Water Use License for the Groundwater abstraction at Paul Roos Gymnasium, Erf 16502, Stellenbosch.

Water Use License for the Proposed Groundwater Abstraction at Richmond Park, Cape Town.

Water Use License for the Groundwater abstraction at Stellenbosch Square, Stellenbosch.

Water Use License for Wynberg Depot, Cape Town.

Water Use License for IRT Phase 2A Trunk E3, Cape Town.

Water Use License for the proposed farm worker "chill zones", Boschendal, Western Cape.

ACADEMIC RECORD

MSc in Marine Sciences – in process (University of Cape Town)

BSc (Honours) in Marine Sciences (University of Cape Town)

BSc in Biological Sciences majoring in Applied Biology, Marine Biology, Evolution and Ecology
(University of Cape Town)