

KwaNobamba Royal Residence

Environmental Management Programme for Construction of new Zulu Royal Residence

Prepared by

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Ecological and Environmental Services**

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This Environmental Management Programme (EMPr) for the proposed KwaNobamba Royal Residence, in the eMakhosini-Opathe Heritage Park, was completed in June 2014 and was produced by:

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1 INTRODUCTION

1.1 Background and description of proposed expansion

His Royal Highness, King Goodwill Zwelithini kaBekuzulu, the reigning King of the Zulu Nation, wishes to re-establish a Royal Residence in the eMakhosini Valley, where the founder of the Zulu Nation, King Shaka kaSenzangakhona, was born. This residence will be built along the lines of a traditional homestead (*umuzi/Isigodlo*).

The residence will be located in the eMakhosini-Opathe Heritage Park (hereafter referred to as “the Park”), some 27 km from Ulundi and 85 km from Eshowe.

The significance of the name kwaNobamba is that it was the ancestral home of King Jama kaNdaba, who was King Shaka kaSenzangakhona’s grandfather, and it was King Shaka’s birthplace. When King Dingaan ascended to the throne, he moved back to the eMakhosini Valley, from kwaDukuza near Stanger, and temporarily located his capital at kwaNobamba, whilst building Mgungundlovu. After his defeat at the hands of the Boers, with the assistance of his brother, Prince Mpande, in 1840, Mgungundlovu was razed to the ground. King Mpande then moved the Royal Residence to kwaNodwengu, which is now located in Ulundi, near the Holiday Inn Hotel. King Dingaan was therefore the last Zulu king to have a homestead within the eMakhosini Valley.

The building of a Royal Residence within the eMakhosini Valley, with the same layout as a traditional *umuzi/Isigodlo*, will have tremendous cultural and spiritual significance to the Zulu Royal Family which, in a sense, will be “coming home”.

The Royal Residence will cover an area of 20 hectares and will consist of the following:

1. Nine traditional thatched “beehive huts” (rondavels), arranged in a circle, with a central cattle enclosure (*isibaya*) within the arrangement of “huts”. These will be constructed with a steel framework, as opposed to the traditional wooden latticework structure, as they will be much bigger than the traditional huts.
 - a. The main residence (*indlunkulu*), opposite the entrance (Unit A), will cover an area of 241.0 m², with a courtyard of 397.7 m² adjacent to it on the outer perimeter.
 - b. On each side of the main residence, going around the circle, will be two units “B” (four in total). One of them (B2 - *iqadi*) will cover an area of 310.5 m². Three of them (Unit B1) will cover an area of 189 m² each, to give a total “Unit B1” area of 568.8 m². Each will have an outer courtyard, covering 251 m², giving a total “Unit B” courtyard area of 1004.8 m².
 - c. On each side of the entrance will be two units “C” (four in total). Each will cover an area of 104.5 m², to give a total area of 418.0.5 m².
2. One prayer unit, covering 70.2 m², outside the main circle and between Unit A and one Unit B (the *iqadi*).
3. Two guard houses, covering 13.5m² each, to give a total area of 27.0 m²
4. On each side of the entrance will be an ablution block, with the male ablution on the right hand side, and the female ablution on the left hand side, as one enters the circle. Each ablution block will cover an area of 44.0² m, to give a total area of 88.0 m². Adjacent to

the ablution facilities will be service rooms (kitchen, scullery and domestic laundry facility), covering an area of 21.7 m².

5. There will be covered parking bays and a garage to the left of the entrance and the garage will cover an area of 38.5 m².
6. On each side of the main dwelling, outside the circle, will be two ancillary accommodation units, covering an area of 477.3 m² each, to give a total area of 954.6 m². Each of these units will have a courtyard, covering an area of 302.4 m², to give a total area of 604.8 m².
7. The total area covered by buildings will therefore be 2,739.3 m², and that covered by courtyards will be 2,007.9 m², to give a total development area of 4,747.1 m², spread out within an area of 6.1 ha, which will have a perimeter fence and gates.
8. In addition to the main dwelling area, there will be a guest accommodation facility, covering an area of 5.3 ha, set apart from the main dwelling.
9. A fenced area of natural veld, covering an area of 8.6 ha, will act as a grazing site for Royal cattle.
10. Therefore, the total overall site size, including the residence, guest facility and grazing area, will cover an area of 20 ha.
11. The 3 km access road, from the gate to the Royal Residence, will be upgraded from a track to a gravel road, of the standard of a district road (Class R4 rural local road), with a speed limit of 60 km/h and the road reserve not exceeding 20 m.

In terms of provision of bulk services, the following will apply:

1. **Electricity:** Initially the system will be designed to work entirely on solar power, with generator backup. At a later stage, an Eskom connection may be considered, but at this stage, the existing Eskom network does not allow for a cost-effective connection to the proposed residence.
2. **Water:** Will be obtained from a borehole and, for this purpose, a Water Use License will need to be applied for. Rainwater harvesting measures will be implemented, wherever possible.
3. **Sewerage:** Will be processed by means of a package plant - Either the Scarab™ or Lilliput® sewage treatment system.

1.2 Communication with Interested and Affected Parties (I&AP's)

Summary of Public Participation. (This section will be updated)

The following efforts were made to notify and inform the public and Interested and Affected Parties (I&AP's) of the proposed development of the KwaNobamba Royal Residence:

1. An advertisement was placed in The Zululand Observer, The Mercury and the Isolezwe newspapers on 26 May 2014.
2. Notices were placed at strategic locations on – at the Mgungundlovu Multi Media Centre and at the entrance to the property where the proposed development will take place.
3. Notices and copies of the Background Information Document (BID) were sent out to targeted Interested and Affected Parties on

2 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

GNR 543 of the National Environmental Management Act, No. 107 of 1998, and EIA Regulations (2010) includes a number of provisions regarding the content of EMPs.

Section 33 states - “A draft environmental management programme must include:

- a) Details of -
 - i) The person who prepared the environmental management programme; and
 - ii) The expertise of that person to prepare an environmental management programme;”

The name and details of the EAP are thus provided below:

This EMP was prepared by Brousse-James & Associates. Brousse-James & Associates is a Close Corporation, registered in 1997 (CK97/57246/23), and jointly owned by Mr Barry Mark James and Mrs Danielle Brousse James. All professional work taken on by Brousse-James & Associates has been conducted by Barry James, with Danielle James providing assistance with administration, editing of documents and field work. When required, other specialist sub-consultants are subcontracted. Since 1997, Brousse-James & Associates has been involved in a variety of projects, ranging from wildlife management plans, environmental journalism, specialised computer programming for biological and conservation applications, environmental impact assessments, specialist biodiversity assessments, writing of rehabilitation plans and environmental management programmes, and Barry James has also acted as environmental control officer for a number of projects.

Expertise to undertake Environmental Assessment Process

Qualifications and memberships:

- **PhD (Da Vinci Institute)** Currently registered for a PhD, looking at sustainable utilisation of indigenous Southern African wood.
- **MSc** (Natal University - 1998); Project Title - Succession and soil properties following the removal of pine plantations on the Eastern Shores of Lake St Lucia, South Africa.
- **BSc (Hons)** (Potchefstroom University - 1995); Stress Physiology (Distinction); Soil Degradation (Distinction) Plant Ecology and Management; Analytical Procedures in Ecology; Reclamation Ecology; Soil Classification; Taxonomy; Modern Systematics; Statistics (Distinction). Project Title - Numerical analysis of the vegetation, its distribution and relation to major environmental gradients in the south-western portion of Umfolozi Game Reserve.
- **BSc** (UNISA - 1994); Majors: Zoology and Botany. Distinctions in Plant Ecology and Animal Physiology.
- **Pr.Sci.Nat.** - Registered with the South African Council for Natural Scientific Professions in the field of Ecological Science (Registration No. 400263/06).
- **MSAIE&ES** - Professional member of the Southern African Institute of Ecologists and Environmental Scientists.
- **EAPSA** - Certified Environmental Assessment Practitioner with Interim Certification Board.

- **Numerous Natal Parks Board In-Service Courses**
- **Short Courses of relevance to the EIA Process:**
 - Geographic Information Systems (GIS) - (Natal University, 1998)
 - Integrated Environmental Management (IEM) - (Natal University, 1998)
 - Crash course in Environmental Auditing - (Eagle Environmental, 1999)
 - Soil Classification and Land Capability - (Cedara, 1999)
 - Environmental Impact Assessment - (Rhodes University, 2006)

Applicable Experience:

A comprehensive list of projects undertaken by Brousse-James & Associates is available as required.

3 ENVIRONMENTAL PRINCIPLES

As the KwaNobamba Royal Residence will be located in a protected area (although it is not in the formally proclaimed section), the upgrading of facilities will be done in such a manner that it has no long-lasting negative impact on the natural environment or any ecological processes. To this end, the following environmental principles will apply.

- 1) In terms of the construction of the residence, the following will apply.
 - a) The construction footprint will be kept to the absolute minimum and the destruction of mature trees will be avoided, as far as possible.
 - b) Disposal of waste from construction activities will be done in the most environmentally sensitive manner possible, given available technology and logistical constraints.
 - c) Construction staff will be given strict conditions under which they work and interact with the environment.
 - d) Every effort will be made to minimise long-term disturbance to soil and the possibility of accelerated erosion. To this end, topsoil will be stockpiled to be used for post-construction rehabilitation.

- 2) Once the residence and infrastructure have been constructed, the following principles will apply.
 - a) Stockpiled topsoil from any excavations will be spread on disturbed areas and shaped to blend with the natural contours.
 - b) Any replanting or re-establishment of vegetation surrounding the construction site will resemble the surrounding natural vegetation and no “gardens” comprising alien plant species will be created. As far as possible, this includes indigenous species that are not naturally found within the Park. For genetic reasons, the seeds or other propagules of any species planted within the Royal Residence site must have originated from Zululand.
 - c) Alien vegetation will be aggressively eradicated, where found, and ongoing follow up will continue in order to prevent re-infestation.
 - d) Disposal of waste from the Royal Residence will take place in the most environmentally-responsible manner possible, given available technology and logistical constraints. To this end, an integrated waste management approach will be used that is based on waste minimisation and best practice, and will incorporate reduction, recycling, re-use and disposal, where appropriate.
 - e) To prevent the development of problem animal situations, precautions will be taken against allowing animals access to food waste.
 - f) Residents and staff will be discouraged from feeding animals or attempting to approach them too closely with a view to trying to touch them.

4 COMPLIANCE MONITORING – ROLES, RESPONSIBILITIES AND REPORTING PROCEDURES

4.1 Roles and responsibilities

1. Project Manager/Principal Agent (Dr John Mbuli)

- Representative for the Zulu Royal Family.
- Contract administration.
- Appointment of EAP and other professionals.
- Co-ordination of all Professional Consultants.
- Adjudication of tenders and recommendation to Client.

2. Architect (Mr Minenhle Makhanya)

- Preliminary feasibility / budget, scope of work sketch design.
- Design and layout of Royal Residence.
- Demarcation of construction site in consultation with project manager.
- Municipal approvals.
- Provision of tender and working drawings.
- Provision of “as-built drawings”.

3. Quantity Surveyor

- Preparation of Project Estimate.
- Preparation of Bills of Quantities.
- Preparation of Tender Document.
- Assistance with adjudication of tenders of Building Contractor.
- Financial management of the construction phase of the project.
- All of the above functions as assistance to the Principal Agent.

4. Environmental Control Officer

- The Environmental Control Officer (ECO) can be from the existing team, but must be appropriately qualified.
- The ECO will conduct inspections at strategic times during the pre-construction, construction and closure process. Must be present at site demarcation and site clearing.
- Ensuring that conditions, mitigation measures and recommendations stipulated in the Basic Assessment Report, Record of Decision and this EMP are complied with.
- Monitoring and auditing of activities.
- Conducting a post-construction environmental audit.
- Sending results of the audits to the Department of Environmental Affairs and Tourism (DEAT) and/or the KwaZulu-Natal Department of Agriculture and Environmental Affairs (DAEA), on request.
- Maintaining a “Complaints Register” and having it available for inspection by DEAT and/or DAEA. This can be housed at the site office.

