DRAFT BASIC ASSESSMENT REPORT

THE PROPOSED DEVELOPMENT OF THE SPRINGHAAS SOLAR PV FACLITIES CONSISTING OF SEVEN (7) NEW SOLAR PHOTOVOLTAIC FACILITIES WITH ASSOCIATED INFRASTRUCTURE NEAR DEALESVILLE, BLOEMFONTEIN, FREE STATE

Part 2

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Springhaas Solar Facility 1: 14/12/16/3/3/1/2523 Springhaas Solar Facility 3: 14/12/16/3/3/1/2524 Springhaas Solar Facility 4: 14/12/16/3/3/1/2525 Springhaas Solar Facility 5: 14/12/16/3/3/1/2526 Springhaas Solar Facility 6: 14/12/16/3/3/1/2527 Springhaas Solar Facility 8: 14/12/16/3/3/1/2528 Springhaas Solar Facility 9: 14/12/16/3/3/1/2529



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Preliminary

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7 Impact Assessment

The over-arching objective of the impact assessment process in a basic assessment process is to identify, record and assess the scale of the changes that may occur within a specific receiving environment, in response to the introduction of the proposed solar PV facilities within that receiving environment. In terms of Environmental Impact Assessment as provided for as an Integrated Environmental Management (IEM) tool for assessment in terms of the National Environmental Management Act and its associated Regulations, this refers to a specific site.

This approach enables the EAP to provide the team of specialist with a clearly defined Scope of Work and allows the specialists to focus and highlight pertinent changes as an independent assessor of the changes to the receiving environment in the context of their field of speciality.

The approach therefore provides a framework for the assessment of the impacts that the proposed project will have on the environment, and of the impacts the environment will have on the proposed project. Based on inputs from the project team, stakeholders, I&APs and specialists, the potential environmental (biophysical, social and cultural) impacts were identified and accordingly assessed and their significance summarised as an 'Environmental Impact Statement'.

7.1 Impact Assessment Methodology

GIBB, subsequent to the assessments conducted by the specialist team, reviewed the impacts identified and assessed the inherent and residual risks posed to the receiving environment pre and post the application of mitigation measures. For each of the main project phases the existing and potential future impacts and benefits (associated only with the proposed development) were described using the criteria listed in **Table 7-1** below. This was done in accordance with Government Notice R.326, promulgated in terms of Section 24 of the NEMA, and the criteria drawn from the IEM Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts, published by the DEAT (April 1998) and the DEAT 2006 Guideline 5: Assessment of Alternatives and Impacts (June 2006).

The assignment of ratings has been undertaken based on past experience of the project technical team, as well as through research. Mitigation measures were subsequently identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

Table 7-1: Impact Assessment Criteria

Criteria	Rating Scales	Notes					
Nature	Positive	An evaluation of the effect of the impact related to the proposed					
	Negative	development					

Criteria	Rating Scales	Notes				
Extent	Footprint	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur				
	Site	The extent of the impact is rated as site as it will affect only the				
	Site	development area				
	Local	The extent of the impact is rated as Local as it affects the development area and adjacent properties				
	Regional	The extent of the impact is rated as Regional as the effects of the				
	g.o.i.u.	impact extends beyond municipal boundaries The extent of the impact is rated as National as the effects of the				
	National	impact extends beyond more than 2 regional/ provincial boundaries				
	International	The extent of the impact is rated as International as the effect of the				
Duration	_	impact extends beyond country borders The duration of the activity associated with the impact will last 0-6				
	Temporary	months and as such is rated as Temporary				
	Short term	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term				
	Medium term	The duration of the activity associated with the impact will last 18				
	wedium term	months-5 years and as such is rated as Medium term				
	Long term	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term				
Severity		The severity of the impact is rated as High negative as the natural,				
	High negative	cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and				
	The The Guttve	valued, important, sensitive or vulnerable systems or communities				
		are substantially affected.				
		The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social				
	Moderate negative	functions and processes continue albeit in a modified way; and				
		valued, important, sensitive or vulnerable systems or communities are negatively affected				
		The severity of the impact is rated as Low negative as the impact				
	Low negative	affects the environment in such a way that natural, cultural and social				
		functions and processes are minimally affected The severity of the impact is rated as Low positive as the impact				
	Low positive	affects the environment in such a way that natural, cultural and social				
		functions and processes are minimally improved The severity of the impact is rated as Moderate positive as the				
		affected environment is altered but natural, cultural and social				
	Moderate positive	functions and processes continue albeit in a modified way; and				
		valued, important, sensitive or vulnerable systems or communities are positively affected				
		The severity of the impact is rated as High positive as the natural,				
	High positive	cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or				
		communities are substantially positively affected.				
Potential for	No	No irreplaceable resources will be impacted.				
impact on irreplaceable	Yes	Irreplaceable resources will be impacted.				
resources		meplaceasic resources will be impacted.				
Consequence	Extremely detrimental					
	Highly detrimental					
	Moderately	A combination of subset dissector total the section of the				
	detrimental	A combination of extent, duration, intensity and the potential for impact on irreplaceable resources				
	Slightly detrimental					
	Negligible					
	Slightly beneficial					

Criteria	Rating Scales	Notes				
	Moderately beneficial					
	Highly beneficial					
	Extremely beneficial					
Likelihood of the impact	Unlikely	It is highly unlikely or less than 50 % likely that an impact will occur				
occurring	Likely	It is between 50 and 75 % certain that the impact will occur				
	Definite It is more than 75 % certain that the impact w that the impact will occur					
Significance	Very high - negative					
	High - negative					
	Moderate - negative					
	Low - negative					
	Very low	A function of Consequence and Likelihood				
	Low - positive					
	Moderate - positive					
	High - positive					
	Very high - positive					

Table 7-2: Explanation of Assessment Criteria

Criteria	Explanation
Nature	This is an evaluation of the type of effect the construction, operation and management of the proposed development would have on the affected environment. Will the impact change in the environment be positive or negative?
This refers to the spatial scale at which the impact will occur. Extent of the described as: footprint (affecting only the footprint of the development), single the site) and regional (limited to the immediate surroundings and closest town extent or scale refers to the actual physical footprint of the impact, not it significance. It is acknowledged that some impacts, even though they may extent, are of very high importance, e.g. impacts on species of very restrict order to avoid "double counting, specialists have been requested to incoming significance under "intensity" or "impact on irreplaceable resources" but "extent" as well.	
Duration	The lifespan of the impact is indicated as temporary, short, medium and long term.
Severity	This is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. Does the activity destroy the impacted environment, alter its functioning, or render it slightly altered?
Impact on irreplaceable resources	This refers to the potential for an environmental resource to be replaced, should it be impacted. A resource could possibly be replaced by natural processes (e.g. by natural colonisation from surrounding areas), through artificial means (e.g. by reseeding disturbed areas or replanting rescued species) or by providing a substitute resource, in certain cases. In natural systems, providing substitute resources is usually not possible, but in social systems substitutes are often possible (e.g. by constructing new social facilities for those that are lost). Should it not be possible to replace a resource, the resource is essentially irreplaceable e.g. red data species that are restricted to a particular site or habitat of very limited extent.

Criteria		Explanation
Consequence		The consequence of the potential impacts is a summation of above criteria, namely the
Consequence		extent, duration, severity and impact on irreplaceable resources.
		The probability of the impact actually occurring based on professional experience of the
Probability	of	specialist with environments of a similar nature to the site and/or with similar projects. It
occurrence	01	is important to distinguish between probability of the impact occurring and probability that
occurrence		the activity causing a potential impact will occur. Probability is defined as the probability of
		the impact occurring, not as the probability of the activities that may result in the impact.
		Impact significance is defined to be a combination of the consequence (as described below)
		and probability of the impact occurring. The relationship between consequence and
		probability highlights that the risk (or impact significance) must be evaluated in terms of
		the seriousness (consequence) of the impact, weighted by the probability of the impact
		actually occurring.
Significance		
		In simple terms, if the consequence and probability of an impact is high, then the impact
		will have a high significance. The significance defines the level to which the impact will
		influence the proposed development and/or environment. It determines whether
		mitigation measures need to be identified and implemented and whether the impact is
		important for decision-making.
Degree	of	Specialists and the EIR team were required to provide an indication of the degree of
confidence	in	confidence (low, medium or high) that there is in the predictions made for each impact,
	ın	based on the available information and their level of knowledge and expertise. Degree of
predictions		confidence is not taken into account in the determination of consequence or probability.
Mitigation		Mitigation measures are designed to reduce the consequence or probability of an impact,
Mitigation		or to reduce both consequence and probability. The significance of impacts has been
measures		assessed both with mitigation and without mitigation.

Table 7-3: Impact Assessment Criteria and Rating Scales

	Duration Extent Irreplaceable Resources		Severity	Consequence = (Duration + Extent + Irr) x Severity			Likelihood		Significance	Confidence			
1	Temporary	1 Footprint	1	Yes	-3	High - negative	-25 to -33	Extremely detrimental	1	Unlikely	-73 to -99	Very high - negative	Low
2	Short term	2 Site	0	No	-2	Moderate - negative	-19 to -24	Highly detrimental	2	Likely	-55 to -72	High - negative	Medium
3	Medium term	3 Local			-1	Low -negative	-13 to -18	Moderately detrimental	3	Definite	-37 to -54	Moderate - negative	High
4	Long term	4 Regional					-7 to -12	Slightly detrimental			-19 to -36	Low - negative	
		5 National			1	Low -positive	0 to -6	Negligible			0 to -18	Very low - negative	
		6 Internationa	ı		2	Moderate - positive							
					3	High - positive	0 to 6	Negligible			0 to 18	Very Low - positive	
							7 to 12	Slightly beneficial			19 to 36	Low - positive	
							13 to 18	Moderately beneficial			37 to 54	Moderate - positive	
							19 to 24	Highly beneficial			55 to 72	High - positive	
							25 to 33	Extremely beneficial			73 to 99	Very high - positive	

7.1.1 Ascribing Significance for Decision-Making

The best way of expressing the impact assessment cost benefit implications for decision-making, is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood)¹ of that event. Many risks are accepted or tolerated on a daily basis because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, is potentially death but the likelihood of such an event happening is so low that parachutists are prepared to take that risk and hurl themselves out of an airplane. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die.

Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

7.1.2 Consequence

The ascription of implications for decision-making becomes then relatively simple. It requires the consequences to be classified and likelihood to be defined of that consequence. In **Table 7-4** below, a system for ascribing consequence is shown.

Two important features should be noted in the table, namely that the scoring doubles as the risk increases and that there is no equivalent 'high' score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be 'traded off' by a benefit and would render the proposed project to be unacceptable.

¹ Because 'probability' has a specific mathematical/empirical connotation the term 'likelihood' is preferred in a qualitative application and is accordingly the term used in this document.

Table 7-4: Ranking of Consequence

Environmental Cost	Inherent risk
Human health – morbidity / mortality, loss of species	High
Material reductions in faunal populations, loss of livelihoods, individual economic loss	Moderate – high
Material reductions in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate – low
Negative change – with no other consequences	Low
Environmental Benefits	Inherent benefit
Net improvement in human welfare	Moderate – high
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic Development	Moderate – Low
Positive change – with no other consequences	Low

7.1.3 Likelihood

Although the principle is one of probability, the term 'likelihood' is used to give expression to a qualitative rather than quantitative assessment, because the term 'probability' tends to denote a mathematical/empirical expression. A set of likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring, is presented in **Table 7-5**.

Table 7-5: Likelihood Categories and Definitions

Likelihood Descriptors	Definitions
Highly unlikely	The possibility of the consequence occurring is negligible
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely
Likely	The consequence may not occur but a balance of probability suggests it will
Highly likely	The consequence may still not occur but it is most likely that it will
Definite	The consequence will definitely occur

It is very important to recognise that the likelihood question is asked twice. The first time the question is asked is the likelihood of the cause and the second as to the likelihood of the consequence. In the tables that follow the likelihood is presented of the cause² and then the likelihood of the consequence is presented. A high likelihood of a cause does not necessarily translate into a high likelihood of the consequence. As such the likelihood of the consequence is not a mathematical or statistical 'average' of the causes but rather a qualitative estimate in its own right.

7.1.4 Residual Risk

The residual risk is then determined by the consequence and the likelihood of that consequence. The residual risk categories are shown in **Table 7-6** where consequence scoring

² Cause of the change to the receiving environment.

is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in **Table 7-7**.

Table 7-6: Residual Risk Categories

				Residual risk		
	High	Moderate	High	High	Fatally	flawed
ence	Moderate – high	Low	Moderate	High	High	High
Consequence	Moderate	Low	Moderate	Moderate	Moderate	Moderate
Cons	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
				Likelihood		

Table 7-7: Implications for Decision-Making of the different Residual Risk Categories

Rating	Nature of implication for Decision – Making		
Very Low	Project can be authorised with very low risk of environmental degradation		
Low Project can be authorised with low risk of environmental degradation			
Moderate	Project can be authorised but with conditions and routine inspections		
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement		
Fatally Flawed	The project cannot be authorised		

7.2 **Development Phases**

The impact assessment considers all phases of a development. These are:

- 1. Preconstruction phase, this is the phase where site investigations, the base assessment process, land use planning application etc. are completed.
- 2. Construction phase, estimated at 12 months
- 3. Operational phase, will be approximately 20+ years
- 4. Decommissioning phased, estimated to be less than 12 months.

The following alternatives were considered during the basic assessment process.

7.3 Springhaas 1 Detailed Impact Assessment

7.3.1 Alternatives Considered

(a) Location Alternatives

Two location alternatives were considered for the electrical infrastructure compound for SPH1.

(b) Technology Alternatives

Two technology alternatives namely lithium-ion and redox flow batteries were considered for the BESS.

(c) No-Go Alternative

The no-go alternative was considered for all seven of the proposed facilities. The impact of the no-go alternative was rated as the same for all seven facilities. The no-go alternative is assessed in **Section 7.8**.

7.3.2 Pre-construction phase

No significant impacts for the pre-construction phase have been identified by any specialist studies or by the EAP for SPH1.

7.3.3 Construction Phase

(a) Agricultural Impact

The most significant agricultural impacts associated with the development of SPH1 will occur during the construction phase when the site is fenced off, vegetation is removed and the soil surface is prepared for the installation of infrastructure.

The footprint of SPH1 contains one small area of medium sensitivity agricultural land and the start of the main access road crosses a small medium sensitivity land. These patches are small and isolated from other areas of viable production. The loss of these areas of moderate sensitivity land are therefore considered the same as the loss of low sensitivity areas.

SPH1 was also classified in terms of agricultural potential. The majority of the site is classified as low to very low potential. There are three patches of low-moderate potential land and two sections of moderate potential land, one of which is located at the start of the main access road. As these patches of low-moderate and moderate potential agricultural land are isolated from larger patches of moderate sensitivity land they are not viable from a production perspective.

Tables 7-8 – 7-11 cover both location alternatives for the electrical infrastructure compound and the two technology options for the BESS. There was no difference in the alternatives proposed from an agricultural perspective.

Table 7-8: SPH1: Impact of land use change from livestock farming to renewable energy generation

LAND USE CHANGE FROM LIVESTOCK FARMING TO ENERGY GENERATION						
PROJECT PHASE	Construction	n Phase				
DIRECT IMPACT	Construction of boundary fence and PV infrastructure will change land use from livestock					
DIRECT IIVIFACT	farming to r	enewable energy generation				
	Intensification	Intensification of agriculture in other areas or otherwise reduction of livestock produced in				
INDIRECT IMPACT	the area					
CUMULATIVE IMPACT	Increase in a	Increase in areas where agriculture is converted into other land uses				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
PRE-MITIGATION						
DURATION	4	The duration of the activity associated	-14	3		
DORATION	4	with the impact will last more than 5	-14	3		

SIGNIFICANCE	-42	moderate - negative		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
		years and as such is rated as Long		

PROPOSED MITIGATION MEASURES

Springhaas Solar Facility 1 (Pty) Ltd must provide market-related compensation that will allow the current land users to have the same or better ability to sustain their livelihood.

Ensure that the final infrastructure layout remains within the fenced off area of the development footprint.

Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area.

The use of main access routes by construction vehicles and equipment must do so with consideration of nearby agricultural land users who use the same access routes for farming activities.

All left-over construction material must be removed from site once construction on a land portion is completed.

No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.

No boundary fence must be opened without the landowners' permission.

No open fires made by the construction teams are allowable during the construction phase.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

Table 7-9: SPH1: Impact significance of soil loss through erosion during the construction phase

	SOIL LOSS THROUGH EROSION				
PRC	OJECT PHASE	Construction Phase			

•						
DIRECT IMPACT	-	particles from areas where const	truction activities result in	the removal of		
INDIDECT IN ADACT	,	regetation from the surface.				
INDIRECT IMPACT		o vegetation growth in eroded area	15.			
CUMULATIVE IMPACT		areas exposed to soil erosion		ı		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3		
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area				
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-54	moderate - negative				

PROPOSED MITIGATION MEASURES

Limit vegetation removal from the soil surface to the areas of infrastructure development such as access routes as well as around the foundations of the PV arrays and buildings.

Vegetation clearance must only be undertaken immediately prior to construction activities and only within the development footprint

Once construction of an area has been completed, level any remaining soil removed from excavation pits (where the PV arrays will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface where it is exposed to rain and wind. This is applicable to all construction areas, except where topsoil stockpiles must remain for site rehabilitation of specific areas.

 $Stormwater\ channels\ on\ site\ must\ be\ designed\ to\ minimise\ the\ soil\ erosion\ risk\ that\ results\ from\ surface\ water\ runoff.$

 $Where\ possible,\ conduct\ the\ construction\ activities\ outside\ of\ the\ rainy\ season.$

POST-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	_	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative	·	·
CONFIDENCE LEVEL				
High				

Table 7-10: SPH1: Impact significance of impaired soil functionality caused by compaction

IMPAIRED SOIL FUNCTIONALITY						
PROJECT PHASE	Construct	tion Phase				
DIDECT IMPACT	The weig	ht and movement of vehicles and equipme	ent over the surfac	e will result in soil		
DIRECT IMPACT	compacti					
		ed soil have reduced pore space and water in		pacted soil surfaces		
INDIRECT IMPACT	INDIRECT IMPACT increase the rate of surface water runoff, especially after a rainfall event.					
CUMULATIVE IMPACT	Increase I	in areas affected by soil compaction.				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated				
DURATION	3	with the impact will last 18 months-5				
		years and as such is rated as Medium term	-18	3		
EXTENT	2	The extent of the impact is rated as site as				
EXTERN	-	it will affect only the development area				
		The severity of the impact is rated as High				
		negative as the natural, cultural or social				
		functions and processes are altered to the				
SEVERITY	-3	extent that the natural process will				
		temporarily or permanently cease; and				
		valued, important, sensitive or vulnerable	Moderately Defin	Definite		
		systems or communities are substantially affected.	Detrimental	•		
IMPACT ON		dijecteu.				
IRREPLACEBLE	1	Irranlacaghla recourses will be impacted				
RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-54	moderate - negative				
SIGNIFICANCE	-34	PROPOSED MITIGATION MEASURES				
Only allow vahiolos and as	viinna ant ti		annuhara alsa with	in the development		
area.	γαιριπετιί το	o travel on designated access routes and not	unywnere eise with	iiii the development		
	outes and ir	nternal farm roads where possible and avoid u	sing other greas in t	he site as temporary		
access routes.	outes unu ii	iternarjarnirodas where possible and avoid a.	sing other areas in the	ne site as temporary		
Vehicles and equipment m	ust nark in	designated narking areas				
		red in designated laydown area.				
		ction activities outside of the rainy season as	wet soil compacts (easily as opposed to		
dry soil.		and according outside of the runny season as		casily as opposed to		
,		POST-MITIGATION				
		The duration of the activity associated				
DURATION	3	with the impact will last 18 months-5				
		years and as such is rated as Medium term	_	2		
		The extent of the impact is rated as	-5	3		
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				
		The severity of the impact is rated as Low	_			
		negative as the impact affects the				
SEVERITY	-1	environment in such a way that natural,				
		cultural and social functions and	Negligible	Definite		
		processes are minimally affected	gg.o.c	20,mic		
IMPACT ON						
IRREPLACEBLE	1	Irreplaceable resources will be impacted.				
RESOURCES		<u> </u>				
SIGNIFICANCE						
	CONFIDENCE LEVEL					
High						

Table 7-11: SPH1: Impact significance of impaired soil health as a result of soil pollution

IMPAIRED SOIL HEALTH				
PROJECT PHASE	Construction Phase			

		can be caused by oil and fuel spills from vehicl					
DIDECT IMADA CT		waste on site. Should the vanadium redox					
DIRECT IMPACT		rosive and environmentally toxic electrolyte is	•				
		state containerised batteries are used, there is a possibility of thermal runaway that will result in the release of toxic and flammable gasses.					
		Increased risk of pollutant uptake by vegetation within the development area that can affect					
INDIRECT IMPACT		I and human health.	ie developinent di	ed that can affect			
CUMULATIVE IMPACT		eas at risk of soil pollution.					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
DIMILIAZION	KATING	PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD			
		The duration of the activity associated					
DURATION	3	with the impact will last 18 months-5					
DONATION	3	years and as such is rated as Medium term					
		The extent of the impact is rated as Local	-21	3			
EXTENT	3	as it affects the development area and					
LAILINI	3						
		adjacent properties					
ì		The severity of the impact is rated as High negative as the natural, cultural or social					
1		functions and processes are altered to the					
		extent that the natural process will					
SEVERITY	-3	temporarily or permanently cease; and					
		valued, important, sensitive or vulnerable	Himble.				
		systems or communities are substantially	Highly detrimental	Definite			
		affected.	aetrimentai				
IMPACT ON		dijected.					
IRREPLACEBLE	1	Irreplaceable resources will be impacted.					
RESOURCES	1	Inteplaceable resources will be impacted.					
SIGNIFICANCE	-63	high negative					
SIGINII ICANCE	-03	PROPOSED MITIGATION MEASURES					
Maintananca must ha u	ndartakan ragu		ent to provent hydr	acarban caille			
		larly on all vehicles and construction equipme					
construction teams.	uring construct	ion must be stored into designated containe	rs ana removea ji	om the site by the			
	an matarials m	ist he removed from the development area					
		ist be removed from the development area.	1) to dotact any oar	lu sians of fuol and			
		red by the Environmental Control Officer (ECC nust also report any spills from batteries.)) to detect any ear	iy sigris oj juei aria			
		nust also report any spilis from batteries. In is undertaken by accredited staff and conti	ractors				
		or the safe handling of battery cells during tra		tion			
Compile (una dunere to)	ra procedure je	POST-MITIGATION	risport and instanti	.1011.			
		The duration of the activity associated					
DURATION	3	with the impact will last 18 months-5					
DURATION	3	years and as such is rated as Medium term					
		The extent of the impact is rated as	-5	3			
EXTENT	1	footprint as it only affects the area in					
EVICINI	1	which the proposed activity will occur					
		The severity of the impact is rated as Low					
		negative as the impact affects the					
SEVERITY	-1	environment in such a way that natural,					
JEV LIMI I	-1	cultural and social functions and					
		processes are minimally affected	Negligible	Definite			
IMPACT ON		processes are minimally affected					
IRREPLACEBLE	1	Irreplaceable resources will be impacted.					
RESOURCES	_	meplaceable resources will be impacted.					
SIGNIFICANCE	-15	very low negative	1				
SIGNII ICANEL	-13	very low liegative					

(b) Aquatic Impact

High

Construction phase activities would result in disturbance of soil and clearing of vegetation.

CONFIDENCE LEVEL

Water quality impacts may occur from batching of concrete on site, hydrocarbon spills and other construction activities.

Two location alternatives are proposed for the electrical infrastructure compound for SPH1. As both are located beyond aquatic habitats there is no difference between the two options in terms of impacts on aquatic biodiversity.

Two technology options are proposed for the BESS. As the electrical infrastructure compound which contains the BESS in SPH1 is located beyond any aquatic environments there is no difference in the two options in terms of impacts on aquatic biodiversity.

Table 7-12: SPH1: Impact of aquatic ecosystems during the construction phase

		AQUATIC ECOSYSTEM IMPACTS				
PROJECT PHASE	PROJECT PHASE Construction Phase					
DIRECT IMPACT	Disturbance	of aquatic habitat; water quality impacts				
INDIRECT IMPACT	Modification	of flow and alien vegetation invasion in aquatic fe	eatures			
CUMULATIVE IMPACT	Degradation	of the ecological condition of aquatic ecosystems	:			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	-	PRE-MITIGATION				
	2	The duration of the activity associated with the				
DURATION		impact will last 6-18 months and as such is				
		rated asShort term	-4	1		
	2	The extent of the impact is rated as site as it will				
EXTENT	2	affect only the development area				
	-1	The severity of the impact is rated as Low				
CEL (EDIT)		negative as the impact affects the environment				
SEVERITY		in such a waythat natural, cultural and social				
		functions and processes are minimally affected	Negligible	Unlikely		
IMPACT ON	0	No irreplaceable resources will be impacted.	- 3 3.0.0	,		
IRREPLACEBLE RESOURCES						
	-4	Vory low pogetive				
SIGNIFICANCE	-4	Very low negative PROPOSED MITIGATION MEASURES				

A buffer of at least 250 m between the significant aquatic ecosystems (larger pans) and all the proposed project activities should be maintained (noting that this is already honoured in the proposed layout for all facilities).

Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers, while retaining the topography and cover vegetation within the wider drainage areas through the site is preferred to reduce the potential modification to the way in which water drains through these areas.

The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.

During the construction phase, site management must be undertaken at the laydown and construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities such as hydrocarbon spills. The solar panels will be washed with water and a biodegradable/ greendetergent.

Any stormwater that does arise within the construction sites must be handled appropriately to trap sediments and reduce flow velocities where necessary.

Development within the drainage areas, where located within a proposed facility, will however need to consider stormwater management measures and should avoid impacting on the movement of water through the more seasonally wet areas. Minimal disturbance to the topography and cover vegetation in these areas is recommended.

POST-MITIGATION					
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated asTemporary		1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the			

High					
CONFIDENCE LEVEL					
SIGNIFICANCE	NIFICANCE -2 very low negative				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SEVERITY	-1	proposed activitywill occur The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	

(c) Avifaunal Impact

(i) Habitat destruction associated with the construction of the facility

Habitat destruction and alteration will occur during the construction phase of SPH1. The majority of the development footprint would be transformed from its current state to a renewable energy facility. SPH1 will transform approximately 209ha of habitat. Most of this is in a fairly natural state currently, or in the case of arable lands is still accessible and useable for birds foraging.

Table 7-13: SPH1: Formal rating of destruction of bird habitat during construction.

DESTRUCTION OF BIRD HABITAT DURING CONSTRUCTION						
PROJECT PHASE	Construction phase					
DIRECT IMPACT	Transformation of natural habitat into PV facility					
INDIRECT IMPACT						
CUMULATIVE IMPACT	Yes - Larger	area transformed from natural habitat				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur				
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural and social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-54	moderate negative				
	PROPOSED MITIGATION MEASURES					
There is no specific mitigation required. Impact avoidance has already been implemented in the design phase through the adherence to no-go buffers around pans.						
POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	3		

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-36	low - negative			
CONFIDENCE LEVEL					
High					

(ii) Disturbance of birds & displacement effects

Disturbance of avifauna during the construction (and thereafter during maintenance and operational and decommissioning) of the facility and all development alternatives and associated infrastructure is likely to occur. Disturbance of breeding birds is typically of greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. It is noted that no breeding sites have been identified on site at this stage.

There is no difference between the location and technology options in terms of disturbance and displacement of birds.

Table 7-14: Formal rating of disturbance of birds during construction.

PROJECT PHASE	Construction	n phase & operations phase to lesser extent				
DIRECT IMPACT	Birds disturbed from their normal activities through the increased noise and activity levels					
	associated v	with construction				
INDIRECT IMPACT						
CUMULATIVE IMPACT	More projec	More projects will result in overall higher disturbance levels				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated with the				
DURATION	2	impact will last 6-18 months and as such is rated		1		
		as Short term	-			
		The extent of the impact is rated as Local as it				
EXTENT	3	affects the development area and adjacent				
		properties				
		The severity of the impact is rated as Low		Unlikely		
CEVEDITY	-1	negative as the impact affects the environment				
SEVERITY		in such a way that natural, cultural and social				
		functions and processes are minimally affected				
IMPACT ON			Negligible			
IRREPLACEBLE	0	No irreplaceable resources will be impacted.				
RESOURCES						
SIGNIFICANCE	-5	very low negative				
		PROPOSED MITIGATION MEASURES				
There is no specific mitig	ation require	d as there are no particularly sensitive features ic	lentified (such as b	reeding sites).		
General good environme	ental practice	should be implemented during construction in te	erms of control of	vehicles, staff,		
minimising the impact on	the receiving	environment as much as possible.	-			
POST-MITIGATION						
		The duration of the activity associated with the				
DURATION	2	impact will last 6-18 months and as such is rated	-5	1		
		as Short term				

EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY		-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		-5	very low negative		
CONFIDENCE LEVEL					
Medium					

(d) Bats Impact

SPH1 overlaps an area of medium bat sensitivity. During the construction of SPH1 habitat modification would occur, disturbance and displacement of bats may occur and bat roosts may be disturbed or destroyed. SPH1 overlaps an area of medium bat sensitivity.

Two location alternatives for the electrical infrastructure compound are under consideration for SPH1. The alternatives are both located similar habitats and do not overlap any sensitive features for bats. As such, both alternatives are equally acceptable. Two technology options are under consideration for the BESS. For bat impacts the type of technology used for the BESS is not considered relevant. Both technology options are considered equally acceptable.

Table 7-15: SPH1: Bat habitat modification

	-					
IMPACT ON POSSIBLE HABITAT MODIFICATION						
PROJECT PHASE	Construction	Construction phase				
DIRECT IMPACT	Modificatio	n of habitat through the removal of vegetation cove	er and water source	?S		
INDIRECT IMPACT	Displaceme	nt				
CUMULATIVE IMPACT	Loss of fora	ging resources for local bat population				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	2		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur				
SEVERITY	1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Nagligibla	Likely		
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.	Negligible	Likely		
SIGNIFICANCE	-8	very low negative				
	PROPOSED MITIGATION MEASURES					

This impact may be reduced by limiting the removal of vegetation and available water sources, as far as possible.

Avoid all high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided.

All construction activities should be limited to the assessed project footprint only.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction, rehabilitation of all disturbed areas, inclusive of that beyond permanent infrastructure footprints, (e.g.temporary access tracks and laydown areas) must be undertaken. POST-MITIGATION The duration of the activity associated with the **DURATION** 2 impact will last 6to 18 months and as such is rated asShort term The extent of the impact is rated as footprint as **EXTENT** 1 it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment **SEVERITY** -1 in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely ON **IMPACT** IRREPLACEBLE Irreplaceable resources will beimpacted. 1 **RESOURCES** SIGNIFICANCE -4 very low negative CONFIDENCE LEVEL Medium

Table 7-16: SPH1: Disturbance and displacement effects for bats

	IMPACT (ON POSSIBLE DISTURBANCE & DISPLACEMENT EFFE	ECTS	
PROJECT PHASE	Construction	n phase		
DIRECT IMPACT		of bats during construction activities		
INDIRECT IMPACT	Displaceme			
CUMULATIVE IMPACT		ity of suitable foraging resources in the broader env	ironment for displa	iced individuals
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	ı	PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis		
		rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Norticible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.	Negligible	
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
Limit construction activiti	es to daylight	hours only and minimise lighting at night, as far as	possible.	
_		With the layouts currently assessed, this has been the transfer of the layouts currently assessed, this has been the layouts areas have the layouts are as have a layouts are as have the layouts are as have a layouts are a layouts are a layouts are as have a layouts are a layouts		
Avoid construction in me	dium sensitiv	e areas, as far as possible. Where unavoidable, lim	nit and restrict all	movement and
noise inthese areas, as a	result of const	ruction activities, to daylight hours only.		
All construction activities	should be lim	ited to the assessed project footprint only.		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	1	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely

IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will beimpacted.		
SIGNIFICANCE		-5	very low negative		
CONFIDENCE LEVEL					
Medium					

Table 7-17: SPH1: Bat roost disturbance

	IMPACT ON POSSIBLE ROOST DISTURBANCE					
PROJECT PHASE	Construction	n phase				
DIRECT IMPACT	Disturbance	of roosting bats during construction activities				
INDIRECT IMPACT	Roost aband	donment				
CUMULATIVE IMPACT	Unavailabili	ity of suitable roosting resources in the broader envir	onment for abando	nedindividuals		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-10	2		
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area				
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Likely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-20	low negative				

PROPOSED MITIGATION MEASURES

Avoid construction in medium sensitive areas, as far as possible. Where unavoidable, limit and restrict all movement and noise inthese areas, as a result of construction activities, to daylight hours only.

All construction activities should be limited to the assessed project footprint only.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to bestpractice.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
CONFIDENCE LEVEL				
Medium				

Table 7-18: SPH1: Bat Roost destruction

		IMPACT OF POSSIBLE ROOST DESTRUCTION		
PROJECT PHASE	Constructio			
DIRECT IMPACT		of potential bat roosting features		
INDIRECT IMPACT		of available roosting sites and/or Mortality		
INDIRECT IIVII ACT		roosting resources to support the local populat	ion and notential	increased hat
CUMULATIVE IMPACT	mortality	Toosting resources to support the local populat	ion una potentiar	mercuscu but
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
DIVILIAZION	KATING	PRE-MITIGATION	CONSEQUENCE	LIKELITIOOD
DUDATION	2	The duration of the activity associated withthe impact will last 6 to 18 months and as such is		
DURATION	2	rated as Short term	-10	2
			-10	2
EXTENT	2	The extent of the impact is rated as site as it will		
		affect only thedevelopment area		
		The severity of the impact is rated as Moderate		
		negative as the affected environment is altered		
SEVERITY	-2	but natural, cultural and social functions and		
		processes continuealbeit in a modified way; and valued, important, sensitive or vulnerable	Climbal.	
		systems or communities are negatively affected	Slightly Detrimental	Likely
IMPACT ON		systems of communities are negatively affected	Detrimentai	
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES	1	Interfaceable resourceswill be impacted.		
SIGNIFICANCE	-20	low negative		
SIGIVII ICAIVEL		MITIGATION MEASURES TO BE INCLUDED IN THE	EMDr	
Avoid the destruction or r		sting farmsteads and trees, as far as possible.	LIVIFI	
		dders status has been awarded), a bat specialist sho	ould conduct a site v	valkthrough to
		if construction does not take place within 5 years of		
		the 5-year period, as described above), then these		
best practice.	ijii iiieu (ujtei	the 3-year periou, as described above,, then these	e should be bujjere	a according to
·	should be lim	ited to the assessed project footprint only.		
All construction activities	SHOUIU DE IIIII	POST-MITIGATION		
				Ι
DUDATION	2	The duration of the activity associated withthe		
DURATION	2	impact will last 6 to 18 months and as such is rated as Short term		
		The extent of the impact is rated as footprint as	-4	2
EXTENT	1	it only affects the area in which the proposed		
EXICINI	1	activity will occur		
		The severity of the impact is rated as Low		
		negative as the impactaffects the environment		
SEVERITY	-1	in such away that natural, cultural and social		
		functions and processes are minimally affected	Negligible	Likely
IMPACT ON		Janea on S and processes are minimally affected	recyngibic	Linely
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES	_	cp. securic resources will be impuered.		
SIGNIFICANCE	-8	very low negative	<u> </u>	<u>I</u>
		CONFIDENCE LEVEL		
Medium				
mediam				

(e) Botanical Impacts

The development of SPH1 would result in extensive but localized loss of relatively undisturbed (unploughed but grazed) Western Free State Clay Grasslands.

The shade effect of the panels on the grassland vegetation is not known and it not easily predicted. There will be space under the panels for grass and other plants to grow. However, the microclimate is likely to be different to that of open grassland, so a different suite of plant species is likely to colonize the space under the solar panels.

Two location alternatives for the electrical infrastructure compound are proposed for SPH1 and two technology options for the BESS. The location and technology alternatives will make no difference on the botanical impact assessment and as such these alternatives are covered in the **Table 7-19**.

Table 7-19: SPH1: Impact of loss of Western Free State Clay Grassland

LOSS OF VEGETATION						
PROJECT PHASE	Construction	Construction Phase				
DIRECT IMPACT	Removal of	natural vegetation: Western Free State Clay Grass	slands			
INDIRECT IMPACT	None deterr	mined				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term.	-15	3		
EXTENT	3	The impacts will be localized to the designated target areas.				
SEVERITY	-2	The severity of the potential impact will be moderate negative.				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Moderately Detrimental	Definite		
SIGNIFICANCE	-45	medium - negative				
PROPOSED MITIGATION MEASURES						

The first mitigation measures necessary would be the relocation of **Ammocharis coranica** bulbs if they cannot be avoided. Ideally the bulb should be lifted when they area dormant (winter) but that would mean traversing the entire area of the SPH sites in the preceding summer and marking every occurrence of these plants. A more practical approach would be to unearth

the bulbs during the construction phase and relocating and planting them soon after removal.

Secondly, all areas that are disturbed during construction and that are not needed during the operational phase should be rehabilitated, using natural grasses that occur in the area. It would be possible for some grasses and forbs to survive under the panels, but it is difficult to predict the extent of such growth, nor which plant species would grow effectively under the panels.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.	-5	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

(f) Groundwater Impact

The water required during the construction phase of SPH1 is approximately $18,000\text{m}^3$ per year. The water requirement lies well within the yield potential of the underlying fractured rock aquifer (i.e. 0.5-2.0 L/s). It must be noted that at present the use of groundwater is not proposed however if this changes the potential impacts of groundwater abstraction are shown in **Table 7-20**.

Earthmoving plant and/or construction vehicles will be used on site during the construction phase. Use of vehicles presents a risk of groundwater contamination by fuel and oil leakage.

Two location alternatives for the electrical infrastructure compound and two technology options (lithium-ion vs redox flow batteries) were considered for SPH1. The alternatives considered are equally preferred.

Table 7-20: SPH1: Impact table for the lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place).

	Potential imp	act on groundwater level due to over ab	straction	
PROJECT PHASE	Construction I	Phase		
DIRECT IMPACT	Lowering of g	roundwater level due to over abstraction	n	
INDIRECT IMPACT		ngs in the area		
CUMULATIVE IMPACT	Permanent da	mage to the aquifer system in the area		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated		
		with the impact will last 18 months-5		
		years and as such is rated as		
		Medium term		
EXTENT	3	The extent of the impact is rated as	-14	2
		Local as it affects the development		
		area		
		and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
		cultural and social functions and		
		processes continue albeit in a		
		modified way; and valued,	Moderately	Likely
		important, sensitive or vulnerable	Detrimental	Likely
		systems or communities are		
		negatively affected		
IMPACT ON	1	Irreplaceable resources will be		
IRREPLACEBLE RESOURCES		impacted.		
SIGNIFICANCE	-28	low - negative		
	ı	PROPOSED MITIGATION MEASURES		
If boreholes are used it mu	st be correctly v	vield tested according to the National S	tandard (SANS 102	99-4:2003, Part 4 –
		ludes a Step Test, Constant Discharge Te		
	-	monitor water levels and flow.		
Groundwater abstraction v	olumes must be	monitored.		
		POST-MITIGATION		
DURATION	3	The duration of the activity		
		associated with the impact will last		
		18 months-5 years and as such is		
		rated as Medium	0	1
		term		
EXTENT	1	The extent of the impact is rated		

		as footprint as it only affects the area in which the proposed activity will occur			
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be	Negligible	Unlikely	
RESOURCES		impacted.			
SIGNIFICANCE	0	very low negative			
CONFIDENCE LEVEL					
Medium					

The main risk associated with the construction phase is groundwater contamination from the use of construction vehicles and heavy machinery on-site.

Table 7-21: SPH1: Impact of contamination of groundwater as a result of accidental oil spillages or fuel leakages during the construction and decommissioning phases.

		quality as a result of accidental oil spillages o	r fuel leakages	
PROJECT PHASE		n and Decommissioning Phase		
DIRECT IMPACT		er contamination		
INDIRECT IMPACT		the vegetation or ecosystem it the area		
CUMULATIVE IMPACT		educed groundwater quality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	•	PRE-MITIGATION	1	
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	- - 5	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-10	very low negative		
		PROPOSED MITIGATION MEASURES		
Dirty water should be capture environment.	ed, to be re-use	kept in a good working order. ed where possible. No dirty water is allowed t n excavation area when not in use. Drip trays		
and machinery where possible	e.	POST-MITIGATION		
DURATION	3	The duration of the activity		
EXTENT	1	associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in	- 4	1
SEVERITY	-1	which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the		
		environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON	0	No irreplaceable resources will be		

IRREPLACEBLE RESOURCES		impacted.		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
Medium				

(g) Heritage Impact

(i) Impacts to archaeological resources

Impacts to archaeological resources at SPH1 are limited to one site of low significance (Grade GPB, but which might not even be 100 years old) and the associated remnants of a small dam (Grade GPC). Impacts will be direct and permanent but because of the low cultural significance the severity is low.

Two location alternatives were considered for the electrical infrastructure compound, neither of the footprints contain heritage resources. As such, both are equally preferred.

Two technology alternatives were considered for the battery technology for the BESS. Both technology options are equally preferred.

Table 7-22: SPH1: Assessment of construction phase impacts to archaeological sites.

		Archaeological impacts					
PROJECT PHASE	Construction	on Phase					
DIRECT IMPACT	IRECT IMPACT Destruction of a ruined historical cottage (already in very poor condition)						
INDIRECT IMPACT	None						
CUMULATIVE IMPACT	Increased I	oss of vernacular architecture					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
	PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	3			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite			
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		·			
SIGNIFICANCE	-18	very low negative					
		PROPOSED MITIGATION MEASURES					
recorded.		condition and does not have any special arc	hitectural qualities t	hat need to be further			
No materials to be remo	ved from an	y other ruins in the wider project area.					
		POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	3			

SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		
IMPACT O IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-18	very low negative				
	CONFIDENCE LEVEL					
High						

(ii) Impacts to graves

Impacts to graves for SPH1 are not expected because all identified graves have been avoided by the facility layout. There is still the chance of an unmarked grave being present, or even a marked grave that was not found during the survey. The chances are considered low, however.

Table 7-23: SPH1: Assessment of construction phase impacts to graves

		IMPACTS TO GRAVES				
PROJECT PHASE		Construction Phase				
DIRECT IMPACT	Destruction	n of graves, including their coverings and po	ssibly human rema	iins		
INDIRECT IMPACT	None	None				
CUMULATIVE IMPACT	Destruction	n of graves, including their coverings and po	ssibly human rema	iins		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	-18	2		
		The extent of the impact is rated as	-10	2		
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				
		The severity of the impact is rated as				
		High negative as the natural, cultural or				
		social functions and processes are				
SEVERITY	-3	altered to the extent that the natural	Moderately Detrimental			
SEVERITY		process will temporarily or permanently				
		cease; and valued, important, sensitive		Lilonho		
		or vulnerable systems or communities		Likely		
		are substantially affected.				
IMPACT ON						
IRREPLACEABLE	1	Irreplaceable resources will be impacted.				
RESOURCES						
SIGNIFICANCE	-36	low - negative				
		PROPOSED MITIGATION MEASURES				
Farm-style wire fences sh	ould be erect	ted around all known and unfenced graves (i.	e. waypoints 362 8	& 404) within the farm		
portion affected by const	ruction. Pede	estrian access gates must be provided and ti	he fences must be l	ocated a minimum of		
5 m away from all graves	•					
All graves to be treated a	All graves to be treated as no-go areas with temporary signage as required.					
POST-MITIGATION						
		The duration of the activity associated		_		
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	-18	1		
		The extent of the impact is rated as	-18	1		
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				

SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-18	very low negative		
		CONFIDENCE LEVEL		
High				

(iii) Impacts to the cultural landscape SPH 1

No landscape features such as hills and pans will be impacted by SPH1. The impact on cultural landscape is due to the construction activities (construction vehicles and equipment) on site which is a rural landscape.

Table 7-24: SPH1 Assessment of construction phase impacts to the cultural landscape

CULTURAL LANDSCAPE IMPACTS						
PROJECT PHASE		Construction Phase				
DIRECT IMPACT		Alteration of the rural landscape character through the introduction of construction equipment				
		es and all the associated activities on site				
INDIRECT IMPACT	None					
CUMULATIVE IMPACT		ll be greater with multiple facilities being o	constructed at once			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	-30	low - negative				
		PROPOSED MITIGATION MEASURES				
Keep construction period as short as possible.						
Rehabilitate any areas no	t needed dur	ing operation as soon as possible.				
POST-MITIGATION						
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3		

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	low - negative		
CONFIDENCE LEVEL				
High			<u>-</u>	·

(h) Palaeontological Impact

Palaeontological impacts would be the destruction of fossils from construction activities. The site as a whole is considered as low sensitivity in terms of palaeontology.

Table 7-25: SPH1: Assessment of the potential impacts to possible palaeontological resources considers the criteria below

		PALAEONTOLOGY IMPACTS				
PROJECT PHASE	Construct	ion, Operational and de commissioning Phases				
DIRECT IMPACT	Destruction	Destruction of fossils in the footprint				
INDIRECT IMPACT						
CUMULATIVE	Loss of fo	ssil heritage and scientific knowledge				
IMPACT						
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	2	7		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-2	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Mantinible	Definite		
IMPACT ON IRREPLACEBALE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite		
SIGNIFICANCE	-6	Very Low Negative				
PROPOSED MITIGATION	ON MEASU	RES				
removed and put in a fossils are important ti	safe place. he palaeont Inised facilit	ons for foundations and amenities have commenced Photographs should be sent to a palaeontologist to ologist must obtain a permit from SAHRA, visit the sit by such as a museum or palaeontology department in will be reauired	o assess their scient e and remove the fos	ific value. If the		
POST-MITIGATION						
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	2	3		

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	6	Very Low Positive		
CONFIDENCE LEVEL				
High				

(i) Socio-Economic Impact

(i) Stimulation of the Economy during construction

The size of the Tokologo LM's economy was estimated at R2,170 million at current prices (2022) and primarily comprises of the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. That being said, it is likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the development of SPH1 through local procurement.

The stimulation of the economy will not be dependent on the layout or technology options of the SPH1 solar facility; thus, alternatives are equally preferred.

Table 7-26: Impact of Economic Stimulation during construction

	IMPACT ON ECONOMY				
PROJECT PHASE	Construct	Construction Phase			
DIRECT IMPACT	Tempora	ry increase in production and GDP in the local	economy		
INDIRECT IMPACT	Improved	household income and increased business sal	es in the local econd	оту	
CUMULATIVE IMPACT	Tempora	ry increase in production and GDP in the regio	nal economy		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3	
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite	

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.
SIGNIFICANCE	30	low positive

PROPOSED MITIGATION MEASURES

To optimise the stimulation of the local economy through direct, indirect and induced effects, the following should be applied where possible:

Procure construction materials, goods, and products from local and domestic suppliers if feasible

Employ local contractors where possible

Note: The proposed mitigation measures will possibly increase the positive impact on the local economy; however, this will not affect the weighting thereof.

POST-MITIGATION					
DURATION		2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY		2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT IRREPLACEABLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		30	low positive		
CONFIDENCE LEVEL					
High		·	·		·

(ii) Creation of Employment during construction

The construction of SPH1 will require temporary employment of construction workers, foremen, and engineers On-site. Construction is expected to last twelve months where at the peak of construction about 150 people will be working on-site. The creation of between 100 and 150 temporary employment opportunities for SPH1 throughout the duration of construction which equates to about 50 FTE.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

SPH1 will create the same number of employment opportunities, regardless of its layout on the site; thus, layout alternatives are equally preferred.

Table 7-27: SPH1: Assessment of Employment during construction

IMPACT ON EMPLOYMENT						
PROJECT PHASE Construction Phase						
DIRECT IMPACT	DIRECT IMPACT Creation of temporary employment opportunities On-site					

INDIRECT IMPACT	Improved	income of households whose members a	re employed on the pi	roject
CUMULATIVE IMPACT	Creation o	f temporary employment opportunities i	n the area	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION	T	T
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	7
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
		PROPOSED MITIGATION MEASURE	S	
The following is recommend	ded to incre	ase the employment opportunities create	d in the local commun	ities, where feasible:
Employ labour intensive me	ethods in co	nstruction, where feasible		
Employ local residents and	communitie	es, where possible		
Utilise local suppliers, wher	e possible			
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive	•	
CONFIDENCE LEVEL				
High				
<u> </u>				

(iii) Reduction of Land Area available for productive farming

The proposed site of SPH1 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH1 as being of low to very low agricultural potential with small isolated patches of low – moderate and moderate potential land on the edges of the facility. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH1 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on

the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH1.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-28: SPH1: Assessment of Impact on agricultural production

Reduction of Land Area available for Productive Farming						
PROJECT PHASE	Construct	tion and Operational Phase				
DIRECT IMPACT	Loss of ag	gricultural production within the footprint a	lue to land sterilisatio	n		
INDIRECT IMPACT	Negligib	le to no indirect impact				
CUMULATIVE IMPACT	Negligible	e to no cumulative effects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	o de la companya de	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		•		
SIGNIFICANCE	-18	very low negative				
		PROPOSED MITIGATION MEASURES				
Rehabilitation of land shou after the closure of the pro		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming		
	T	POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	Ç	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		

IMPACT IRREPLACEABLE RESOURCES	ON	1	Irreplaceable resources will be impacted.
SIGNIFICANCE		-18	very low negative
			CONFIDENCE LEVEL
High			

(iv) Loss of Property

An influx of job seekers to the area during the construction phase may result in stock theft and burglaries. The number of workers and duration of construction will not be affected by the layout alternatives or technology alternatives; thus, all alternatives are equally preferred.

Table 7-29: SPH1: Assessment of loss of property

		IMPACT ON CRIME LEVELS			
PROJECT PHASE	Construct				
DIRECT IMPACT	Temporar	ry increase in crime associated with the infl	ux of people		
INDIRECT IMPACT	Reduced I	evel of security in and around the proposed	facility		
CUMULATIVE IMPACT	No to neg	ligible cumulative impact			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	J	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES SIGNIFICANCE	0 - 30	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-30	PROPOSED MITIGATION MEASURES			
The following mitigations	ara advisad	to be instituted to minimise and possible en	liminate the impact of	altogother:	
Ensure proper fencing and			inninate the impact t	intogether.	
Maximise job creation and	allocation	to locals as far as practically possible. Recresite. This will reduce the probability of work			
	rsonnel dur	ing the construction period			
c additional security pe	. comici dur	POST-MITIGATION			
		The duration of the activity associated			
DURATION	2	with the impact will last 6-18 months and as such is rated as Short term			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	

IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.	
SIGNIFICANCE		-15	very low negative	
		3	CONFIDENCE LEVEL	
High				

(j) Terrestrial Biodiversity & Faunal Impact

(i) Direct Impact - Destruction of faunal habitat

Clearing or disturbance to natural vegetation for the construction of SPH1 will remove up to 209ha of natural grassland habitat. This includes the burrows of many fossorial species as well as termite mounds which provide a source of food for species such as aardvark and mongoose.

There are two location alternatives for the electrical infrastructure compound for SPH1. Noting that if both are not approved, the area of the second one would likely comprise solar PV panels, therefore the difference in terms of the impact of clearance of natural habitat is negligible. Two technology alternatives for the battery to be used in the BESS have been proposed. As the type of battery used will not alter the footprint of the BESS the alternatives are rated as equal for the impact of clearance of natural habitat.

Table 7-30: SPH1: Destruction of faunal habitat

DESTRUCTION OF FAUNAL HABITAT					
PROJECT PHASE Construction phase					
DIRECT IMPACT	Destructi	Destruction of faunal habitat			
INDIRECT IMPACT					
CUMULATIVE IMPACT	Loss of ho	abitat and habitat connectivity			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-21	3	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-63	high negative			
		PROPOSED MITIGATION MEASURES			

Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays. Only indigenous grasses found in the area must be used for rehabilitation

Undertake vegetation clearing during the dry season, and outside of the breeding season of burrowing fauna

If possible, the movement of animals through the sites must be permitted during operations. The use of fencing that will allow the movement of small to medium fauna through would help mitigate the effect of fences acting as barriers. This can

be achieved by constructing a fence that has places for animals to crawl through and is not difficult for fleeing animals and birds to see. For example, black mesh panel fencing can be used where gaps of approximately 30 cm high and 50 cm wide and spaced at regular intervals are cut/installed. The tops of these gaps must be smoothed off to limit the chance of wildlife being injured when passing through. The use of barbed wire must be avoided

The proposed activities must remain within the project footprint

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All mitigation measures prescrib	bed by the	avifaunal specialist must be strictly adhered	to		
	POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-10	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-10	3	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted			
SIGNIFICANCE	-30	low negative			
	CONFIDENCE LEVEL				
Medium					

(ii) Direct Impact - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death. The clearing of ground for the foundations of the PV arrays will destroy burrows, potentially causing injury or death to burrowing animals. Furthermore, the presence of the construction site and personnel may result in negative interactions with fauna, such as hunting or killing animals perceived to be pests.

Regarding the technology alternative for the type of battery used in the BESS for all facilities, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

The alternative locations for the electrical infrastructure compound will not change the ratings for this impact.

Table 7-31: SPH1: Injury or death to fauna

		INJURY OR DEATH TO FAUNA			
PROJECT PHASE	PROJECT PHASE Construction Phase				
DIRECT IMPACT	Injury or	Injury or death to fauna			
INDIRECT IMPACT		-			
CUMULATIVE IMPACT					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	,	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-54	moderate negative			

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

No wild animal may under any circumstance be handled, removed or be interfered with by construction workers

To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

Ideally construction should not continue at night so as to avoid potential collisions with nocturnal fauna

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

7 th Thirigation measures present	ocu by the	avijaariai specialist mast be strictly danere				
	POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted				
SIGNIFICANCE	-4	very low negative	·			
CONFIDENCE LEVEL						
High						

(iii) Indirect Impacts - Pollution and contamination of natural areas

During construction, dust from exposed areas and roads, and litter from construction workers have the potential to pollute the surrounding natural vegetation. The use of dust suppressants, as well as hydrocarbons from vehicles and machinery, have the potential to contaminate soils and ground water, and be washed into the nearby natural pans during high rainfall events. This is relevant to all facilities equally for the construction phase.

Table 7-32: SPH1 pollution and contamination of natural areas

POLLUTION AND CONTA	INATION OF NATURAL A	REAS	
ECT PHASE Construction Phase			
CT IMPACT			
ECT IMPACT Pollution and contamin	on of natural areas		
JLATIVE IMPACT Habitat degradation	-		
DIMENSION RATING	OTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-	TIGATION		
The duration	the activity associated		
	t will last 6-18 months		
	ated as Short term	-15	3
	ne impact is rated as	13	J
	ts the development		
	ent properties		
	the impact is rated as		
	as the natural, cultural		
	ons and processes are		
	extent that the natural		
RITY -3 process will			
	ease; and valued,	Moderately	Definite
	sitive or vulnerable	detrimental	•
	munities are		
substantially		<u> </u>	
1 11 1	le resources will be		
URCES impacted	utia	_	
FICANCE -45 moderate n	GATION MEASURES		
ркорозер м dependent Environmental Control Officer (ECO) mu		all construction acti	uities
hicles and machinery must be checked for leaks an			villes
pillage must be dealt with rapidly and in the most o		S	
	ropriate manner		
ashing of vehicles must take place on site	nnraccad using a water t	ankar	
g construction, dust on construction roads must be			
oing of solid waste in natural areas, including cigard			st be pronibited
opriate solid waste disposal facilities must be provid	Tor workers auring cons	truction	
		T	
	the activity associated		
· · · · · · · · · · · · · · · · · · ·	t will last 6-18 months		
	ated as Short term	-4	1
	he impact is rated as		
NT 2 site as it will			
developmen The coverity	the impact is rated as		
	s the impact affects the		
	s the impact affects the such a way that		
	al and social functions	Negligible	Unlikely
	are minimally affected	Negligible	Officery
CT ON IRREPLACEABLE No irrenlace	le resources will be	_	
	C TOSOUTECS WIII DC		
	ive		
URCES impacted FICANCE -4 very low ne			

(iv) Indirect Impacts – Disturbance and displacement of fauna

Construction activities have the potential to cause disturbance to fauna inhabiting the natural grassland through noise, vibrations, and light (if construction continues after dark). Security lights for the solar facilities during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The location alternatives for the electrical infrastructure compound for SPH1 and the technology alternatives for the BESS will not change the ratings for this impact.

Table 7-33: SPH1: Disturbance and displacement of fauna

	DISTUF	RBANCE AND DISPLACEMENT OF FAUNA			
PROJECT PHASE	Construct	tion Phase			
DIRECT IMPACT					
INDIRECT IMPACT	Disturbar	Disturbance to and displacement of fauna – natural grassland			
CUMULATIVE IMPACT	Displacer	Displacement of fauna			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	_		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Likely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-36	low negative			

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

Ideally construction activities should cease at night to minimise the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals

Lighting during construction should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2

EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-10	very low negative		
CONFIDENCE LEVEL				
Medium	•			

(v) Indirect Impacts – Increased potential of invasion by alien vegetation

During construction, the removal of natural vegetation and disturbance to the soil will increase the likelihood of invasion by alien plant species. Alien species establish easily and quickly on bare soil by colonisation or from seeds existing in the seed bank of the soil. Infestation by alien and invasive species will lead to degradation of the surrounding natural habitat and will increase the potential of spread into the greater landscape. In addition, the vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds. This impact is relevant to all the proposed arrays equally and has therefore been assessed in one table for the construction phase.

The location alternative for the electrical infrastructure compound and the technology alternatives for the BESS will not change the ratings for this impact.

Table 7-34: SPH1: Increased potential of invasion by alien vegetation

IN	CREASED P	OTENTIAL OF INVASION BY ALIEN VEGET	TATION	
PROJECT PHASE	Construct	ion Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Increased	l potential of invasion by alien vegetation		
CUMULATIVE IMPACT	Habitat d	egradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-42	moderate - negative		
	F	PROPOSED MITIGATION MEASURES		
An independent Environmental	Control Of	ficer (ECO) must be appointed to oversee	all construction activ	vities monthly

All areas cleared of natural vegetation must be rehabilitated. Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays and other cleared areas. Only indigenous grasses found in the area must be used for rehabilitation. This must be advised by the botanist

An invasive alien plant species management and monitoring plan must be implemented during the construction phase. Monitoring should continue into the operational phase and through and for a period after decommissioning. This should be advised by the botanist

All alien seedlings and saplings must be removed as they become evident for the duration of construction and during the operational phase. Manual / mechanical removal is preferred to chemical control

All construction vehicles and eq	uipment r	nust be free of plant material before enter	ring the site	
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative	·	
		CONFIDENCE LEVEL		
High				

(k) Transport Impact

Traffic impacts anticipated to occur during the construction phase of the project are construction related traffic and noise and dust pollution.

Two location alternatives for the electrical infrastructure compound and two technology alternative for the BESS have been proposed. There is no difference in the impacts from a traffic perspective between the alternatives.

Table 7-35: SPH1: Traffic Impacts - Construction Phase

		TRAFFIC IMPACT			
PROJECT PHASE	Constructi	Construction phase			
DIRECT IMPACT		Traffic congestion due to an increase in traffic caused by the transportation ofequipment, material and staff to site			
INDIRECT IMPACT	Constructi	ion traffic on roads might generate dus	t and noise.		
CUMULATIVE IMPACT	Traffic del	ays on the surrounding road network.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue	Slightly Detrimental	Definite	

IMPACT ON IRREPLACEBLE		albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected No irreplaceable resources will beimpacted.		
RESOURCES SIGNIFICANCE	-30	low negative		
SIGINII ICANCE		PPOSED MITIGATION MEASURES		
	od (if possib ads (interna	le); Il roads and the access road to the site) Internal roads and the access road		
construction phase. The use of mobile batching p Staff and general trips should		parries in close proximity to the site (if a	vailable and feasib	le); and
Stujj unu general trips silouit	i occur outsi	POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is ratedas Short term	_	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will beimpacted.		
SIGNIFICANCE	-15	very low negative		
		CONFIDENCE LEVEL Medium		

(I) Landscape and Visual Impact

Four visual impacts were identified for SPH1 during the construction, operational phase and decommissioning phase

- Landscape change
- Impact on Protected Areas
- Impact on local roads
- Impact on homesteads
- Light pollution

These impacts would all occur during the construction, operation and decommissioning phase. Impacts would peak once the facility is constructed, remain relatively constant during the operational phase and then decrease during the decommissioning phase.

For certain impacts the location alternatives for the electrical infrastructure compound are assessed separately in the tables below. The type of battery technology used in the BESS would not impact on the assessment of visual impacts and so the tables below cover both technology options.

Table 7-36: SPH1 Landscape change, both location alternatives for electrical infrastructure compound

Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not	e surrounding tural site feat g monitoring etation that h ks; s for vegetati required for t	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing in glandscape and maintain existing vege tures such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction and implement the post-decommissioning use of the site-decommissioning and implement remember the duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted. low - negative	ground levels; tation around the d that this has largel is necessary; n; ent remedial action e;	y been achieved in layout
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not is Monitor areas for vegetation DURATION EXTENT IMPACT ON IRREPLACEBLE RESOURCES	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetati required for t on cover post 4 3 -1	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege were such as drainage pans, it is noted and restriction of access to these areas have been disturbed during construction on cover post-construction and impleme the post-decommissioning use of the site- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted.	ground levels; tation around the a that this has largel is necessary; n; ent remedial action e; edial actions.	y been achieved in layout
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not is Monitor areas for vegetation DURATION EXTENT IMPACT ON IRREPLACEBLE	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetati required for t on cover post 4 3	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege arres such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction from cover post-construction and implement post-decommissioning use of the siturbed during construction. The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be	ground levels; tation around the a that this has largel is necessary; n; ent remedial action e; edial actions.	y been achieved in layout
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not is Monitor areas for vegetation DURATION EXTENT SEVERITY	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for to on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing and continuous particular and restriction of access to these areas have been disturbed during construction and implement post-decommissioning use of the siturbed and restriction and implement remains post-decommissioning and implement remains associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	ground levels; tation around the a that this has largel is necessary; n; ent remedial action e; edial actions.	y been achieved in layout
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation DURATION EXTENT	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for to on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege arres such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction for cover post-construction and implement post-decommissioning use of the site-decommissioning and implement remember post-decommissioning and implement remember decommissioning and implement remember post-decommissioning and as such is rated as Long Term The duration of the activity associated with the impact will last more than 5 years and as such is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally	ground levels; tation around the a that this has largel is necessary; n; ent remedial action e; edial actions.	y been achieved in layout
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation DURATION EXTENT	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for to on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege it are such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction from cover post-construction and implement the post-decommissioning use of the sit- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions	ground levels; tation around the a that this has largel is necessary; n; ent remedial action e; edial actions.	y been achieved in layout
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation DURATION EXTENT	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for to on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege it are such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction from cover post-construction and implement the post-decommissioning use of the sit- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that	ground levels; tation around the a that this has largel is necessary; n; eent remedial action e; edial actions.	y been achieved in layout
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for t on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege itures such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction fron cover post-construction and implement the post-decommissioning use of the sit- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects	ground levels; tation around the a that this has largel is necessary; n; eent remedial action e; edial actions.	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for t on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege it are such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction from cover post-construction and implement the post-decommissioning use of the site- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties	ground levels; tation around the a that this has largel is necessary; n; eent remedial action e; edial actions.	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for t on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege it are such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction and cover post-construction and implement the post-decommissioning use of the site- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development	ground levels; tation around the a that this has largel is necessary; n; eent remedial action e; edial actions.	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat required for t on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege were such as drainage pans, it is noted and restriction of access to these areas have been disturbed during construction con cover post-construction and implement the post-decommissioning use of the site- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as	ground levels; tation around the a that this has largel is necessary; n; eent remedial action e; edial actions.	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetati required for t on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing of landscape and maintain existing vege ours such as drainage pans, it is noted and restriction of access to these areas have been disturbed during construction on cover post-construction and implement remember of the post-decommissioning use of the site-decommissioning and implement remember of the duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	ground levels; tation around the a that this has largel is necessary; n; eent remedial action e; edial actions.	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetati required for t on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing of landscape and maintain existing vege of landscape and restriction of access to these areas have been disturbed during construction and implement concover post-construction and implement landscape of the situation of the activity associated with the impact will last more than 5 years and as such is	ground levels; tation around the a that this has largel is necessary; n; eent remedial action e; edial actions.	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work Monitor rehabilitated areas Remove infrastructure not Monitor areas for vegetation	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetati required for t on cover post	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing year gradient and maintain existing vege fures such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction for cover post-construction and implement the post-decommissioning use of the situ- decommissioning and implement reme POST-MITIGATION The duration of the activity associated with the impact will last	ground levels; tation around the d that this has largel is necessary; n; ent remedial action e;	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing year gradient and maintain existing vege for a such as drainage pans, it is noted and restriction of access to these areas have been disturbed during construction for cover post-construction and implement the post-decommissioning use of the situation of the activity The duration of the activity	ground levels; tation around the d that this has largel is necessary; n; ent remedial action e;	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing year gradient and maintain existing vege for a such as drainage pans, it is noted and restriction of access to these areas have been disturbed during construction for cover post-construction and implement the post-decommissioning use of the situation of	ground levels; tation around the d that this has largel is necessary; n; ent remedial action e;	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege fures such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction fon cover post-construction and implement whe post-decommissioning use of the sit- decommissioning and implement reme	ground levels; tation around the d that this has largel is necessary; n; ent remedial action e;	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas Remove infrastructure not	t of structure. e surrounding tural site feat g monitoring etation that h ks; s for vegetat	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege itures such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction ion cover post-construction and implementations.	ground levels; tation around the d that this has largel is necessary; n; ent remedial action e;	y been achieved in layou
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary world Monitor rehabilitated areas	t of structure e surrounding tural site feat g monitoring etation that h ks; s for vegetati	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing in a gradual part of the second par	ground levels; tation around the d that this has largel is necessary; n; ent remedial action	y been achieved in layou
RREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege Remove all temporary work	t of structure e surrounding tural site feat g monitoring etation that h ks;	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege were such as drainage pans. it is noted and restriction of access to these areas have been disturbed during construction	ground levels; tation around the d that this has largel is necessary; n;	y been achieved in layou
RREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing Reinstate any areas of vege	t of structure e surrounding tural site feat a monitoring etation that h	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege fures such as drainage pans. it is noted and restriction of access to these areas	ground levels; tation around the a that this has largel is necessary;	•
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat planning, however ongoing	t of structure e surrounding tural site feat g monitoring	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing a glandscape and maintain existing vege fures such as drainage pans. it is noted and restriction of access to these areas	ground levels; tation around the a that this has largel is necessary;	•
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the Plan to protect existing nat	t of structure e surrounding tural site feat	moderate - negative PROPOSED MITIGATION MEASURE is as low as possible relative to existing in a graduation of the control of	ground levels; tation around the d that this has largel	•
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height Minimise disturbance of the	t of structure e surrounding	moderate - negative PROPOSED MITIGATION MEASURE s as low as possible relative to existing s g landscape and maintain existing vege	ground levels; tation around the d	•
IRREPLACEBLE RESOURCES SIGNIFICANCE Plan to maintain the height	t of structure	moderate - negative PROPOSED MITIGATION MEASURE s as low as possible relative to existing g	ground levels;	(nucleone est
IRREPLACEBLE RESOURCES SIGNIFICANCE		moderate - negative PROPOSED MITIGATION MEASURE		
IRREPLACEBLE RESOURCES	-42	moderate - negative		
IRREPLACEBLE RESOURCES	43	•		
IRREPLACEBLE		impactea.		
	0	impacted.		
	_	No irreplaceable resources will be		
		negatively affected		
		systems or communities are	Detrimental	
		important, sensitive or vulnerable	Detrimental	Definite
		modified way; and valued,	' Madawatali	
SEVERITY	-2	processes continue albeit in a		
		cultural and social functions and		
		environment is altered but natural,		
		Moderate negative as the affected		
		The severity of the impact is rated as		
	-	area and adjacent properties		
EXTENT	3	Local as it affects the development		
		The extent of the impact is rated as	-14	3
		rated as Long Term	-14	3
DURATION	4	associated with the impact will last more than 5 years and as such is		
		The duration of the activity		
ı		PRE-MITIGATION		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
CUMULATIVE IMPACT		f landscape industrialisation due to othe		
INDIRECT IMPACT				
DIRECT IMPACT	Change of c	haracter due to industrialisation of a No	atural Landscape	
PROJECT PHASE	peak levels	during decommissioning.		
		of construction, be relatively constant		
	Construction	n, Operational & Decommissioning Pho	ases. Impacts will i	increase to peak level or
		LANDSCAPE CHANGE		

High NOTES

- 1. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 2. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-37 Industrialization of the landscape as seen from Nielsview NR, with alternative electrical substation compound (alternative 1)

PROJECT PHASE DIRECT IMPACT INDIRECT IMPACT CUMULATIVE IMPACT	Construction completion levels during	NFRASTRUCTURE COMPOUND (ALTER n, Operational & Decommissioning Pl of construction, be relatively constant o	hases. Impacts will incre	ease to peak level on		
DIRECT IMPACT INDIRECT IMPACT	completion levels during		•	EUSE LO DEUN IEVEI UII		
DIRECT IMPACT INDIRECT IMPACT	levels during	of construction, be relatively constant t	completion of construction, be relatively constant during operation and decrease again from peak			
DIRECT IMPACT INDIRECT IMPACT		levels during decommissioning.				
INDIRECT IMPACT	maustriansa	g decommissioning. Ition of the view from Nielsview NR due	a to this project			
	The distribution of the view from Meloview vivide to this project.					
CUMULATIVE IMPACT	<u> </u>					
CUMULATIVE IMPACT		f industrialisation of views from Prot · ·	tectea Areas aue to thi	s ana otner electrica		
	infrastructu					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties				
SEVERITY	0	Negligible				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite		
SIGNIFICANCE	0	very low negative				
	-	PROPOSED MITIGATION MEASU	RES			
Plan to maintain the heir	tht of structur	res as low as possible relative to existin				
		ing landscape and maintain existing ve		alanmant:		
		ratures such as drainage pans. it is note		•		
	-	g and restriction of access to these are	<u> </u>	een acmevea in layou		
		t have been disturbed during construct	ion;			
Remove all temporary wo						
		ation cover post-construction and imple				
Remove infrastructure no	ot required fo	r the post-decommissioning use of the	site;			
		POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties				
SEVERITY	0	Negligible				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite		
SIGNIFICANCE	0	very low negative				
		CONFIDENCE LEVEL				
High						
-		NOTES				

- 1. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 2. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-38 Industrialization of the landscape as seen from Nielsview NR, with alternative electrical substation compound (alternative 2)

SPH 1 INDUSTRIALISA		E LANDSCAPE AS SEEN FROM NIELSVIEW SUBSTATION COMPOUND (ALTERNATIV	•	E ELECTRICAL
PROJECT PHASE		n, Operational & Decommissioning Phase		
DIRECT IMPACT		ation of the view from Nielsview NR due to		
INDIRECT IMPACT	maastranst	ition of the view from meiories in the due to	o uno projecu.	
THE THE THE TENT OF THE TENT O	Extension o	f industrialisation of views from Protect	red Areas due to this a	nd other electrical
CUMULATIVE IMPACT	infrastructu	·	ed thede due to time di	ra other electrical
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
SIGITIFICATION		PROPOSED MITIGATION MEASURES		
Minimise disturbance of t	he surroundin	es as low as possible relative to existing gr g landscape and maintain existing vegeto tures such as drainage pans. it is noted th	ation around the develor	
		and restriction of access to these areas is		acmerea mrayeat
Reinstate any areas of vec	getation that	have been disturbed during construction;		
Remove all temporary wo				
		tion cover post-construction and impleme	nt remedial actions:	
		the post-decommissioning use of the site,		
nemove mjrastractare me	. required joi	POST-MITIGATION	,	
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
Medium				
		NOTES		
1 The alternative hatte	ry technologie	es have no influence on visual impact as h	oth alternatives are like	ly to he enclosed in

- 1. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 2. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-39 Industrialization of the landscape as seen from local roads, SPH1 with alternative electrical infrastructure compound (alternative 1)

	NDSCAPE AS SEEN FROM LOCAL ROADS, : NFRASTRUCTURE COMPOUND (ALTERNA		LELLCTRICAL
Constructio	n, Operational & Decommissioning Phase	S	
	,	, ,	
Extension (of industrialisation of views from loca	ıl roads due to this a	nd other electric
		CONSEQUENCE	LIKELIHOOD
		0011024021102	222002
T			
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4	•		
		-7	3
1		,	3
3	· · · · · · · · · · · · · · · · · · ·		
 			
1			
-1	*		
		Slightly Detrimental Def	Dofinito
+	una processes are minimally affected		Definite
	No irreplaceable resources will be		
U	impacted.		
<u> </u>			
-21			
	<u> </u>		
he surroundin	ng landscape and maintain existing veget	ation around the develop	ment;
atural site fea	tures such as drainage pans;		
getation that	have been disturbed during construction;		
orks;			
as for vegetar	tion cover post-construction and impleme	nt remedial actions;	
, ,	POST-MITIGATION		
1	The duration of the activity		
	-		
2	· ·		
		-5	2
1		J	-
3			
3			
-1			
 			
0	No irreplaceable resources will be	Negligible	Definite
	impacted.		
-15	very low negative		
	CO.III SEITCE ELVEE		
	NOTES		
	Extension of infrastructual RATING 4 3 -1 0 -21 se earthworks the surroundinatural site fear getation that orks; has for vegetation and the surrounder of the surrounder of the surrounder of the surroundinatural site fear getation that orks; has for vegetation and the surroundinatural site fear getation that orks;	INFRASTRUCTURE COMPOUND (ALTERNA Construction, Operational & Decommissioning Phase Industrialisation of the view from local roads due to the second infrastructure projects RATING MOTIVATION PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Low negative as the impact offects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted. PROPOSED MITIGATION MEASURES are earthworks to ensure that levels are not elevated; the surrounding landscape and maintain existing vegetor attural site features such as drainage pans; getation that have been disturbed during construction; orks; as for vegetation cover post-construction and implement required for the post-decommissioning use of the site of the surrounding landscape and maintain existing vegetor as for vegetation cover post-construction and implement are and adjacent properties The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term The extent of the impact is rated as Local as it affects the development area and adjacent properties -1 Negligible No irreplaceable resources will be impacted.	INFRASTRUCTURE COMPOUND (ALTERNATIVE 1) Construction, Operational & Decommissioning Phases Industrialisation of the view from local roads due to this project. Extension of industrialisation of views from local roads due to this a infrastructure projects RATING MOTIVATION CONSEQUENCE PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted. PROPOSED MITIGATION MEASURES See earthworks to ensure that levels are not elevated; the surrounding landscape and maintain existing vegetation around the develop atural site features such as drainage pans; getation that have been disturbed during construction; processor are post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation that have been disturbed during construction; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for vegetation cover post-construction and implement remedial actions; as for veg

The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.

^{2.} The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-40 Industrialization of the landscape as seen from local roads, SPH1 with alternative electrical infrastructure compound (alternative 2)

INDUSTRIALISATIO		IDSCAPE AS SEEN FROM LOCAL ROADS,		E ELECTRICAL
	T	IFRASTRUCTURE COMPOUND (ALTERNA		
PROJECT PHASE		n, Operational & Decommissioning Phase		
DIRECT IMPACT	Industrialisa	ation of the view from local roads due to	this project.	
INDIRECT IMPACT				
CUMULATIVE IMPACT	Extension of infrastructu	of industrialisation of views from loco re projects	al roads due to this a	nd other electrical
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	_ ongnuy bearmentar	·
SIGNIFICANCE	-7	very low negative		
		PROPOSED MITIGATION MEASURES	S	
As Alternative 1				
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
High				
		NOTES		

^{3.} The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.

^{4.} The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-41 Industrialization of the landscape as seen from local homesteads, with proposed electrical infrastructure compound (alternative 1)

		LANDSCAPE AS SEEN FROM LOCAL HOM IFRASTRUCTUER COMPOUND (ALTERNA'		SED ELECTRICAL
Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on completion of construction, be relatively constant during operation and decrease again from peak PROJECT PHASE levels during decommissioning.				
			lua ta thia musia st	
DIRECT IMPACT	inaustrialisc	ntion of the view from local homesteads a	iue to this project.	
INDIRECT IMPACT	F	find about the stine of the street forms to all the		
CUMULATIVE IMPACT	infrastructu	f industrialisation of views from local h re projects		ana otner electrical
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURES		
Plan to maintain the heigh				
Minimise disturbance of t	he surroundin	g landscape and maintain existing vegeto	ation around the develor	oment;
Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development; Construct / grow 2m high screen along SW and E edges of solar cluster closest to affected homesteads;				
Construct / grow 2m high		tures such as drainage pans. it is noted t		n achieved in layout
Plan to protect existing no planning, however ongoin	g monitoring	and restriction of access to these areas is		
Plan to protect existing no planning, however ongoin Reinstate any areas of veg	g monitoring getation that			
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo	g monitoring getation that i rks;	and restriction of access to these areas is have been disturbed during construction;		
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area	g monitoring getation that i rks; as for vegetat	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme	nt remedial actions;	
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area	g monitoring getation that i rks; as for vegetat	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site.	nt remedial actions;	
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area	g monitoring getation that i rks; as for vegetat	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site POST-MITIGATION	nt remedial actions;	
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area	g monitoring getation that i rks; as for vegetat	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site. POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	nt remedial actions;	3
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area Remove infrastructure no	g monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site. POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term The extent of the impact is rated as Local as it affects the development area and adjacent properties	nt remedial actions; ;	3
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area Remove infrastructure no	g monitoring getation that rks; as for vegetat t required for 2	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site. POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term The extent of the impact is rated as Local as it affects the development	nt remedial actions; ;	3 Definite
Plan to protect existing not planning, however ongoing Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area Remove infrastructure not DURATION EXTENT	g monitoring getation that rks; as for vegetat t required for 2	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site. POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted.	nt remedial actions; ; -5	
Plan to protect existing not planning, however ongoing Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated area Remove infrastructure not DURATION EXTENT IMPACT ON IRREPLACEBLE	g monitoring getation that rks; as for vegetat t required for 2 3 -1	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site. POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be	nt remedial actions; ; -5	

High

NOTES

- 1. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 2. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-42 SPH 1 Industrialization of the landscape as seen from local homesteads, with alternative electrical infrastructure compound (alternative 2)

SPH1 INDUSTRIALISAT		ANDSCAPE AS SEEN FROM LOCAL HOME		ATE ELECTRICAL
PROJECT PHASE	Constructio completion	n, Operational & Decommissioning Phas of construction, be relatively constant o	es. Impacts will increas	•
	peak levels during decommissioning. Industrialisation of the view from local homesteads due to this project.			
DIRECT IMPACT	inaustrialis	ation of the view from local nomesteads a	iue to this project.	
INDIRECT IMPACT				
CUMULATIVE IMPACT	Extension of infrastructu	f industrialisation of views from local hore re projects	omesteads due to this a	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURES		
Plan site levels to minimis	e earthworks	to ensure that levels are not elevated;		
Plan to maintain the heigi	ht of structure	es as low as possible;		
Minimise disturbance of t	he surroundir	ng landscape and maintain existing vegeto	ation around the develor	oment;
Construct and/or plant 2n	n high screen	along SW and E edges of solar cluster clos	sest to affected homeste	rads;
Plan to protect existing no	atural site fea	tures such as drainage pans. it is noted th	hat this has largely been	achieved in layout
planning, however ongoin	g monitoring	and restriction of access to these areas is	necessary;	
Reinstate any areas of veg	getation that	have been disturbed during construction;		
Remove all temporary wo				
Monitor rehabilitated are	as for vegeta	tion cover post-construction and impleme	nt remedial actions;	
Remove infrastructure no	t required for	the post-decommissioning use of the site		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

SEVERITY		0	Negligible			
IMPACT	ON		No important a manufacture will be	Negligible	Dofinito	
IRREPLACEBLE		0	No irreplaceable resources will be impacted.	Negligible	Definite	
RESOURCES			трастеа.			
SIGNIFICANCE		0	very low negative			
			CONFIDENCE LEVEL		_	
High						
NOTES						

^{1.} The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.

Table 7-43 SPH 1 Light pollution, with proposed / alternative electrical infrastructure compound (alternatives 1 & 2)

PROJECT PHASE DIRECT IMPACT INDIRECT IMPACT	completion levels during Light polluti Extension of	& 2) n, Operational & Decommissioning Phase of construction, be relatively constant duri g decommissioning. on from the project spoiling the night time	ng operation and decre	•				
DIRECT IMPACT INDIRECT IMPACT	Light polluti Extension o							
INDIRECT IMPACT	Extension o	on from the project spoiling the night time		evels during decommissioning.				
			e environment ana nuis	ance to neighbors.				
CUMULATIVE IMPACT								
		flight pollution due to this and other elect		iects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD				
		PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3				
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties						
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.						
SIGNIFICANCE	-42	moderate - negative						
		PROPOSED MITIGATION MEASURES						
Use low key lighting around	d buildings a	nd operational areas that is triggered only	when people are pres	ent;				
Utilise infra-red security sys	stems or mo	tion sensor triggered security lighting;						
Ensure that lighting is focus	sed on the de	evelopment with no light spillage outside	the site;					
No tall mast lighting should	d be used;							
		POST-MITIGATION						
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3				
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur						
SEVERITY	0	Negligible	Negligible	Definite				

^{2.} The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE		0	very low negative			
			CONFIDENCE LEVEL			
High						
NOTES						

^{1.} The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.

7.3.4 Operational Phase

(a) Agricultural Impact

During the operational phase, areas that where vegetation will remain cleared such as access routes, will remain at risk of soil loss through erosion. During the operation phase, staff and maintenance personnel will access the development area to maintain the infrastructure and make repairs, where required. Biodegradable detergents and water will be used to clean the panels, however this is not expected to result in impacts from an agricultural perspective. The assessment of these impacts are summarised in **Table 7-44** and **Table 7-45**.

Table 7-44 Impact significance of soil loss through erosion during the operation phase

SOIL LOSS THROUGH EROSION						
PROJECT PHASE	Operation	Operation Phase				
DIRECT IMPACT		Areas where soil surfaces will remain bare such as access routes and between PV arrays, will emain at risk of soil erosion.				
INDIRECT IMPACT	Eroded a	reas can expand into nearby areas and resul	t in land degradation	ı.		
CUMULATIVE IMPACT	Increase	in areas at risk of soil erosion.				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3		
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-14	3		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-42	moderate - negative				
		PROPOSED MITIGATION MEASURES				

The development area, including internal access routes, as well as areas bordering on the development area, must regularly be monitored to detect early signs of soil erosion on-set.

If soil erosion is detected, the area must be stabilised using geo-textiles and facilitated re-vegetation.

POST-MITIGATION

^{2.} The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-18	very low negative			
CONFIDENCE LEVEL					
High			_		

Table 7-45 Impact significance of soil pollution during the operation phase

		SOIL POLLUTION				
PROJECT PHASE	Operatio	nal phase				
		tion caused by oil and fuel spills or maintena	nce materials and do	mestic waste left on		
DIRECT IMPACT		replacement of electrolyte of the redox flow				
		risk of pollutant uptake by vegetation with				
INDIRECT IMPACT		environmental and human health				
CUMULATIVE IMPACT		in areas at risk of soil pollution				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
DIMENSION	IVATING	PRE-MITIGATION	CONSEQUENCE	LIKELINOOD		
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
2010/11/014	-	years and as such is rated as Long Term				
		The extent of the impact is rated as site	-14	1		
EXTENT	2	as it will affect only the development				
LATEINT		area				
		The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural,				
ļ.	-2	cultural and social functions and				
SEVERITY		processes continue albeit in a modified	Moderately Detrimental			
		way; and valued, important, sensitive or				
		vulnerable systems or communities are		Unlikely		
		negatively affected	Detrimental			
IMPACT ON		negatively affected				
IRREPLACEBLE	1	Irreplaceable resources will be impacted.				
RESOURCES	_	mreplaceable resources will be impacted.				
SIGNIFICANCE	-14	very low negative				
		PROPOSED MITIGATION MEASURES				
Maintenance must be und	ertaken re	gularly on all vehicles and maintenance mac	hinery to prevent hyd	drocarbon spills.		
		be left at the site and must be transporte				
authorised waste dumping						
Regularly monitor the BES	S area for a	any signs of oil, grease and fuel spillage or th	ne presence of waste	•		
		POST-MITIGATION				
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	-6	1		
		The extent of the impact is rated as	-6	1		
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				
SEVERITY	-1	The severity of the impact is rated as Low	Nogligible	Unlikoly		
JLVLNIII	-1	negative as the impact affects the	Negligible	Unlikely		

			environment in such a way that natural, cultural and social functions and processes are minimally affected	
IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.	
SIGNIFICANCE		-6	very low negative	
			CONFIDENCE LEVEL	
High				

(b) Aquatic Impact

During the operation phase, the solar arrays will operate largely unattended and with low maintenance required for more than 20 years. The hard surfaces created by the development may lead to increased runoff. This may lead to increased erosion and sedimentation of the downslope areas. A localised long-term impact (more than 20 years) of low intensity (depending on the distance between the solar arrays and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified aquatic ecosystems in the area.

The only potentially toxic or hazardous materials which would be present in relatively small amounts would be of lubricating oils and hydraulic and insulating fluids. Therefore, contamination of surface or groundwater or soils is highly unlikely.

Significance of impacts after mitigation: The overall significance of the impact on the aquatic ecosystems is expected to be very low. The impacts are also rated the same for the location alternatives for the electrical infrastructure compound the battery technology options for the BESS.

Table 7-46: SPH1 Operational phase aquatic ecosystem impacts

		AQUATIC ECOSYSTEM IMPACTS				
PROJECT PHASE	DJECT PHASE Operational phase					
DIRECT IMPACT	Disturban	ce of aquatic habitat; water quality impacts				
INDIRECT IMPACT	Modificat	ion of flow and alien vegetation invasion in aquation	features			
CUMULATIVE IMPACT	Degradat	ion of the ecological condition of aquatic ecosyste	ms			
DIMENSION	RATING	MOTIVATION PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD		
DURATION	1	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	1		
SEVERITY IMPACT ON IRREPLACEBLE	-1 0	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted.	Negligible	Unlikely		
RESOURCES SIGNIFICANCE	-5	very low negative				
PROPOSED MITIGATION MEASURES						

Any disturbance during the operation phase should be limited to the approved development footprints and should avoid disturbance of the soil and natural vegetation cover.

Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areasdo not become infested with invasive alien plants.

Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwaterleaving developed areas.

Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider. In a scenario where services are installed, these systems need to be adequately installed and maintained to prevent any potential contamination of the water resources on site.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term	-5	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur	-5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-	-5 very low negative		
		CONFIDENCE LEVEL		
Medium				

(c) Avifaunal Impact

(i) Bird fatality at PV facility

Bird fatalities could occur at the site through a number of mechanisms, including collision with PV panels, entanglement in perimeter fence (less likely since developer has chosen to use mesh panel fencing which has a tight weave and birds are less likely to become entangled), electrocution in substations/electrical compounds and others. The location alternatives for the electrical infrastructure compound and the battery technology options for the BESS are rated the same and are all covered in the same table.

Table 7-47: SPH1 bird fatality during operational phase

BIRD FATALITY AT PV FACILITY					
PROJECT PHASE	Operationa	l phase			
DIRECT IMPACT	Birds killed	through various interaction with facility infrastr	ucture		
INDIRECT IMPACT					
CUMULATIVE IMPACT	More projec	cts will result in overall higher fatality rates in th	ne area		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	o	1	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the	Slightly Detrimental	Unlikely	

		environment in such a way that natural, cultural and social functions and processes are minimally affected		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		
PROPOSED MITIGATION MEASURES				

None required at this stage. Once operational, if facility staff identify any fatalities this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. Operational phase bird monitoring should be conducted for at least one year as per the best practice guidelines – see Section 8.

garaciii ee		DOCT MITICATION		
		POST-MITIGATION		•
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		
CONFIDENCE LEVEL				
Medium			_	_

(ii) Nesting & other use of facility infrastructure by birds

Certain species, in particular doves, pigeons, weavers and crows, are likely to use some of the facility infrastructure for nesting, perching and roosting. At face value this is a positive impact for birds and has been rated as VERY LOW POSITIVE significance both pre and post mitigation. However, where nesting interferes with the operation of the facility this could cause conflict and require management. Nesting on infrastructure also increases the likelihood of bird fatalities occurring through the various mechanism, particularly of young inexperienced birds. No mitigation is required for the impact of the facility on birds through nesting. For the impact of the birds nesting on the facility, the specialist recommends nest management on a case by case basis under the supervision of an avifaunal specialist, and in conformance with all relevant national and provincial legislation. The impact is rated the same for the electrical infrastructure location alternatives and the battery technology options for the BESS.

Table 7-48: SPH1 impact of bird nesting and other use of facility infrastructure by birds

BIRD NESTING, PERCHING & ROOSTING AT PV FACILITY				
PROJECT PHASE	Operational	phase		
DIRECT IMPACT				
INDIRECT IMPACT	Birds use inj	frastructure to perch, roost or nest on		
	More proje	cts in the area will probably diminish the likel	ihood of this happ	pening as perch
CUMULATIVE IMPACT	availability	will increase		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Beneficial	-
SIGNIFICANCE	7	very low positive		
		PROPOSED MITIGATION MEASURES		

None required at this stage. Once operational, if facility staff identify any nesting which interferes with operations this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. All nest management measures should only be undertaken in compliance with national and provincial environmental legislation in this regard.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	7	very low positive		
CONFIDENCE LEVEL				
Medium				

(d) Bats Impact

Day to day operation and maintenance of the facility may result in disturbance and displacement of bats. The impact is rated the same for the electrical infrastructure location alternatives and the battery technology options for the BESS.

Table 7-49: SPH1 disturbance and displacement effects for bats

	IMPACT OF	N POSSIBLE DISTURBANCE & DISPLACEMENT EFF	FCTS	
PROJECT PHASE	Operational		20.0	
DIRECT IMPACT		e of bats during operational activities		
INDIRECT IMPACT	Displaceme			
CUMULATIVE IMPACT	_	ty of suitable foraging resources in the broader en	vironment for displa	aced individuals
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		suchis rated as Long Term	-7	1
	_	The extent of the impactis rated as site as it	·	_
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes		
		are minimally affected	Slightly	Unlikely
IMPACT ON			Detrimental	
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES				
SIGNIFICANCE	-7	very low negative		
		PROPOSED MITIGATION MEASURES		
Limit operational and main	tenance activi	ties to daylight hours, as far as possible, and min	imise lighting at nig	ht.
All lighting should preferab	ly use low pre	ssure sodium and warm white LED lights.		
Operational and maintenar	ice activities s	hould be limited to the immediate project footpr	rint only.	
Site access should be strictly	y controlled, t	o avoid unnecessary disturbance.		
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		suchis rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it		
LAILINI	2	will affect only the development area		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes	Slightly	Unlikely
		are minimally affected	detrimental	Omiciy
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES		<u> </u>		
SIGNIFICANCE	-7	very low negative		-
		CONFIDENCE LEVEL		
Medium				

Table 7-50: SPH1 bat roost disturbance

		MPACT ON POSSIBLE ROOST DISTURBANCE				
PROJECT PHASE	Operationa					
DIRECT IMPACT		of roosting bats during operational activities				
INDIRECT IMPACT	Roost aban					
INDIRECT IVII ACT		ity of suitable roosting resources in the bro	ader environment	for ahandoned		
CUMULATIVE IMPACT	individuals	ty of suituble roosting resources in the broken	uder environment	joi abanaonea		
DIMENSION	RATING	MOTIVATION	CONSTOLIENCE	HIVELIHOOD		
DIVIENSION	KATING	MOTIVATION PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD		
	_	The duration of the activity associated with				
DURATION	4	the impact will last more than 5 years and as		_		
		such is rated as Long Term	-14	2		
EXTENT	2	The extent of the impact is rated as site as it				
	_	will affect only the development area				
		The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural, cultural				
SEVERITY	-2	and social functions and processes continue				
		albeit in a modified way; and valued,	Moderately			
		important, sensitive or vulnerable systems or	Detrimental	Likely		
		communities are negatively affected	Detrimental			
IMPACT ON						
IRREPLACEBLE	1	Irreplaceable resources will be impacted.				
RESOURCES						
SIGNIFICANCE	-28	low negative				
		MITIGATION MEASURES TO BE INCLUDED IN THI				
During operational & maint	enance activi	ties, avoid all movement and noise around mediu	m sensitive areas.			
All lighting should preferabl	ly use low pre	ssure sodium and warm white LED lights.				
Operational and maintenar	ice activities s	hould be limited to the immediate project area.				
Site access should be strictly	, controlled, t	o avoid unnecessary disturbance.				
		POST-MITIGATION				
		The duration of the activity associated with				
DURATION	4	the impact will last morethan 5 years and as				
		such is rated as Long Term	-7	1		
EVTENT	2	The extent of the impactis rated as site as it				
EXTENT	2	will affect only the development area				
		The severity of the impact is rated as Low				
		negative as the impact affects the				
SEVERITY	-1	environment in such a way that natural,				
		cultural and social functions and processes are	Slightly	I Indiilant		
		minimally affected	detrimental	Unlikely		
IMPACT ON			1			
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.				
RESOURCES						
SIGNIFICANCE	-7	very low negative	•			
		CONFIDENCE LEVEL				
Medium						

(e) Botanical Impacts

Maintenance activities will require management of vegetation which may result in loss of natural vegetation. The impact is rated the same for the electrical infrastructure location alternatives and the battery technology options for the BESS.

Table 7-51: SPH1 loss of Western Free State Grassland during operational phase

		LOSS OF VEGETATION		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Direct impa	ct		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-5	1
EXTENT	1	The extent of the impact is the footprint as it only affects the area in which the proposed activity will occur.	,,	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
<u> </u>		aring should be undertaken during the dry seasor	1.	
Only clear vegetation where				
		will be decided and approved by the Project M	anager and appoin	ted ECO before
construction commences or	site and sho	uld not be located within drainage lines.		
		POST-MITIGATION		
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	2	4
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-2	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-2	very low negative		
		CONFIDENCE LEVEL		
Medium				

(f) Groundwater Impact

Similar to the construction phase, the operational phase of the SPH1 will require approximately $2,000 \, \text{m}^3/\text{a}$ ($0.03 \, \text{L/s}$). This does not exceed the regionally mapped yield of the underling aquifer ($0.5 - 2.0 \, \text{L/s}$). It is not currently planned to use groundwater for the operational phase of this project however if this changes a water use licence will need to be applied for and the potential impacts and mitigation measures are presented in **Table 7-52**.

The principal risks for groundwater contamination that have been identified are the use of cleaning agents for cleaning of PV panels and for dust suppression of internal roads. If required, it is encouraged that water alone is used to conduct these tasks. Alternatively, the PV cleaning agents and dust suppression mixes must be environmentally friendly and should breakdown naturally without causing ingression of harmful chemicals into the environment. The risks and status of groundwater contamination occurring during the operational phase of SPH1 is presented in **Table 7-56**.

The proposed development will require a BESS. Currently two different technologies are being considered, i.e. either Solid State Lithium Batteries (SSLB) or Vanadium Redox Flow Battery Energy Storage Systems (VRFB). Both of these two BESS systems require an electrolyte. The SSLB contain an ethylene carbonate or di-ethyl carbonate electrolyte and the VRFB system will require that an estimate of 3 000 m³ of sulfuric acid solution with vanadium ions electrolyte is stored on site for each Springhaas Facility. The BESS systems will also require cooling systems and these systems could potentially either be water based or it may be refrigerant based systems which used chemicals such as ethylene glycol- based coolants.

The containers that the BESS systems are held in are equipped with a "Clean agent" which is a fires suppression systems that can release a powder/gas into the container to snuff fires. These systems usually leave a residue on the equipment that will need to be cleaned off. With any chemical storage there is always a risk of chemical fires that will need to be put out with water or foam and the waste water from these activities could contain contaminants that should not be let to run off into the environment.

The fire safety systems, refrigerants, electrolyte solutions and the waste products produced from these systems could contaminate the soil and groundwater and all measures should be taken to prevent leaks or spills on the ground. The risks and mitigations for the BESS are presented in **Table 7-57**.

The impact on groundwater levels is rated the same for the electrical infrastructure location alternatives and the battery technology options for the BESS.

Table 7-52 SPH1: Impact of lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place)

Potential impact on groundwater level due to over abstraction					
PROJECT PHASE	Operational				
DIRECT IMPACT	Lowering of	groundwater level due to over abstraction			
INDIRECT IMPACT		rings in the area			
CUMULATIVE IMPACT	Permanent	damage to the aquifer system in the area			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	2	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-32	low – negative			
		PROPOSED MITIGATION MEASURES			
Test pumping of wate	er boreholes).	rectly yield tested according to the National Sto This includes a Step Test, Constant Discharge Te	•		
Adhere to the boreho	le's safe yield	and to monitor water levels and flow.			
Groundwater abstrac	tion volumes	must be monitored.			
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	U	1	
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely	
SIGNIFICANCE	0	very low negative			
		CONFIDENCE LEVEL			
Medium					

Table 7-53: SPH1 Impact of contamination of groundwater as a result of cleaning agents used for cleaning the solar panels

Potential impa	act on ground	water as a result of cleaning agents used for cl	eaning the solar pa	nels.
PROJECT PHASE	Operational	Phase		
DIRECT IMPACT	Contaminat	ion of groundwater		
INDIRECT IMPACT		the vegetation or ecosystem it the area		
CUMULATIVE IMPACT	Long-term r	educed groundwater quality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2
EXTENT	w	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-16	2
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		
		PROPOSED MITIGATION MEASURES		
Use environmentall	y safe cleanin	ng agents that breakdown naturally (biodegrad	dable detergents/g	reen soaps) and
that will not cause o	dverse effect:	S.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
Medium				

Redox flow batteries contain electrolyte solution which needs to be replaced approximately every 15 to 20 years. During replacement of electrolyte there is a risk of leaks or spills. This impact is only applicable to the redox flow batteries as lithium-ion batteries are solid state batteries.

Table 7-54 Impact table for contamination of groundwater quality as a result of leaking or spills from the electrolyte solution from the battery energy storage system (BESS)

Potential impact on gr		ty as a result of leaking or spills from t tery energy storage system (BESS)	he electrolyte solut	ion from the
PROJECT PHASE	Operational Pho			
DIRECT IMPACT		of groundwater		
INDIRECT IMPACT		vegetation or ecosystem it the area		
CUMULATIVE IMPACT		ced groundwater quality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or Communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		
	PRO	OPOSED MITIGATION MEASURES		
		red or used on site have secondary are. Ensure that all chemicals are handle		
Any waste products produ		S systems should be removed and disp uld not be allowed to runoff into the e		ly.
Any waste products produ		uld not be allowed to runoff into the e POST-MITIGATION		ly.
Any waste products produ		uld not be allowed to runoff into the e POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	nvironment.	
Any waste products produc Waste water produced by	fire hydrants sho	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as		ly. 1
Any waste products produc Waste water produced by	fire hydrants show	Indicate the allowed to runoff into the expost-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed	nvironment.	
Any waste products produced by Waste water produced by DURATION EXTENT SEVERITY IMPACT ON IRREPLACEBLE	fire hydrants show	Ald not be allowed to runoff into the epost-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur Negligible Irreplaceable resources will be	nvironment.	
Any waste products product Waste water produced by DURATION EXTENT SEVERITY	4 1 0	uld not be allowed to runoff into the e POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur Negligible	0	1

Medium

(g) Heritage Impact

(i) Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts during operation of SPH1 relate only to the presence of the facility in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the facility. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a degree of change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. The impacts are the same for the location alternatives for the electrical infrastructure compound and the technology options for the batteries for the BESS.

Table 7-55: SPH1: Assessment of operation phase impacts to the cultural landscape

		CULTURAL LANDSCAPE IMPACTS						
PROJECT PHASE	Operation F	Phase						
DIRECT IMPACT	Alteration o	f the rural landscape character through the presence o	f a solar energy fac	cility				
INDIRECT IMPACT None								
CUMULATIVE IMPACT	Impacts will	l be greater with multiple facilities being present						
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD				
	PRE-MITIGATION							
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3				
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-/	3				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Definite				
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental					
SIGNIFICANCE	-21	low - negative						
		PROPOSED MITIGATION MEASURES						
Keep all maintenance w		• •						
Minimise night-time lig	ht pollution in	the area (visual recommendations to be followed to a	chieve this).					
		POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3				
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-,	,				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite				
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental					
SIGNIFICANCE	-21	low - negative						
		CONFIDENCE LEVEL						
High								

(h) Socio-Economic Impact

(i) Stimulation of the Local Economy during operations

The operational period of SPH1 is a minimum of 20 years. Of the money spent annually during the operations period, a significant portion will likely comprise of salaries and wages of the Springhaas employees. The operations of the facility will make some contribution towards the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

No differentiate can be made between the location alternatives for the electrical infrastructure compound and battery technology for the BESS. All alternatives are considered in **Table 7-56** and **Table 7-57**.

Table 7-56: SPH1 Assessment of Economic stimulation during operations

STIMULATION OF THE LOCAL	ECONOMY	DURING OPERATIONS				
PROJECT PHASE	Operation	Operational Phase				
DIRECT IMPACT	Long-term	Long-term increase in production and GDP in the local economy				
INDIRECT IMPACT	Improved	Improved household income and increased business sales in the local economy				
CUMULATIVE IMPACT	Increase in	crease in production and GDP in the regional economy				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	o	2		
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	8	3		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	24	low positive				
PROPOSED MITIGATION MEA	SURES					
Where feasible, procure good	s and servic	es required for the operation of the plant from th	e local economy			
POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3		
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	10	,		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue	Moderately Beneficial	Definite		

		albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	
SIGNIFICANCE	48	moderate positive	
CONFIDENCE LEVEL			
High			

(ii) Creation of Employment and increased household income during operations

The operation of SPH1 will require functional and maintenance employees. It is envisaged that about eight direct jobs per facility will be created during the operations phase, which will occur for a duration of 20 years. About 70% of these jobs are to be filled by people from the local communities as they will be low-skilled employment opportunities. Employment of the eight individuals for the entire operational period will increase their household income, improve their standard of living and benefit their families.

SPH1 will create the same number of employment opportunities, regardless of its location on the site; thus, layout alternatives are equally preferred. The type of battery used in the BESS will also not significantly affect employment alternatives, thus both technology alternatives are equally preferred.

Table 7-57: SPH1 Assessment of employment during operations

CREATION OF EMPLOYMENT AND INCREASED HOUSEHOLD INCOME DURING OPERATIONS						
PROJECT PHASE	Operation	Operational Phase				
DIRECT IMPACT	Creation c	Creation of permanent employment opportunities in the local and regional economy				
INDIRECT IMPACT	Improved	income of households whose members are em	ployed on the proje	ect		
CUMULATIVE IMPACT	Creation c	reation of permanent employment opportunities in the region				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
		The duration of the activity associated with				
DURATION	4	the impact will last more than 5 years and		3		
		as such is rated as Long Term	- 8			
		The extent of the impact is rated as				
EXTENT	4	Regional as the effects of the impact				
		extends beyond municipal boundaries				
		The severity of the impact is rated as Low				
		positive as the impact affects the				
SEVERITY	1	environment in such a way that natural,				
		cultural and social functions and processes	Slightly	5 % "		
		are minimally improved	Beneficial	Definite		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be				
RESOURCES	U	impacted.				
SIGNIFICANCE	24	low positive				
PROPOSED MITIGATION MEASURES						
Where feasible, aim to fill all t	he positions	by labour from the local community				
POST-MITIGATION						

DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	8	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	8	3
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
CONFIDENCE LEVEL				
High				

(iii) Improved municipal service delivery

SPH1 will have a capacity of up to 250MWac and will be connected to the national grid through Eskom substation and generated electricity will be sold nationwide. The proposed project, albeit relatively small, will contribute towards improving National electricity availability; thus, improving the government service delivery, and could potentially also aid in growing the local economy by increasing the overall supply of electricity in the local economy. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas.

The layout alternatives and BESS technology alternatives will not affect the capacity of the solar facility; thus all alternatives are equally preferred.

Table 7-58: SPH1: Assessment of service delivery improvement

IMPROVED MUNICIPAL SERVICE DELIVERY				
PROJECT PHASE	Operation	nal phase		
DIRECT IMPACT	It will like	ly Improve the local electricity supply if fe	d to the grid	
INDIRECT IMPACT	Improved	standard of living within the region		
CUMULATIVE IMPACT	Improved	l electricity availability		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified	Moderately Beneficial	Definite

			way; and valued, important, sensitive or vulnerable systems or communities are positively affected
IMPACT	ON		No irreplaceable resources will be
IRREPLACEABLE		0	impacted.
RESOURCES			mpacca.
SIGNIFICANCE		48	moderate positive
PROPOSED MITIG	ATION M	EASURE	S
No mitigations pro	oposed		

(i) Reduction of Land Area available for productive farming

The proposed site of SPH1 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH1 as being of low to very low agricultural potential with small isolated patches of low – moderate and moderate potential land on the edges of the facility. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH1 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH1.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-59: SPH1: Assessment of Impact on agricultural production

Reduction of Land Area available for Productive Farming						
PROJECT PHASE Operational Phase						
DIRECT IMPACT	Loss of ag	gricultural production within the footprint due to	land sterilisation			
INDIRECT IMPACT	Negligibl	e to no indirect impact				
CUMULATIVE IMPACT	Negligible	e to no cumulative effects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		2		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	6	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,	Negligible	Definite		

•	Ī	1	İ	Ī
		cultural and social functions and processes		
		are minimally affected		
IMPACT ON				
IRREPLACEABLE	1	Irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-18	very low negative		
		PROPOSED MITIGATION MEASURES		
Rehabilitation of land shou	ld take plac	ce at the end of the project's life to allow for the lo	and to be used for li	vestock farming
after the closure of the pro	ject.			
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	6	2
		The extent of the impact is rated as footprint	6	3
EXTENT	1	as it only affects the area in which the		
		proposed activity will occur		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes		5 <i>(: ::</i>
		are minimally affected	Negligible	Definite
IMPACT ON				
IRREPLACEABLE	1	Irreplaceable resources will be impacted.		
RESOURCES		·		
SIGNIFICANCE	-18	very low negative		
		CONFIDENCE LEVEL		
High				

(i) Terrestrial Biodiversity and Animal Species

(i) Direct Impacts – Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death.

Regarding the technology alternative for the type of battery used in the BESS for SPH1, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place. The impact ratings will be same irrespective of the layout alternatives of the electrical infrastructure compound.

Table 7-60: SPH1 Injury or death to fauna

		ALL FACILITIES		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Injury or de	ath to fauna		
INDIRECT IMPACT				
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	2
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-32	low negative		

PROPOSED MITIGATION MEASURES

No wild animal may under any circumstance be handled, removed or be interfered with by maintenance staff

To prevent possible collisions with animals, drivers of maintenance vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

Adequate fire prevention and safety measures must be in place. A fire emergency management plan must be in place

All electrical equipment must be maintained on a regular basis to minimise the risk of fire

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-6	very low negative			
		CONFIDENCE LEVEL	_		
High					

(ii) Indirect Impacts – Pollution and contamination of natural areas

During operations, release of grey water into the environment can cause contamination by detergents. Grey water from cleaning of the solar panels has the potential to contaminate soils and ground water and be washed into the nearby natural pans during high rainfall events. This includes biodegradable detergents used for cleaning the panels, which can accumulate in the soil and be washed into the nearby pans before they break down. Biodegradable detergents can alter the balance of freshwater ecosystems as they promote bacterial growth and lower oxygen levels. The impacts are rated the same for both location alternatives for the electrical infrastructure compound and the battery technology alternatives for the BESS.

Table 7-61: SPH1 Pollution and contamination of natural areas

	POLLUTION	ON AND CONTAMINATION OF NATURAL	AREAS	
PROJECT PHASE	Operational Phase			
DIRECT IMPACT	-			
INDIRECT IMPACT	Pollution and c	ontamination of natural areas – no nearb	y pans or wetlands	
CUMULATIVE IMPACT	Habitat degrad	lation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	2
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-28	low negative		
		PROPOSED MITIGATION MEASURES		

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum

every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

POST-MITIGATION						
DURATION 4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	1			

EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-6	very low negative		
CONFIDENCE LEVEL				
High		·	·	_

(iii) Indirect Impacts – Disturbance and displacement of fauna

Security lights for SPH1 during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The impacts are rated the same for both location alternatives for the electrical infrastructure compound and the battery technology alternatives for the BESS.

Table 7-62 SPH1: Disturbance and displacement of fauna

DISTURBANCE AND DISPLACEMENT OF FAUNA					
PROJECT PHASE	Operation	nal Phase			
DIRECT IMPACT					
INDIRECT IMPACT	Disturbance to and displacement of fauna – natural grassland				
CUMULATIVE IMPACT	Displacen	nent of fauna			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-32	low negative			
PROPOSED MITIGATION MEASURES					

Operations during the night must be avoided to minimise the need for artificial lighting and to reduce the impact of light and noise on nocturnal animals

Lighting during operations should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-7	very low negative			
	CONFIDENCE LEVEL				
High				•	

(j) Traffic Impact

During the operational phase there will be approximately 8 full time employees on site. Vehicles would access the site for daily operations and maintenance as and when required. The impacts are rated the same for both location alternatives for the electrical infrastructure compound and the battery technology alternatives for the BESS.

Table 7-63 SPH1: Traffic impacts during operation phase

		TRAFFIC IMPACTS				
PROJECT PHASE		Operational Phase				
DIRECT IMPACT		Traffic congestion due to the trips generated by the operation of the facility				
INDIRECT IMPACT		ated noise and dust pollution				
CUMULATIVE IMPACT		rys on the surrounding road network				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	1	PRE-MITIGATION	T			
DURATION	4	The duration of the activity associated with the impact will lastmore than 5 years and as such is rated as Long Term	0	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the developmentarea and adjacent properties				
SEVERITY	0	Negligible				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite		
SIGNIFICANCE	0	very low negative				
		PROPOSED MITIGATION MEASURES				
Staff and maintenance trips	s should occu	r outside of peak traffic periods; and				
Client/Facility Manager is t	o ensure tha	t regular maintenance of gravel roads (locat	ed within the site boun	dary,including the		
		peration phase to minimise/mitigate dust pol		,,		
,	<u> </u>	POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will lastmore than 5 years and as such is rated as Long Term	0	3		
EXTENT	2	The extent of the impact is rated assite as it will affect only the development area	-	-		

SEVERITY	0	Negligible		
IMPACT ON	0	No irreplaceable resources will be	Negligible	Definite
IRREPLACEBLE		impacted.	rregngible	Dejiiiice
RESOURCES				
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
High				

7.3.5 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered **Section 7.7**.

7.3.6 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities and is covered in **Section 7.8.**

7.3.7 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The cumulative impact assessment is available in **Section 7.9.**

7.3.8 Impact Summary

A large number of impacts have been identified through the basic assessment process. These are summarised in **Table 7-6** below for ease of reference. The impacts apply to the location alternative of the electrical infrastructure compound and the battery technology options unless stated otherwise.

Table 7-64: SPH1 impact summary

Impact	Nature	Rating pre-mitigation	Rating post mitigation			
Design/Planning/Pre-Construction Phase						
No impacts identified						
Construction Phase						
Agricultural impacts						
Land use change from livestock farming to energy generation	Negative	Moderate	Low			
Soil loss through erosion	Negative	Moderate	Very low			
Impaired soil functionality caused by compaction	Negative	Moderate	Very low			

Aquatic impacts Disturbance and water quality impacts Avifaunal impacts Destruction of bird habitat during construction Disturbance of birds during construction Bat impacts Bat habitat modification Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative Negative Negative Negative	High Very low Moderate Very low	Very low Very low Low
Aquatic impacts Disturbance and water quality impacts Avifaunal impacts Destruction of bird habitat during construction Disturbance of birds during construction Bat impacts Bat habitat modification Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on cultural landscape Note the province of t	Negative Negative Negative	Very low Moderate	Very low
Avifaunal impacts Destruction of bird habitat during construction Disturbance of birds during construction Bat impacts Bat habitat modification Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative Negative	Moderate	,
Avifaunal impacts Destruction of bird habitat during construction Disturbance of birds during construction Bat impacts Bat habitat modification Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative Negative	Moderate	,
Disturbance of birds during construction Bat impacts Bat habitat modification Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative		Low
Disturbance of birds during construction Bat impacts Bat habitat modification Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative	Very low	
Bat impacts Bat habitat modification Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	-		Very low
Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative		
Disturbance and displacement of bats Possible roost disturbance Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape		Very low	Very low
Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative	Very low	Very low
Bat roost destruction Botanical impacts Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative	Low	Very low
Loss of vegetation Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape	Negative	Low	Very low
Groundwater impacts Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape N			
Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape N	Negative	Medium	Low
construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape N			
Contamination of groundwater as a result of accidental oil spillages or fuel leakages Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape N	Negative	Low	Very low
Heritage impacts Impact on archaeological sites Impact on graves Impact on cultural landscape Impact on cultural landscape	Negative	Very low	Very low
Impact on archaeological sites Impact on graves Impact on cultural landscape Impact on cultural landscape			•
Impact on graves Impact on cultural landscape N	Negative	Very low	Very low
Impact on cultural landscape	Negative	Low	Very low
	Negative	Low	Low
Palaeontological impacts		LOW	LOW
Destruction of fossils N	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-economic impacts			u
Stimulation of the economy during construction P	Positive	Low	Low
Employment opportunities P	Positive	Low	Low
Reduction in land available for productive farming N	Negative	Very low	Very low
Loss of property N	Negative	Low	Very low
Terrestrial biodiversity and animal species (faunal) impacts			
Destruction of faunal habitat	Negative	High	Low
Injury or death to fauna	Negative	Moderate	Very low
Pollution and contamination of natural areas			
Disturbance and displacement of fauna – edge effects	Negative	Low	Very low
Spread of invasion by alien vegetation	Negative	Moderate	Very low
Traffic impacts			
Traffic congestion N	Negative	Very low	Very low
Landscape and visual impacts			
location alternatives)	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve with proposed electrical infrastructure compound (alternative 1)			

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Industrialisation of the landscape as seen from Nielsview Nature	Negative		mitigation
Reserve with proposed electrical infrastructure compound (alternative 2)		Very low	Very low
Industrialisation of the landscape as seen from local roads, with alternative electrical infrastructure compound (alternative 1)	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads, with alternative electrical infrastructure compound (alternative 2)	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads, with proposed electrical infrastructure compound (alternative 1)	Negative	Moderate	Very low
Industrialisation of the landscape as seen from local homesteads, with proposed electrical infrastructure compound (alternative 2)	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
Operational Phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Soil pollution	Negative	Very low	Very low
Aquatic impacts	•		
Increased run-off, pollution	Negative	Very low	Very low
Disturbance of aquatic habitat; water quality impacts	Negative	Very low	Very low
Avifauna impacts			
Bird fatality through interaction with infrastructure	Negative	Very low	Very low
Nesting and use of other infrastructure by birds	Positive	Very low	Very low
Bat impacts			
Disturbance and displacement	Negative	Very low	Very low
Roost disturbance	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Very low	Very low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place).	Negative	Low	Very low
Contamination of groundwater from use of cleaning agents	Negative	Low	Very low
Contamination of groundwater from leaks or spills from BESS	Negative	Low	Very low
Heritage impacts			
Impact on cultural landscape	Negative	Low	Low
Socio-economic impacts			
Economic stimulation during operations	Positive	Low	Moderate
Employment opportunities	Positive	Low	Low
Improved service delivery	Positive	Moderate	Moderate
Reduction in land available for productive farming	Negative	Very low	Very low
Terrestrial biodiversity and animal species	1		
Injury or death of fauna	Negative	Low	Very low
Pollution and contamination of natural areas - no nearby pans or wetlands	Negative	Low	Very low
Disturbance and displacement of fauna	Negative	Low	Very low
Traffic impact	ı		
Traffic congestion	Negative	Very low	Very low
		10.710	15.4.01

large de la constant	Nature	Button on other trans	Rating post
Impact		Rating pre-mitigation	mitigation
Palaeontological impacts			
Destruction of fossils	NA	NA	NA
Decommissioning phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Impaired soil health as a result of soil pollution	Negative	High	Very low
Aquatic impacts			
Disturbance of aquatic habitat, water quality impacts	Negative	Very low	Very low
Avifaunal impacts			
Disturbance of birds	Negative	Very low	Very low
Bat impacts		,	10.7.0
Disturbance and displacements	Negative	Very low	Very low
Botanical impacts		very low	
Loss of vegetation	Negative	Low	Low
Groundwater		LOW	LOW
Contamination from construction activities	Negative	Very low	Very low
Heritage impacts		very low	very lov
Alteration of the rural landscape character through the presence of	Negative		
construction equipment and vehicles and all the associated	Negative	Low	Very low
activities on site			
Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-Economic impacts			
Impact on the economy	Positive	Very low	Very low
Creation of temporary employment opportunities in the local and	Positive	Very low	Very low
regional economy Torrestrial biodiversity and animal enesies	1 0516170	10.7.0	Tery lon
Terrestrial biodiversity and animal species	T		
Destruction of novel ³ faunal habitat (i.e. grassed areas under the panels where fauna may recolonise after construction)	Negative	Moderate	Very low
Injury or death to animals (due to collisions with construction			
vehicles or destruction of burrows that have established under the panels)	Negative	Moderate	Very low
Pollution and contamination of natural areas including pans and	Negative	Moderate	Very low
wetlands	Negative	Wioderate	very low
Disturbance to and displacement to fauna and edge effects – natural grassland	Negative	Low	Very Low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Reestablishment of movement corridors through the landscape	Negative	Very low	Low positive
due to removal of fences and return to open grassland Traffic impacts		111,1011	2011
Traffic congestion due to an increase in traffic caused by the			
transportation of equipment, material and staff to site	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change (both electrical infrastructure compound	Negative	Moderate	Low
location alternatives)			

³ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Industrialisation of the landscape as seen from Nielsview Nature Reserve with proposed electrical infrastructure compound (alternative 1)	Negative	Very low	Very low
Industrialisation of the landscape as seen from Nielsview Nature Reserve with proposed electrical infrastructure compound (alternative 2)	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads, with alternative electrical infrastructure compound (alternative 1)	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads, with alternative electrical infrastructure compound (alternative 2)	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads, with proposed electrical infrastructure compound (alternative 1)	Negative	Moderate	Very low
Industrialisation of the landscape as seen from local homesteads, with proposed electrical infrastructure compound (alternative 2)	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
No-Go Alternative			
Agricultural	Negative	Very low	Very low
Aquatic	Negative	-	Very low- negligible
Avifauna	Negative	Very low	Very low
Bats	Negative	Very low	Very low
Botanical	Negative	Low	Low
Heritage	Negative	Very low	Very low
Transport- Traffic congestion	Negative	Very Low	Very Low
Terrestrial biodiversity and animal species	Negative/	Low negative	Very low
Socio-economic	NA- no impact, forgone + impacts	NA	positive NA
Destruction of fossils	NA	NA	NA
Landscape and Visual	Negligible	No impact/NA	No impact/NA
Groundwater Impacts	Negligible	NA	NA
Cumulative impacts			
Agricultural	Negative	Very low	Very low
Aquatic	Negative	Low	Low
Avi-fauna	Negative	Moderate	Moderate
Bats	Negative	Moderate	Moderate
Datavisal			iviouerate
Botanical	Negative	Very low	Very low
Heritage	Negative Negative	Very low Moderate	
	_		Very low
Heritage	Negative	Moderate	Very low Low
Heritage Socio-economic - Impact on the economy- construction	Negative Positive	Moderate	Very low Low Moderate
Heritage Socio-economic - Impact on the economy- construction Socio-economic - Creation of employment during construction	Negative Positive Positive	Moderate - -	Very low Low Moderate Moderate Low
Heritage Socio-economic - Impact on the economy- construction Socio-economic -Creation of employment during construction Socio-economic -Reduction in land available for productive farming	Negative Positive Positive Negative	Moderate - -	Very low Low Moderate Moderate Low Moderate
Heritage Socio-economic - Impact on the economy- construction Socio-economic -Creation of employment during construction Socio-economic -Reduction in land available for productive farming Socio-economic -Stimulation of the economy – operations	Negative Positive Positive Negative Positive	Moderate - -	Very low Low Moderate Moderate Low Moderate Moderate Moderate
Heritage Socio-economic - Impact on the economy- construction Socio-economic - Creation of employment during construction Socio-economic - Reduction in land available for productive farming Socio-economic - Stimulation of the economy – operations Socio-economic - Employment - operations	Negative Positive Positive Negative Positive Positive	Moderate	Very low Low Moderate Moderate Low Moderate Moderate Moderate Moderate
Heritage Socio-economic - Impact on the economy- construction Socio-economic -Creation of employment during construction Socio-economic -Reduction in land available for productive farming Socio-economic -Stimulation of the economy – operations Socio-economic -Employment - operations Socio-economic -Improved municipal service delivery	Negative Positive Positive Negative Positive Positive Positive	Moderate	Low Moderate Moderate Low Moderate Moderate Moderate Moderate

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Terrestrial biodiversity	Negative	High	Moderate
Transport	Negative	Low	Very Low
Landscape and visual	Negative	-	Low
Destruction of fossils	NA	NA	NA
Groundwater: Aquifer system and water quality	Negative	Low- Very Low	Low – Very Low

7.4 Springhaas 3 Detailed Impact Assessment

7.4.1 Alternatives Considered

(a) Location Alternatives

Two location alternatives were considered for the temporary laydown area for SPH3.

(b) Technology Alternatives

Two technology alternatives namely lithium-ion and redox flow batteries were considered for the BESS.

(c) No-Go Alternative

The no-go alternative was considered for all seven of the proposed facilities. The impact of the no-go alternative was rated as the same for all seven facilities. The no-go alternative is assessed in **Section 7.8**.

7.4.2 Pre-construction phase

No significant impacts for the pre-construction phase have been identified by any specialist studies or by the EAP for SPH3.

7.4.3 Construction Phase

(a) Agricultural Impact

The most significant agricultural impacts associated with the development of SPH3 will occur during the construction phase when the site is fenced off, vegetation is removed and the soil surface is prepared for the installation of infrastructure.

The footprint of SPH3 contains small sections of moderate sensitivity agricultural land and the start of the main access road crosses a small medium sensitivity land. These patches are small and isolated from other areas of viable production. The loss of these areas of moderate sensitivity land are therefore considered the same as the loss of low sensitivity areas.

SPH3 was also classified in terms of agricultural potential. The majority of the site is classified as low to very low potential. There is one patch of low-moderate potential land and three aeas of moderate potential land, one of which is located at the start of the main access road. As these patches of low-moderate and moderate potential agricultural land are isolated from larger patches of moderate sensitivity land they are not viable from a production perspective.

Tables 7-8 – 7-11 cover both location alternatives for the temporary laydown area and the two technology options for the BESS. There was no difference in the alternatives proposed from an agricultural perspective.

Table 7-65: SPH3: Impact of land use change from livestock farming to renewable energy generation

LAND USE CHANGE FROM LIVESTOCK FARMING TO ENERGY GENERATION						
PROJECT PHASE	Construction	Construction Phase				
DIRECT IMPACT	Construction	n of boundary fence and PV infrastructu	re will change land	use from livestock		
DIRECT IIVIPACT	farming to r	enewable energy generation				
	Intensification of agriculture in other areas or otherwise reduction of livestock produced in					
INDIRECT IMPACT	the area					
CUMULATIVE IMPACT	Increase in a	areas where agriculture is converted into a	other land uses			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
DORATION	4	years and as such is rated as Long				
		Term	-14	3		
		The extent of the impact is rated as				
EXTENT	2	site as it will affect only the				
		development area				
		The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural,				
SEVERITY	-2	cultural and social functions and				
SEVERIT	-2	processes continue albeit in a				
		modified way; and valued, important,	Moderately			
		sensitive or vulnerable systems or	Detrimental	Definite		
		communities are negatively affected				
IMPACT ON		Imagina and a second as the base				
IRREPLACEBLE	1	Irreplaceable resources will be				
RESOURCES		impacted.				
SIGNIFICANCE	-42	moderate - negative				

PROPOSED MITIGATION MEASURES

Springhaas Solar Facility 3 (Pty) