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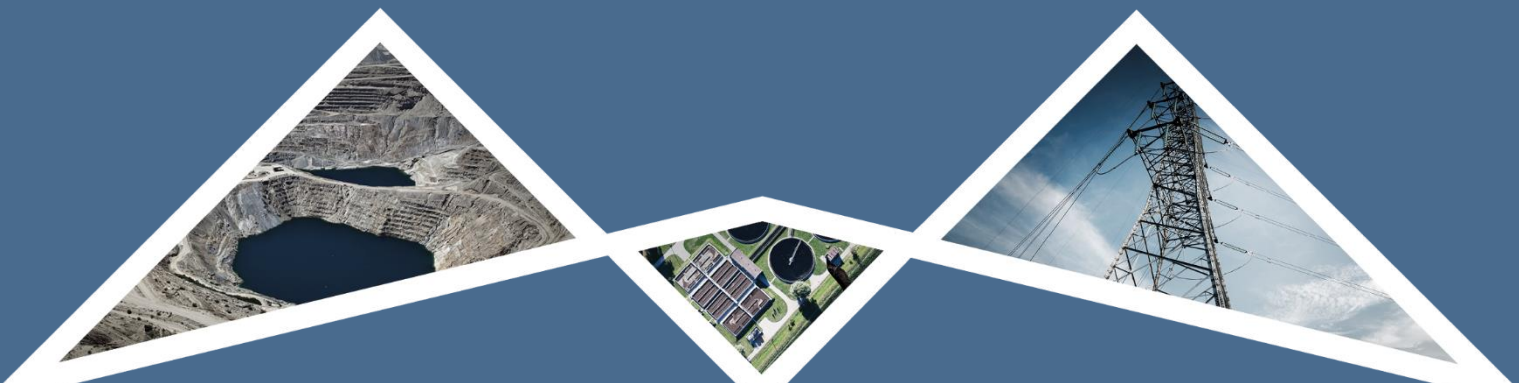
OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME

NOBLESFONTEIN WIND ENERGY FACILITY

DEA REF: 12/12/20/1993/1 (WIND ENERGY FACILITY)

DEA REF: 14/12/16/3/3/1/744 (POWER LINE AND SUBSTATION)

CORIA (PFK) INVESTMENTS 28 (PTY) LTD





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REVISION AND AMENDMENTS

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2021/03/01	ORIGINAL DOCUMENT	DRAFT NOBLESFONTEIN WIND ENERGY FACILITY OEMPr (to be read as an addendum to Savannah Environmental EMPrs for the wind energy facility and power line & substation)
2021/03/16	ORIGINAL DOCUMENT	FINAL NOBLESFONTEIN WIND ENERGY FACILITY OEMPr

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1 INTRODUCTION

This Operational Environmental Management Programme (OEMPr) has been compiled for the Noblesfontein Wind Energy Facility, Substation and 132kV Powerline, by Coria (PFK) Investments 28 (Pty) Ltd. The facility is comprised of up to 44 wind turbines with a generating capacity of up to 132MW. The project was authorised in October 2011, and the authorisation amended in February 2012. An application to split the project into three project development phases was submitted in December 2011, and in February 2012 amended environmental authorisations were issued for each of the three phases (Noblesfontein wind project, Modderfontein wind project, and the Noblesfontein solar PV site).

This Environmental Management Programme (EMPr) is an update of the EMPr submitted with the Environmental Impact Assessment (EIA) for the project (in accordance with the requirement of Condition 13 of the Environmental Authorisation) and includes the conditions of the Environmental Authorisations for the wind energy facility and substation dated October 2011 and February 2012. Option 1 for the substation and power line route was approved by DEA for construction.

This EMPr should be read as an addendum to the Savannah Environmental EMPrs and associated EMPr appendices dated October 2012 (Wind Energy Facility) and April 2013 (Substation and Power Line). This EMPr represents an update and combination of the operational mitigations and recommendations in the Savannah Environmental EMPrs for the Wind Energy Facility (DEA Ref: 12/12/20/1993/1), as well as the 132kV Powerline and Substation (DEA Ref: 14/12/16/3/3/1/744). The operational recommendations of the two Savannah Environmental EMPrs are combined in this OEMPr and additional detail has been included to certain sections where required to provide additional clarity on some of the proposed mitigations. No other changes or amendments have been made to the information from the Savannah Environmental EMPrs, apart from the removal of the mitigation measures relating to the other phases of the project (planning, construction, decommissioning, rehabilitation, and closure) and the additional detail and clarification provided regarding several of the operational recommendations and mitigation measures.

This OEMPr is applicable to all the employees and contractors of the Noblesfontein Wind Energy Facility working on the operation and maintenance phase of the facility. The document will be adhered to and updated as relevant throughout the operational life cycle of the project. Changes to the EMPr, which are environmentally defensible, shall be submitted to the competent authority for acceptance before such changes are affected.

The objective of this OEMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals for the operational phase of the project. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the operation and maintenance of the facility. An effective OEMPr is concerned with both the immediate outcome as well as the long-term impacts of the project. The OEMPr provides specific environmental guidance for the operation and maintenance phase of a project and is intended to manage and mitigate operation and maintenance activities so that unnecessary or preventable environmental impacts do not result.

The OEMPr has the following objectives:

- To outline mitigation measures and environmental specifications which are required to be implemented for the operation and maintenance phase of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Renewable Energy Facility;
- To ensure that the operational phase does not result in undue or reasonably avoidable adverse environmental impacts and ensure that any potential environmental benefits are enhanced;
- To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities;
- To propose mechanisms and frequency for monitoring compliance and preventing long-term or permanent environmental degradation;

- To facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

The mitigation measures identified within the EIA process are systematically addressed in the EMP, ensuring the minimisation of adverse environmental impacts to an acceptable level. Coria (PFK) Investments 28 (Pty) Ltd must ensure that the implementation of the project complies with the requirements of all environmental authorisations and permits, and any environmental legislation applicable to the project. This obligation is partly met through the development and the implementation of the OEMPr through its integration into the project documentation. Since this OEMPr is part of the EIA process undertaken for the Noblesfontein Wind Energy Facility, it is important that this document be read in conjunction with the Scoping Report (December 2010) and EIA Report (April 2011), as well as the Environmental Authorisation. This will contextualise the OEMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. This OEMPr for operation activities will be further developed in terms of specific requirements listed in any subsequent authorisations issued for the project, where relevant.

To achieve effective environmental management, it is important that Operator are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this OEMPr. The Operator is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Operator's obligations in this regard include the following:

- Ensuring that employees have a basic understanding of the key environmental features of the site and the surrounding environment;
- Ensuring that a copy of the OEMPr is readily available on-site, and that all site staff are aware of the location and have access to the document. Employees will be familiar with the requirements of the OEMPr and the environmental specifications as they apply to the facility;
- Ensuring that, prior to commencing any site works, all employees and subcontractors have attended an Environmental Awareness Training Course or Induction. The course must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented;
- Providing basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site; and
- Ensuring awareness of any other environmental matters, which are deemed necessary by the Internal and External Auditors.



2 PROJECT DESCRIPTION

Coria (PFK) Investments 28 (Pty) Ltd Operates a commercial wind energy facility, as well as the associated infrastructure (Substation and powerline) on a site near Victoria West within the Northern and Western Cape Province. The facility is to be called the Noblesfontein Wind Energy Facility of up to 44 turbines with a generating capacity of up to 123 MW over an area of approximately 22 ha (on farm portions: remaining extent of Farm Noblesfontein 227, Portion 3 of the Farm Noblesfontein 227, Portions 2, 3 and 4 of the Farm Ezelsfontein 235, remaining extent of the Farm Annex Noblesfontein 234, Portion 1 of the Farm Annex Noblesfontein 234 and Portion 1 of the Farm Rietkloofplaaten 239).

The **Wind Energy Facility** is comprised of the following components (Figure 1):

- Up to 44 Wind Turbines and associated laydown areas;
- An onsite substation with high-voltage (HV) yard footprint of approximately 100m x 100m;
- Foundations to support both the turbine towers (15 m x 15 m for each turbine foundation);
- Cabling between the project components, laid underground;
- An overhead power line 5 km in length and 132kV turning into the Hutchison/ Biesiespoort-1.
- Internal access roads (~5 m wide and 40 km in length) linking the wind turbines with the other infrastructure on the site. Existing farm roads are used as far as possible. However, the dispersed distribution pattern of wind turbines necessitated the construction of several new internal access roads; and
- Small office and/or workshop building (40 m x 20 m) for maintenance and storage purposes
- Laydown of approximately 0.66 km² shared for different purposes of the development.

The **Substation Facility** is approximately 250 m x 250 m and houses the following infrastructure:

- Transformer and auxiliary transformer;
- Isolators and earth switch;
- Feeder bays for incoming lines;
- Circuit protection;
- Substation yard boundary fence;
- Small oil spill dam;
- Lightning and surge arrestors; and
- String of conductors (cables).

The power line connects the on-site Noblesfontein substation to the Eskom grid via a turn-in and -out configuration with the existing Biesiespoort / Kromrivier 132 kV power line. The power line corridor assessed is approximately 5 km long and 300 m wide. The 132 kV power line is to be strung as a double circuit and would be constructed within a servitude of 36m in width (i.e. considerably less than the assessed corridor width).

The OEMPr has been developed based on the findings of the EIA and external audit report and must be implemented to protect sensitive on-site and off-site features through controlling operational activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts.

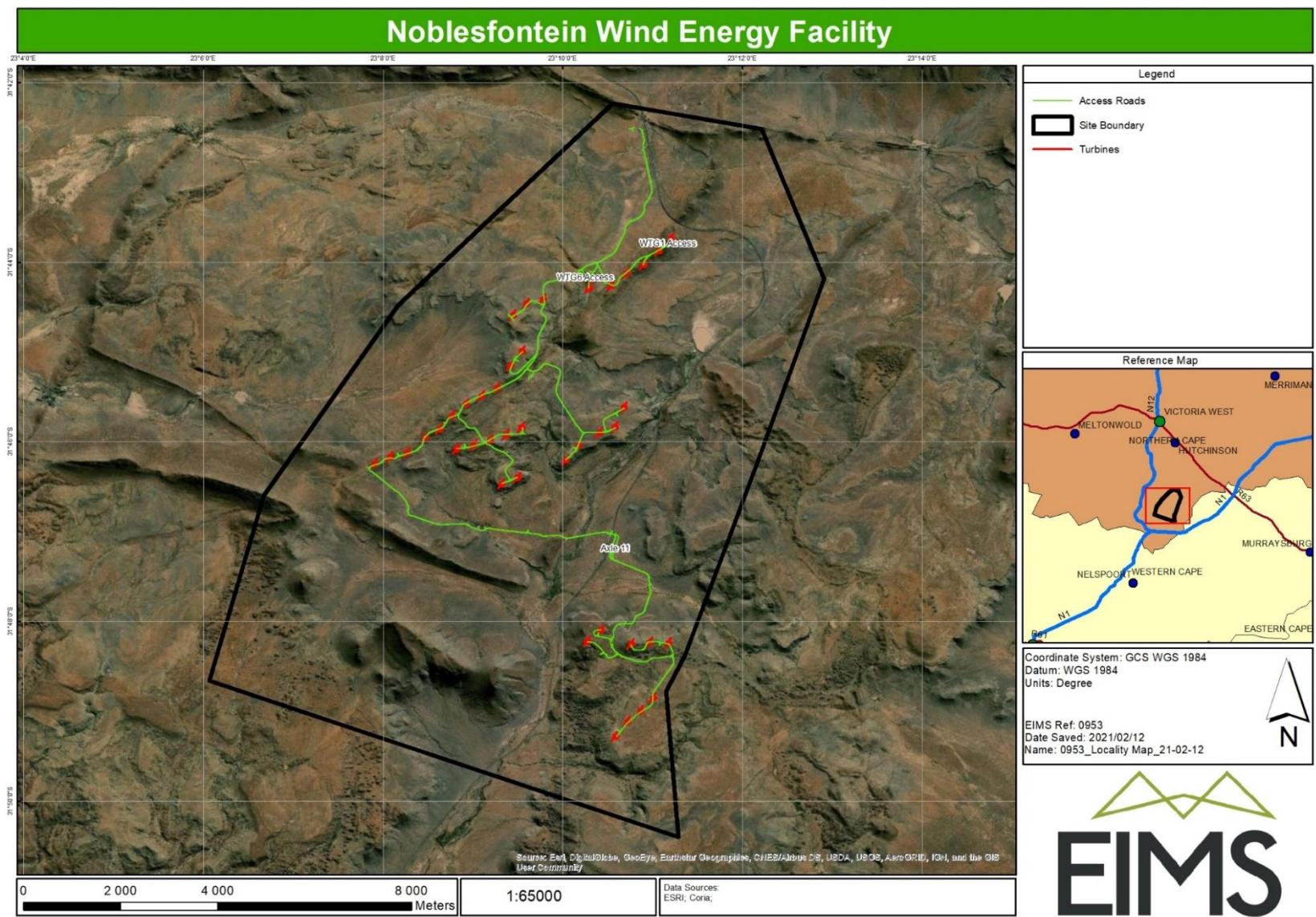


Figure 1: Noblesfontein Wind Energy Facility Layout



3 MAIN ACTIVITIES ASSOCIATED WITH OPERATIONAL PHASE

The main activities/components associated with the Noblesfontein Wind Energy Facility are detailed in Table 1.

Table 1: Operational activities associated with the wind energy facility and substation & power line.

Main Activity/Project Component	Components of Activity	Details
Operation of Wind Energy Facility	Operation of the wind turbines	<ul style="list-style-type: none"> • The Renewable Energy Facility can be monitored remotely. • Limited staff will be required on site for any extended period. It is anticipated that there will be full time security, maintenance and control room staff required on site. • Each turbine in the facility will be operational, except under circumstances of mechanical breakdown, extreme weather conditions, or maintenance activities
Maintenance of wind energy facility	Maintenance activities include: <ul style="list-style-type: none"> • Oil and grease – turbines • Transformer oil – substation • Waste product disposal • Cleaning of turbines 	<ul style="list-style-type: none"> • The wind turbines is subject to periodic maintenance and inspection. • Periodic oil changes are required and any waste products (e.g. oil) will be disposed of in accordance with relevant waste management legislation. • The turbine infrastructure is expected to have a lifespan of approximately 25 - 30 years, with maintenance.
Site operation of maintenance for substation	Substation	<ul style="list-style-type: none"> • Security, maintenance, and control room staff will be required on site. • The access to the site and the internal access roads will be maintained during the operational phase.



4 MANAGEMENT PROGRAMME: OPERATION AND MAINTENANCE PHASE

Overall Goal for Operation: To ensure that the operation of the Renewable Energy Facility does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the Renewable Energy Facility in a way that:

- Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- Enables the Renewable Energy Facility operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises impacts on birds and other fauna using the site.
- Monitors and evaluates the impacts of the Renewable Energy Facility on birds that frequent the area, in particular monitoring of bird strikes, bird nesting activities and water bird uses of the wetlands on the site.
- Establishes an environmental baseline for Renewable Energy Facility sites in South Africa, particularly with regard to priority bird species using the site.

To meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

4.1 OBJECTIVE 1: COMMUNICATION WITH DEFF

This OEMPr constitutes the requirement that a OEMPr should be prepared for the operational phase of the development.

Mitigation: Action/control	Responsibility	Timeframe
Fourteen (14) days written notice must be given to Developer Prior to the Department that the activity operational phase Operations will commence.	Developer	Prior to operation
Compile an operational EMPr for the operational phase of the activity or alternatively, if the applicant has an existing operational management system it must be amended to include the operation of the activity.	Operator	Operation
All monitoring and audit report that are required to be submitted to the DEFF should be done in line with the requirements of the approved EAs and EMPrs.	Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> • Records kept of all EMPr amendments. • Records of communication to DEA kept.
Monitoring	<ul style="list-style-type: none"> • ECO / Auditor

4.2 OBJECTIVE 2: LIMIT IMPACTS ON BATS DUE TO TURBINE BLADES

Bats have been found to be particularly vulnerable to being killed by wind turbines. It has long been a mystery why they should be so badly affected since bat echolocation allows them to detect moving objects very well. A study in America has found that the primary cause for mortality is a combination of direct strikes and barotrauma (bats are killed when suddenly passing through a low air pressure region surrounding the turbine blade tips causing low pressure to damage the bat's lungs).

Bats are most vulnerable when leaving and returning to their roosts, usually at sunset and sunrise. This is also the time of the day (usually) when there is the least wind. The bat monitoring programme will identify whether threatened / near threatened species occur on site or not and when they are most active.

The most vulnerable species are those that are already classified as threatened species, including those classified as critically endangered, endangered or vulnerable.

Project component/s	<ul style="list-style-type: none"> • Wind turbines
Potential Impact	<ul style="list-style-type: none"> • Loss of individuals of the near threatened bat species
Activity/risk source	<ul style="list-style-type: none"> • Operation
Mitigation: Target/Objective	<ul style="list-style-type: none"> • Limited bat mortalities within project control area

Mitigation: Action/control	Responsibility	Timeframe
Implement an environmental monitoring programme to monitor the impact on bat species in consultation with the bat specialist.	Operator consultation with specialist	in Operation with
Based on the outcomes of the monitoring programme, appropriate mitigation measures should be implemented in line with the requirements of the approved EMP, where relevant.	Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> • Number of individual mortalities from collision with wind turbines.
Monitoring	<ul style="list-style-type: none"> • Determine densities of bat species within the area before and after construction. • Document patterns of bat movement in the vicinity. • Record bat mortalities and, as far as possible, the circumstances surrounding collisions. Standard protocols should be used when undertaking such surveys.

4.3 OBJECTIVE 3: MINIMISATION OF VISUAL IMPACTS

The primary visual impact, namely that of the wind turbines is not possible to mitigate. Other impacts include impacts associated with lighting of substations, and the aircraft warning lights mounted on top of the hub of the wind turbines. The regulations for the CAA's *Marking of Obstacles* should be strictly adhered to (refer to Appendix L of the Wind Energy Facility EMP), as the failure of complying with these guidelines may result in the Operator being required to fit additional light fixtures at closer intervals thereby aggravating the visual impact.

Project component/s	<ul style="list-style-type: none"> • Wind turbines • Substations • Power lines and service roads for power line servitudes
Potential Impact	<ul style="list-style-type: none"> • Visual impact of facility degradation and vegetation rehabilitation failure.
Activity/risk source	<ul style="list-style-type: none"> • The viewing of the above mentioned by observers on or near the site.

Mitigation: Target/Objective	<ul style="list-style-type: none"> • Well maintained and neat facility. • To minimise potential for visual impact. • To ensure that the facility complies with Civil Aviation Authority requirements for turbine visibility to aircraft. • Minimise contrast with surrounding environment and visibility of the turbines to humans. • The containment of light emitted from the substations to eliminate the risk of additional night-time visual impacts.
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Mitigation: Action/control	Responsibility	Timeframe
Maintain the general appearance of the facility in an aesthetically pleasing way.	Operator	Operation, Maintenance
Monitor rehabilitated areas and implement remedial action as and when required.	Operator	Operation, Maintenance
Aviation warning lights must be maintained on the turbine hub or such measures required by the Civil Aviation Authority.	Operator	Maintenance
Complaints regarding visual impacts or nuisance will be recorded within the complaints register. Appropriate mitigation measures will be implemented to address the complaints in consultation with the complainant and in line with the EMPr. Actions to address the complaints will be recorded within the complaints register.	Operator	Operation, maintenance
Maintain the general appearance of the facility in an aesthetically pleasing way.	Operator	Operation, maintenance
Undertake regular maintenance of light fixtures.	Operator	Operation, maintenance
Limit access to the Renewable Energy Facility site, power line and substation to along existing access roads.	Operator	Operation, maintenance
The open space management plan (Appendix E of the Approved EMPr) must be implemented during the operation of the facility.	Operator	Operation, maintenance

Performance Indicator	<ul style="list-style-type: none"> • Well maintained and neat facility with intact vegetation on and in the vicinity of the facility. • Minimised visual intrusion on surrounding areas • Appropriate visibility of infrastructure to aircraft • The effective containment of the light to the substation site.
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Monitoring

- Monitoring of rehabilitated areas.
- Ensure that aviation warning lights or other measures are always functional.
- The monitoring of the condition and functioning of the light fixtures during the operational phase of the project.

4.4 OBJECTIVE 4: PROTECTION OF VEGETATION, FAUNA AND AVIFAUNA

During operation of the facility, the threat of collision of avifauna with the turbine blades is the most concerning issue. However, the real extent of this threat is not well understood within the South African context. Lighting of turbines and other infrastructure has the potential to attract birds, thereby increasing the risk of collisions with turbines. Infrastructure associated with the facility often also impacts on birds. Overhead power lines also pose a collision and possibly an electrocution threat to certain bird species.

Indirect impacts on vegetation and fauna during operation could result from maintenance activities and the movement of people and vehicles on site and in the surrounding area. To ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated postconstruction must be undertaken until these areas have successfully re-established.

Project component/s	<ul style="list-style-type: none"> • Wind turbines • Access roads • Substation • Power lines and service roads for power line servitudes. • Areas disturbed during the construction phase and subsequent rehabilitation at its completion. • Areas requiring regular maintenance. • Route of the security team.
Potential Impact	<ul style="list-style-type: none"> • Disturbance to or loss of birds because of collision with the turbine blades. • Disturbance to or loss of birds because of collision with the overhead power line. • Electrocution on power lines and substations. • Disturbance to or loss of vegetation and/or habitat. • Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.
Activity/risk source	<ul style="list-style-type: none"> • Appointment of unqualified personnel to do the monitoring. • Results of pre-construction monitoring not integrated into the final layout and/or the mitigation scheme. • Lack of clear communication between the scientist analysing the monitoring data and the client. • Misinterpretation of either the pre- or post-construction monitoring data.
Mitigation: Target/Objective	<ul style="list-style-type: none"> • The delivery of an effective impact mitigation scheme for the facility, informed initially by influence of pre-construction monitoring on final construction plans, and refined by postconstruction monitoring of actual impacts, and resulting adjustments in management practices and mitigation measures applied. • Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/control	Responsibility	Timeframe
After the initial operational phase bird monitoring programme, the bird monitoring specialist recommended the implementation of an adaptive mitigation plan where adaptive response should be implemented should a new incident occur.	Operator consultation with specialist	in Operation Life of the Facility
Alien invasive management to be implemented during operation of the facility and substation. The management strategy must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken. A botanist familiar with the vegetation of the area should monitor the rehabilitation success and alien plant removal on an annual basis.	Operator consultation with specialist	in Operational Life of the Facility
A botanist familiar with the vegetation of the area should monitor the vegetation composition and density immediately adjacent to new infrastructure and decide on additional revegetation measures that may be required to maintain sufficient vegetation to prevent habitat degradation and accelerated erosion, especially around the Substation.	Operator consultation with specialist	in Operational Life of the Facility
The operator must take all reasonable measures to ensure the efficient use of manpower, operational equipment, and chemicals for the systematic eradication of alien invasive species on site.	Operator and contractor	Operational Life of the Facility
Project Management to create an Area Strategic Plan / Method Statement for clearing alien invasive vegetation. Emerging and potential weeds reported through agreed communication lines, ecologist can be consulted for proper identification. Refer to Appendix G of the of the Wind Energy Facility EMPr for the Alien Invasive Management Plan.	Operator consultation with specialist	in Operational Life of the Facility
Access should be limited to existing access roads as far as possible.	Operator	Operational Life of the Facility
Vehicle movements must be restricted to designated roadways.	Operator	Operational Life of the Facility
No disturbance of vegetation outside of the project site must occur.	Operator	Operational Life of the Facility
Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Operator	Operational Life of the Facility
Performance Indicator	<ul style="list-style-type: none"> • Quantifiable reductions in avian impacts once the facility is operational. • No further disturbance to vegetation or terrestrial faunal habitats. • No disturbance of vegetation outside of project site. • No further thickening of invasive shrubs on site. • Gradual disappearance of all alien plant species on site. 	
Monitoring	<ul style="list-style-type: none"> • Observation of avifaunal populations and incidence of injuries/death from collisions from turbine blades or power line. 	

- Observation of vegetation on-site by wind energy facility / substation manager and environmental manager.
- Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.
- Observation of electrocution or collision events with the power line.

4.5 OBJECTIVE 5: APPROPRIATE HANDLING AND MANAGEMENT OF HAZARDOUS SUBSTANCES AND WASTE

The operation of the Wind Energy Facility will involve the generation of limited waste products. The main wastes expected to be generated by the operation activities includes general solid waste, hazardous waste and liquid waste.

Project component/s	<ul style="list-style-type: none"> • Wind turbines • Substation
Potential Impact	<ul style="list-style-type: none"> • Inefficient use of resources resulting in excessive waste generation. • Litter or contamination of the site or natural resources through poor hazardous substances and waste management practices.
Activity/risk source	<ul style="list-style-type: none"> • Generators and gearbox - turbines • Transformers and switchgear - substation • Fuel and oil storage • Maintenance building • Waste management area
Mitigation: Target/Objective	<ul style="list-style-type: none"> • To comply with hazardous substance and waste management legislation and guidelines. • To minimise production of waste. • To ensure appropriate waste disposal. • To avoid environmental harm from hazardous substances and waste disposal.

Mitigation: Action/control	Responsibility	Timeframe
Hazardous substances and hazardous waste must be stored in sealed containers within a clearly demarcated designated area.	Operator	Operation
Storage areas for hazardous substances must be appropriately sealed and banded to prevent contamination of natural resources in the event of spillages.	Operator	Operation
All structures and/or components replaced during maintenance activities must be appropriately disposed of at an licensed waste disposal site or sold to a recycling merchant for recycling.	Operator	Operation

Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and banded area. Should any accidental spillage take place, it will be cleaned up and appropriately disposed as hazardous waste.	Operator	Operation, maintenance
Waste handling, collection, and disposal operations must be managed and controlled by a waste management contractor. Hazardous waste may only be disposed of at a licensed hazardous waste disposal facility. A specialist waste contractor shall dispose of such waste and shall be required to provide waste manifests and safe disposal certificates.	Operator /waste management contractor	Operation
Appropriate disposal must be arranged with a licensed facility in consultation with the administering authority for used oil and chemicals. Used oil and chemicals waste must be stored and handled according to the relevant legislation and regulations.	Operator	Operation
It must be ensured that the total volume of any hazardous waste stored on site at any one time does not exceed 30m ³ .	Operator	Operation
General waste must be recycled where possible or disposed of at an appropriately licensed landfill. There must adequate waste storage (in the form of waste skips and bins with lids). Waste should be separated into general and hazardous waste. Waste should be separated for recycling, where possible, and frequent removal of nonrecyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on site. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduce risk of environmental contamination	Operator	Operation
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately. The site shall have adequate provision for the storage of hazardous waste (e.g. old oil filters, soil from spills etc.) and the waste shall be contained within closed containers to prevent the possibility of spillages.	Operator	Operation
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Operator	Operation

Performance Indicator

- No complaints received regarding waste on site or indiscriminate dumping.
- Internal site audits/inspections identifying that waste segregation, recycling and reuse and disposal is occurring appropriately.
- Provision of all appropriate waste manifests.
- No contamination of soil or water.

Monitoring	<ul style="list-style-type: none"> • Waste collection must be monitored on a regular basis. • Waste documentation must be completed and available for inspection on request. • An incidents and complaints register must be maintained, in which any incidents or complaints from the community must be logged. • Complaints must be investigated and, if appropriate, acted upon. • Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the SHE Representative. All appropriate waste disposal certificates accompany the monthly reports.
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4.6 OBJECTIVE 6: NOISE CONTROL

The resulting future noise projections indicated that the operation of the facility would comply with the Noise Control Regulations (GN R154) as well as the guidelines as proposed by SANS 10103:2008 during periods when the wind speeds are less than 6 m/s. Non-compliance at higher wind speeds however is due to the ambient sound levels associated with wind induced noises at these higher wind speeds. The significance of this noise impact was determined to be low. Mitigation measures, however, are proposed to ensure that the potential noise impacts and risks be optimally minimised. The following measures are recommended to define the performance of the Operator in mitigating the projected impacts and reducing the significance of the noise impact.

Project Component(s)	<ul style="list-style-type: none"> • All operational phase activities.
Potential Impact	<ul style="list-style-type: none"> • Increased noise levels at potentially sensitive receptors. • Changing ambient sound levels could change the acceptable land use capability. • Disturbing character of sound.
Activity/Risk source	<ul style="list-style-type: none"> • Simultaneous operation of a number of turbines.
Mitigation Target/Objective	<ul style="list-style-type: none"> • Ensure that the change in ambient sound levels as experienced by potentially sensitive receptors is less than 5 dBA. • Prevent the generation of nuisance noises. • Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors.

Mitigation: Action/control	Responsibility	Timeframe
Design and implement a noise monitoring programme in line to the EMPr, if any noise complaints are received.	Acoustical Consultant / Approved Noise Inspection Authority	Operational Phase
Add additional noise monitoring points at any complainants that registered a noise complaint relating to the operation of the wind energy facility. Implement the Grievance Mechanism included as Appendix M of the original Wind Energy Facility EMPr (Savannah Environmental, October 2012).	Acoustical Consultant / Approved Noise Inspection Authority	With quarterly monitoring

Performance Indicator	<ul style="list-style-type: none"> Ensure that the change in ambient sound levels as experienced by potentially sensitive receptors is less than 7 dBA.
Monitoring	<ul style="list-style-type: none"> Monitoring of the external complaints register for noise related complaints. If any complaints are recorded, quarterly noise monitoring should be implemented in line to the approved EMPr and in consultation with an Acoustic Consultant or Approved Noise Inspection Authority.

4.7 OBJECTIVE 9: MINIMISE THE POTENTIAL IMPACT ON FARMING ACTIVITIES AND ON THE SURROUNDING LANDOWNERS

Once operational, the impact on the daily living and movement patterns of neighbouring residents is expected to be minimal and intermittent (e.g. the increase in traffic to and from site, possible dust creation of vehicle movement on gravel roads on site and possible increase in criminal activities). Limited number of workers would be on site daily with subsequent minimal social impacts in this regard.

The only land that would be sterilised would be the areas used for the turbine structures, access roads, fire breaks and associated buildings and substation buildings. Grazing of sheep could thus continue the sections of land between the turbines. It is not anticipated that any activities undertaken as part of the operation and maintenance of the Noblesfontein Wind Energy Facility would negatively impact on the surrounding property owners' daily living patterns. They would thus be able to continue their farming practices without interference from the wind energy.

Project component/s	<ul style="list-style-type: none"> Operation and maintenance of the facility.
Potential Impact	<ul style="list-style-type: none"> Possible limited intrusion impact on surrounding land owners Possible phasing out of sheep farming.
Activity/risk source	<ul style="list-style-type: none"> Increase in traffic to and from site could impact on daily living and movement patterns of surrounding residents.
Mitigation: Target/Objective	<ul style="list-style-type: none"> Effective management of the facility . Mitigation of intrusion impacts on property owners. Mitigation of impact on farming activities . Limit noise impacts.

Mitigation: Action/control	Responsibility	Timeframe
Effective management of the facility to avoid any environmental pollution focusing on water, waste and sanitation infrastructure and services, and limiting any increase in noise levels.	Operator	Operation
Vehicle movement to and from the site should be minimised.	Operator Employees	Operation
Local roads should be maintained to keep the road surface up to standard.	Operator	Operation

Reduce any negative impacts on farming activities by keeping fencing within the site to a minimum and designing fencing to maximise efficiency of stock movements.	Operator	Operation
Limit the development on new access roads on site as far as possible.	Operator and Contractors	Operation
The traffic management plan included as Appendix I of the Wind Energy Facility EMPr (Savannah Environmental, October 2012) should be implemented.	Operator and Contractors	Operation

Performance Indicator

- No environmental pollution occur (waste, water and sanitation related).
- Limited noise pollution.
- No intrusion on private properties and on the activities undertaken on the surrounding properties.
- Continuation of farming activities.
- No noise increase.

Monitoring

- Project proponent should be able to demonstrate that facility is well managed without environmental pollution and that the above requirements have been met.

4.8 OBJECTIVE 10: MINIMISE THE POTENTIAL VISUAL IMPACT AND SUBSEQUENT IMPACT ON THE SENSE OF PLACE AND LAND VALUE

The social impact associated with the impact on the sense of place relates to the change in the landscape character and visual impact of the proposed wind energy facility. Even though the area is rural in character, there is some limited existing disturbance by infrastructure such as roads, transmission lines, telephone poles, the railway line, the existing substation, scattered homesteads and so forth. The proposed facility is thus expected to add to the existing negative visual impact of these types of infrastructure on the open relatively undisturbed rural landscape and therefore on the sense of place. The permanent visual impact would thus be limited to a small minority of residents and road users, but due to the scarcely populated area it would have a more marked effect on these residents’ quiet, undisturbed rural lifestyle, their quality of life and their sense of place.

In this regard it should also be noted that the impact of the turbines and substations on the visual environment would differ based on the receptors’ perception of such facilities. Some people could view the turbines and panels as having a significant negative impact on the beauty of the landscape, while others could view them in a positive light and even use the presence of the facility as part of the area’s marketing efforts.

Another impact is a source of concern is referred to as “shadow flicker” which could impact on nearby residents or motorists making use of local roads. The above mentioned visual impact and the viewers and/or landowners’ perception of the facility could result in devaluation of the land in the short term. Once operational it is however expected that the value of the land would return to normal should the facility be properly managed with no negative impacts on the surrounding landowners’ activities.

Project component/s

- Visual impact due to turbines and subsequent impact on sense of place.
- Possible negative impact on land value.

Potential Impact

- Visual impact and subsequent impact on sense of place.
- Possible negative impact on land value.

Activity/risk source	<ul style="list-style-type: none"> • Devaluation of land value. • Change of landscape character.
Mitigation: Target/Objective	<ul style="list-style-type: none"> • Limit the negative visual impact and thereby limiting the negative impact on the sense of place.

Mitigation: Action/control	Responsibility	Timeframe
The Visual, Noise and Heritage Impact Assessment recommendations should be implemented to limit any potential negative impacts on the sense of place.	Operator	Pre-operation Operation

Performance Indicator	<ul style="list-style-type: none"> • The visual impact is limited as far as possible. • The change in the landscape character is contained as far as possible. • The facility is managed according to international best practice to avoid any negative impacts on the land value.
Monitoring	<ul style="list-style-type: none"> • Project proponent must monitor the external complaints register for any Visual, Noise and Heritage complaints and the EMP mitigation measures should be implemented, where applicable.

4.9 OBJECTIVE 11: MINIMISE SOIL DEGRADATION AND EROSION (EROSION AND STORMWATER MANAGEMENT PLAN)

The soil on site may be impacted in terms of:

- Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern across the entire site which is underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion).
- Uncontrolled run-off relating to operational activities (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion, possible sedimentation of drainage systems and pollution of natural resources.
- Degradation of the natural soil profile due to pollution.

Management of stormwater and erosion will be required during the operation phase of the substation and wind energy facility. An erosion and stormwater management plan is required to ensure compliance with applicable regulations and to prevent increased soil erosion, sedimentation, and potential pollution of the downstream environment. The section below provides a guideline for the management of erosion and stormwater on site.

Project component/s	<ul style="list-style-type: none"> • Operation and maintenance of the facility and substation.
Potential Impact	<ul style="list-style-type: none"> • Soil erosion. • Pollution of natural resources from uncontrolled discharge.
Activity/risk source	<ul style="list-style-type: none"> • Soil degradation and pollution due to operation activities.
Mitigation: Target/Objective	<ul style="list-style-type: none"> • Revegetation of cleared areas. • Proper stormwater management. • Erosion control measures. • Maintenance of roads and associated stormwater management infrastructure.

Mitigation: Action/control	Responsibility	Timeframe
Rehabilitate disturbed areas should the previous attempt be unsuccessful.	Operator	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (bags, logs), silt fences, storm water catch-pits, and shade nets).	Operator	Operation
Repair any damaged erosion control measures as soon as possible.	Operator	Operation
Implement and access road inspection and maintenance programme to ensure timeous identification and repair of erosion along the access roads. It is recommended that this is undertaken at least twice a year.	Operator	Operation
If the erosion identified is severe, engineering input is recommended to ensure that the repairs are adequately designed and implemented.	Operator	Operation
Implementation of the maintenance should be recorded in the current weekly reporting obligations of the wind energy facility.	Operator	Operation
Traffic and movement over stabilised areas shall be restricted and controlled and damage to stabilised areas shall be repaired and maintained	Operator	Operation
Ensure that all water on site does not result in increased surface flow (increase velocity and capacity of water) because of the poor drainage systems.	Operator	Operation
Dirty and clean stormwater at the substation should be separated. Dirty stormwater should be contained. (i.e. within the dirty stormwater sump or similar.)	Operator	Operation
Dirty water areas include areas where stormwater may be contaminated by hazardous or pollution causing substances. (i.e. transformers and hazardous substance storage areas.)	Operator	Operation
An inspection and maintenance schedule should be implemented for the dirty water sump to ensure adequate capacity in the event of a spill.	Operator	Operation
The dirty water sump should be serviced by a reputable service provider and disposed of as hazardous waste, where relevant.	Operator	Operation
Revegetation of cleared areas. Watering the rehabilitated areas should be undertaken in the wet/rainy season but if this is not possible, an initial watering period (supplemental irrigation) will be required to ensure plant establishment (germination and established growth). During dry periods, with no rainfall, additional watering may be necessary to establish plants capable of surviving dry weather (or otherwise specified by the Horticultural Landscape Contractor).	Operator	Operation

Mitigation: Action/control	Responsibility	Timeframe
Performance Indicator	<ul style="list-style-type: none"> Erosion is limited as far as possible. All cleared areas are revegetated. Erosion and stormwater management plan properly implemented. 	
Monitoring	<ul style="list-style-type: none"> Project proponent and surrounding property owners must monitor indicators listed above and should be able to demonstrate that the mitigation measures are implemented. 	

4.10 OBJECTIVE 12: MINIMISE DUST AND AIR EMISSIONS

During the operational phase, limited gaseous or particulate emissions are anticipated from exhaust emissions (i.e. from operational vehicles), and from the augmentation plant. Windy conditions and the movement of vehicles on site may lead to dust creation.

Project component/s	<ul style="list-style-type: none"> Hard engineered surfaces. On-site vehicles.
Potential Impact	<ul style="list-style-type: none"> Dust and particulates from vehicle movement to and on-site. Release of minor amounts of air pollutants (for example NO₂, CO and SOD from vehicles and the augmentation plant.
Activity/risk source	<ul style="list-style-type: none"> Re-entrainment of deposited dust by vehicle movements. Wind erosion from unsealed roads and surfaces. Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	<ul style="list-style-type: none"> To ensure emissions from all vehicles are minimised, where possible. To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements.

Mitigation: Action/control	Responsibility	Timeframe
Roads must be maintained to a manner that will ensure that nuisance to the community from dust is not visibly excessive.	Operator	Operation
Appropriate dust suppression must be applied to the roads as required to minimise/control airborne dust. Speed of vehicles must be restricted, as defined by the Environmental Manager.	Operator	Operation
Speed of vehicles must be restricted, as defined by the Environmental Manager.	Operator	Operation
Any complaints regarding dust nuisance should be acted upon, where required.	Operator	Operation
Performance Indicator	<ul style="list-style-type: none"> No complaints from affected residents or community regarding dust or vehicle emissions. Dust suppression measures implemented for where required. Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. 	

- Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager.

Monitoring	<ul style="list-style-type: none"> • A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. • An incident reporting system must be used to record nonconformances to the EMPr.
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4.11 OBJECTIVE 13: ENSURE THE IMPLEMENTATION OF AN APPROPRIATE FIRE MANAGEMENT PLAN DURING THE OPERATION PHASE

The vegetation in the study area may be at risk of fire. The increased presence of people on the site could increase the risk of veld fires, particularly in the dry season.

Project Component/s	<ul style="list-style-type: none"> • Operation and maintenance of the substation, wind energy facility and associated infrastructure.
Potential Impact	<ul style="list-style-type: none"> • Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences. In addition, fire can pose a very minor risk to the wind energy facility infrastructure.
Activities/Risk Sources	<ul style="list-style-type: none"> • The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires.
Mitigation: Target/Objective	<ul style="list-style-type: none"> • To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Provide adequate fire-fighting equipment on site.	Operator	Operation
Join local Fire Protection Association, should there be one in existence.	Operator	Operation
Provide fire-fighting training to selected operation and maintenance staff.	Operator	Operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	Operator	Operation
Fire breaks should be established where and when required in consultation with the landowners. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.). Access roads may also act as fire breaks.	Operator	Operation
Fire breaks should be maintained around the facilities such as the substation, laydown area and waste areas, where relevant.	Operator	Operation
Fire breaks should include the limitation and management of combustible vegetation in these areas.	Operator	Operation
An emergency evacuation plan must be maintained to ensure the safety of the staff and surrounding land users in the case of an emergency.	Operator	Operation
Contact details of emergency services should be prominently displayed on site.	Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> • Fire-fighting equipment and training provided during the operational phase. • Appropriate fire breaks in place.
Monitoring and Reporting	<ul style="list-style-type: none"> • Proponent must monitor indicators listed above to ensure that they have been met.

4.12 OBJECTIVE 14: ENSURE MITIGATION AND POSSIBLE NEGATION OF THE POTENTIAL VISUAL IMPACT OF LIGHTING AT THE SUBSTATION

The primary visual impact of the substation and its associated infrastructure is not possible to mitigate. The functional design of the structures cannot be changed to reduce visual impacts.

Project Component/s	<ul style="list-style-type: none"> • Substation lighting fixtures. • Power line.
Potential Impact	<ul style="list-style-type: none"> • The potential night time visual impact of lighting fixtures on observers in proximity to the site.
Activities/Risk Sources	<ul style="list-style-type: none"> • The effects of glare and light trespass on motorists and observers.
Mitigation: Target/Objective	<ul style="list-style-type: none"> • The containment of light emitted to eliminate the risk of additional night time visual impacts. • Minimal uses of security and other lighting.

Mitigation: Action/Control	Responsibility	Timeframe
Undertake regular maintenance of light fixtures.	Operator	Operation
If any external complaint regarding light spill is received, a lighting expert should be consulted to address the potential light spill at the substation.	Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> • Effective containment of the light on the site and no complaints from observers
Monitoring and Reporting	<ul style="list-style-type: none"> • Monitor condition and function of light switches during operation