5. Environmental Consultant (Brousse-James & Associates, Mr Barry James)

- Preparation of the Basic Assessment Report.
- Communication with Interested and Affected Parties.
- Liaison with Client, Project Manager and Architect.
- Preparation of this EMP for construction and management of the KwaNobamba Royal Residence, in consultation with the Project Manager and Architect.
- Either assisting ECO or acting as ECO in monitoring construction activities.

6. Engineer

- Design of electrical system.
- Supervision of installation of electrical system.
- Design of steel infrastructure for accommodation units.
- Water supply design.

7. Building Contractor

- Clearing of site prior to construction.
- Construction.
- Post-construction rehabilitation of site, limited to construction site and staff camp only, and in consultation with the Landscaper.
- Control and discipline of construction staff, subcontractors and supplier deliveries.
- Explaining, and assisting with enforcing, the provisions of this EMP to all construction personnel involved with the KwaNobamba Royal Residence construction.
- Ensuring compliance with this EMP by both his staff and sub-contractors.

8. Landscaper

- Post-construction rehabilitation planting around the site, where required, in consultation with the Environmental Consultant.

4.2 Reporting procedures

- Problems with compliance are to be reported to the Principal Agent.
- All instructions to Contractors are to be given via the Principal Agent.
- Problems with environmental compliance and/or building regulations are to be rectified by means of an instruction to the Contractor, via the Principal Agent.
- Disputes/conflicts with regard to compliance will be resolved by means of formal Architect's instructions.
- If any breach of statutory regulations, contents of this EMP or the building contract occurs, this must be rectified immediately, to satisfaction of the Principal Agent and the ECO.
- Monthly site meetings will be held and the ECO will be called upon, if necessary, to report on any issues of concern.

4.3 Monitoring

Continuous monitoring of construction activities will have to be done by the ECO or an appointed representative living close to the site. The representative would have to be given a copy of the EMP and have instructions from the ECO on what to monitor. Weekly telephonic or e-mail contact between the on-site person and the ECO would be needed and the on-site person would need to notify the ECO immediately if any problems are encountered.

Table 1: Summary of activities, responsible parties, time frames and mitigation measures – Construction Phase.

Activity	Responsible Party	Timeframe	Mitigation/Protection Measures
Demarcation of site	Principal Agent / ECO	1 Day – prior to any construction or disturbances	Boundary will be clearly marked with chevron tape.
Demarcation of delivery routes (existing roads, paths & predetermined new routes)	Principal Agent / ECO	1 Day– prior to any construction or disturbances	<ul style="list-style-type: none"> Boundaries clearly marked with chevron tape. Penalties for construction staff moving out of those areas.
Demarcation of areas to be cleared and materials storage areas	Principal Agent / ECO	1 Day– prior to any construction or disturbances	<ul style="list-style-type: none"> Clearly marked with chevron tape. Penalties for staff disturbing beyond those areas or incorrect materials storage.
Site clearance	Building Contractor	1 Week	<ul style="list-style-type: none"> Clearing will occur to a maximum of 2 m working area beyond the foundation of each building. ECO to be present for demarcation of area and site clearance. No damage to or removal of trees without ECO permission.
Construction of Royal Residence	Building Contractor	Ongoing throughout	<ul style="list-style-type: none"> ECO (or representative) and Principal Agent to conduct regular inspections. Incident and Complaint Registers to be maintained.
Environmental awareness training for construction staff	ECO and Building Contractor	Within First Week on site	N/A
Provision of water	Contractor	Ongoing	Only to be obtained from approved source.
Provision of toilet facilities	Building Contractor	Ongoing	<ul style="list-style-type: none"> Chemical toilets to be used; must be properly maintained. Staff not to defecate in veld.
Maintenance of roads	eMakhosini-Ophathe Park Management	Ongoing	<ul style="list-style-type: none"> Immediate repair of damage caused by delivery and construction vehicles. Access road to be upgraded during construction process.
Refuelling	Building Contractor / ECO	Ongoing	<ul style="list-style-type: none"> Only in designated refuelling area. Surface under temporary refuelling area must be protected from spillage.
Vehicle / equipment maintenance	Building Contractor	Ongoing	<ul style="list-style-type: none"> Except for emergency repairs, all maintenance to take place outside the Park. Emergency maintenance or repairs on-site to take place only with permission from ECO. Equipment to be regularly serviced and no leaking equipment allowed on site. Drip trays to be placed under static/parked plant. No washing of equipment on site.

Activity	Responsible Party	Timeframe	Mitigation/Protection Measures
Waste management	Building Contractor	Ongoing	<ul style="list-style-type: none"> • Only paper, wood offcuts and thatch can be burnt at pre-determined sites. • Hazardous/toxic waste to be removed to appropriate facility. • Building rubble and other building waste to be removed from Park. • Recyclable material to be taken to closest recycling facility. • All other waste to Ulundi landfill site. • Site to be cleared daily and food wastes/containers to be removed daily/stored in scavenger-proof bins.
Fire protection	Building Contractor	Ongoing	<ul style="list-style-type: none"> • No open fires for cooking. • No open fires, flames or smoking within 10 m of flammable substances. • Easily accessible fire-fighting equipment to be on hand at all times. • Any fires that do occur to be reported to Principal Agent.
Protection of Natural Resources	Building Contractor / ECO / eMakhosini-Ophathe Park Management	Ongoing	<ul style="list-style-type: none"> • Strict rules to ensure that no capture of or injury to animals or removal or damage to plants takes place by construction staff. • Searching of staff every time they leave the Park.
Post-construction rehabilitation	ECO and Landscape Contractor	1 Month, plus follow-up	Only plants indigenous to the area and from sources within Zululand to be planted – in accordance with KZN Wildlife policy for Protected Areas.

5 PRE-CONSTRUCTION AND CONSTRUCTION PHASE

5.1 Site demarcation and access

- The perimeter of the Royal Residence and the development sites should be clearly demarcated so that unnecessary disturbance of natural areas outside the site does not take place. This area is to be defined and marked by a team consisting of the Project Manager, Architect and ECO.
- Delivery routes for material and equipment during construction activities should be clearly demarcated and should be on existing access roads and paths and/or future roads and paths.
- General movement of construction staff on site should be restricted to existing roads and paths, or the intended routes for future pathways and roads, where possible. These routes should also be used for the reticulation of services, where possible, to limit the impact on site. Staff should not be allowed out of the perimeter of the Royal Residence site.

5.2 Site clearance

- The site clearance will be limited to an area slightly larger than the individual building footprints, to create sufficient working space for the construction process. Care will be taken to prevent any excessive site clearing.
- Clearing will occur to a maximum of 2 m beyond the foundation building and this boundary will be clearly marked with chevron tape.
- No trees are to be trimmed, cut down or removed without prior consultation with the ECO.

5.3 Site protection

5.3.1 Fuels, hazardous substances and other liquid pollutants

- Where reasonably practical, plant shall be refuelled at a designated re-fuelling area, or at a formal fuel outlet, as applicable. If it is not reasonably practical, then the surface under the temporary refuelling area must be protected against pollution, to the reasonable satisfaction of the ECO, prior to any refuelling activities.
- The only construction waste that may be burnt will be wood and/or paper, at a pre-designated site. No plastics, polystyrene, or other potentially hazardous substances may be burnt.
- Potentially toxic waste, such as plastics, chemicals, batteries, oils and fuels, must be removed to a recognised waste disposal facility.
- Handling of chemicals for alien plant control should only be done by qualified personnel and storage should only be in areas specifically set aside and designed for such.
- Spillage of chemicals and fuels should be avoided at all costs, and where these substances are decanted, appropriate containers must be placed to catch any potential spillage. If spillage does occur, the contaminated soil should be dug out immediately and removed to a recognised waste disposal facility, or an absorbent substance, such as sawdust, can be

spread on the spill, if it hasn't drained into the soil already, and then removed to a waste disposal facility.

- To this end, the Contractor shall ensure that there is always a supply of absorbent material readily available to absorb any spillage.

5.3.2 Equipment maintenance and storage

- Where practical, all maintenance of equipment and vehicles shall be performed outside the Park. If it is necessary to do maintenance within the Park, the Contractor shall obtain the approval of the Project Manager or ECO, prior to commencing activities.
- The Contractor shall ensure that, after obtaining approval, if emergency plant maintenance takes place, there is no contamination of the soil or vegetation. When servicing equipment, drip trays must be used to collect the waste oil and other lubricants. Drip trays must also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles).
- All vehicles and equipment must be kept in good working order and serviced regularly. Leaking equipment must be repaired immediately or removed from the site.
- The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing must be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate/nitrate and low sudsing-type detergents.

5.3.3 Building waste

- Building rubble will be disposed of outside the Park, at the Ulundi landfill site.
- Broken glass will be taken to a recognised recycling facility.
- Iron and other metal will be removed to a recognised recycling facility.
- Burning of timber offcuts will be permitted, under controlled circumstances and in designated areas only.
- If any of the above waste is not taken for recycling, it will be disposed of at the Ulundi landfill site.

5.3.4 Health and safety

- Toilet facilities will be provided for construction staff on site and no staff will be allowed to defecate in the veld. Chemical toilets must be properly maintained and the contents thereof must be disposed of at a disposal site designated for that purpose.
- First aid equipment must be kept up-to-date and replenished immediately after being used. Comprehensive first aid kits will be kept at the KwaNobamba construction site. In addition, basic first aid kits should be kept in all construction vehicles.

5.3.5 Control of fire

- No open fires are to be made by construction staff for the cooking of food.
- No open fires or flames to be within 10 m of any flammable substances.
- If permission is received to burnt paper or timber offcuts within a designated area, the fire must be monitored and fire-fighting equipment must be on hand until the fire is burnt out.
- Smoking shall not be permitted in those areas where it is a fire hazard. Such areas include 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.
- Any fires which occur must be reported to the Project Manager immediately.
- Fire-fighting equipment should be on stand-by at all times, with fire extinguishers and fire hoses maintained and kept up-to-date on an annual basis. This equipment should be easily accessible to construction staff and, once construction is complete, easily accessible to residents and staff. There must be at least one fire extinguisher, of the appropriate type, when welding or other “hot” activities are undertaken.
- The Contractor shall appoint a Fire Officer, who will be responsible for ensuring immediate and appropriate actions in the event of a fire and will ensure that employees are aware of the procedures to be followed.

5.3.6 Erosion control

Erosion control measures must be put in place during construction activities. Every effort will be made to ensure sufficient vegetation cover around the newly constructed buildings and infrastructure. Where short grass is to be maintained, *Cynodon dactylon*, *Stenotaphrum secundatum*, *Dactyloctenium australe*, or other similar indigenous creeping grasses found near the site, will be planted as soon as possible. In the short term, it can be irrigated to speed up establishment and decrease the risk of erosion.

5.3.7 Protection of natural resources

On commencement of construction activities, the following rules will be clearly outlined to construction staff.

- Individuals found setting snares for the capture of any animal whatsoever will be prosecuted and not considered for future employment.
- Construction staff found in possession of raw meat and/or skins of wild animals will be considered to have obtained these illegally and be prosecuted accordingly.
- No plants of any kind may be removed from the Park by full-time staff, construction staff or other contractors, whether it is for *muthi* (medicinal) purposes or any other purpose.
- If any protected plant species are found on site, these may not be removed and will be demarcated by a vegetation specialist and clearly marked with chevron tape.
- Construction staff will be required to be searched every time they leave the site or Park.

5.3.8 Protection of cultural heritage resources

Should any artefacts, such as spent ammunition, stone tools, pottery shards, human remains, fossils, or anything else that could have historical, archaeological or cultural value, be found during construction, these must not be removed from the site. The ECO must be notified immediately and the appropriate authorities, Amafa, (Amafa aKwaZulu-Natali/Heritage KwaZulu-Natal) must be contacted to assess the historic and archaeological value of the artefacts and advise on their protection.

5.3.9 Noise

- Noise generated by construction activities should be kept to a minimum (e.g. installation and maintenance of silencers on machinery), since the site is within a protected area and fairly close to the Mgungundlovu Heritage Site and Multi Media Centre.
- The use of radios, tape recorders, compact disc players, television sets, etc., shall not be permitted. The Contractor shall not use sound amplification equipment on site, unless in emergency situations.

5.4 Emergency procedures

The Contractor shall adhere to the following emergency procedures.

- Fire
The Contractor shall advise the Project Manager immediately should a fire start, and shall not wait until they can no longer control it. The Contractor shall ensure that their employees are aware of the procedures to be followed in the event of a fire and appropriate fire-fighting equipment should be well-maintained and available at all times.
- Accidental leaks and spillages
The Contractor shall ensure that their employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Project Manager and/or ECO. Spills and leaks must be dealt with immediately and the Contractor must ensure that the necessary materials and equipment for dealing with spills and leaks are available on site at all times. Treatment and remediation of the spill areas must be undertaken to the reasonable satisfaction of the Project Manager and/or ECO.

5.5 Provision of services for construction

5.5.1 Roads and quarries

- Existing roads will be used for the construction activities and, where these roads are to be maintained or repaired, quarry material to be obtained from a registered quarry outside the Park.
- The Contractor shall control the movement of all vehicles and plant, including that of their Suppliers, so that they remain on designated routes.
- Access routes to each building will only be along designated paths, which will serve as the final hardened paths to the buildings.

5.5.2 Communication systems

Cell phone signals are adequate at the site, therefore no special provision for communication systems during construction are required.

5.5.3 Energy and power

Electricity for construction will be supplied by a portable generator.

5.5.4 Water

Water for construction will be taken from an approved natural source outside the Park, or from the Municipal Supply in Ulundi. A borehole will be sunk during the construction process and, once that is in service, water may be used from there.

5.5.5 Staff accommodation

Any construction staff needing to overnight within the Park will be accommodated at a temporary construction camp adjacent to the site. They will be expected to stay within the confines of the camp at night and not walk or drive outside of designated areas within the Park.

5.5.6 Transport

- Transport to and from the Contractor staff accommodation facilities, construction site and Park entrance gate, or designated pickup and drop-off site, will be provided by the Contractor or Contractor's suppliers. No construction staff will be allowed to walk around within the Park, nor outside the demarcated construction site or accommodation facilities.
- No transport of construction staff or materials will be allowed at night, without prior approval of the Project Manager.
- Speed control (40km/hr) will be strictly enforced and delivery trucks will be held accountable for transgression of the speed limit.

5.5.7 Airstrips and helipads

These are not needed for construction activities.

5.5.8 Waste management

- No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur.
- The Contractor shall provide animal-proof and weatherproof rubbish bins, with lids, of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times.
- Bins shall not be allowed to become overfull and must be emptied at least once a day.
- All solid waste shall be disposed of off site, at an approved waste-disposal site.
- Waste management is further covered under Section 6.9.

5.6 Communication with public/complaints

A copy of the original Basic Assessment Report will be kept at the Site Office and the Mgungundlovu Multi Media Centre office to inform members of the public regarding details of the project.

A Complaints Register will also be kept at the site office. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself, and will be followed up and dealt with by the ECO.

5.7 Site handover

Handover of the construction site to the Contractors will occur when they have been appointed and when the contents of this EMP have been explained to them and the conditions herein accepted, in writing.

5.8 Penalties

- Construction penalties are to be detailed in the final tender documentation between the Client and the Contractors.
- Should one or any of a Contractor's staff be caught disturbing or destroying wild animals or indigenous flora, they will be arrested and legal action will be taken against them. In addition, the contracting company will be fined or another appropriate penalty will be levied and the staff member will be barred from re-entering the Park.

5.9 Review and auditing

Continuous monitoring of construction staff and construction activities will be done by the Environmental Control Officer and/or the Environmental Consultant. All audit reports will be made available to the National Department of Environmental Affairs or the KZN

Department of Agriculture and Environmental Affairs, on request. This Environmental Management Plan will be included in the tender documentation, which all Contractors will be expected to sign and adhere to. Penalties for non-compliance will be clearly outlined in the documentation and will be strictly enforced.

No separate payment will be made to cover the costs of complying with the provisions of this EMP and 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 their tender.

6 POST-CONSTRUCTION: INFRASTRUCTURE MANAGEMENT

6.1 Overall objectives for infrastructure management

- Management of the infrastructure will be done to the highest environmental standards.
- The main objective will be to maintain the protected area in the most natural manner possible, and with the least possible human interference.
- Building maintenance must be in keeping with the “sense-of-place” of the Royal Residence (i.e., no reflective surfaces, keeping to earth tones, etc.).
- Ongoing training will be offered to all staff.

6.2 Buildings

- Ongoing maintenance of buildings should be done in such a manner as to minimise noise, pollution and to avoid any additional environmental impacts.
- The use of potentially harmful poisons, cleaning agents, solvents and other chemicals for cleaning and maintenance of buildings must be avoided and only environmentally-friendly substances should be used.

6.3 Access roads and paths

Access to the Royal Residence, guest accommodation facility and other infrastructure should be restricted to existing roads and paths.

6.4 Transport

The access to supply delivery areas should be hardened and properly maintained to avoid long-term damage to the roads and precipitation of accelerated erosion.

6.5 Energy and power

No electricity for cooking and heating will be needed within the KwaNobamba Royal Residence as this will be done with gas. Fridges and freezers will also run on gas. See the next Section, 6.6, with respect to the use of gas.

Lighting and power for plug points (only for appliances, charging of cell phones, laptop computers, cameras and running fans or television sets and not for heating or cooking) will be provided by solar panels.

6.6 Chemicals, fuel storage and refuelling

Chemicals and fuels to be stored in demarcated areas, under lock and key, and precautions to be taken against leakage or spillage.

Gas for stoves and fridges is to be kept in a central storage area at KwaNobamba Royal Residence, which also includes spare cylinders. The cylinders are to be stored as a bank,

with spare cylinders connected to cylinders in use by means of a tap that can be easily switched over from the empty to the full one and will allow for the changing of cylinders without cutting off the supply. The gas store is to be protected from the elements and from fire emanating from the veld.

Adequate precautions should be taken to prevent leaking of gas, with its related fire risk. In this regard, access by animals, such as hyaena, to the gas store should be prevented, otherwise they may chew gas pipes.

Sufficient fire extinguishers should be located at the gas store and wherever gas appliances are utilised and the staff should be trained in the use thereof.

6.7 Water

Potable water for the KwaNobamba Royal Residence will be obtained from a borehole. A Water Use Licence, from the Department of Water Affairs, will be required for this. If pipes are to be exposed for maintenance, access by hyaena must be prevented to avoid damage to the pipes.

Rainwater harvesting measures will be implemented, wherever possible.

6.8 Sewage system and waste water

Sewage will be processed by means of a package plant – either the Scarab™ or Lilliput® sewage treatment system.

These must be appropriately installed to make allowances for soil conditions on site and to prevent groundwater and surface water pollution. All sewerage infrastructure must be constructed a minimum of 30 m away from any water course and outside the 1:100 year floodline. The placement of any septic tanks and soak-aways that may be installed must be such that any odours do not impact upon residents and staff.

A grease trap will be needed for the dishwashing facilities in order to reduce the pressure on the sewage system, and this grease trap must be serviced regularly.

6.9 Waste management

All solid waste is to be separated at source and all recyclable material to be taken to, or collected by, a recognised recycling facility. All other waste is to be taken to the Ulundi Landfill Site, on a regular basis.

7 REFERENCES

Hicks, N. 2014. *Geology, Soils and Groundwater Conditions in the Kwanobamba Royal Residence, Emakhosini-Ophathe Heritage Park, Ulundi Area, Kwazulu-Natal*. Council for Geoscience, Pietermaritzburg.

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8 APPENDICES

Appendix 1: Complaints Register

Appendix 2: Hazardous Materials Register

Appendix 3: Incident Register

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Complaints Register

Appendix 2:
Hazardous Materials Register

Appendix 3:
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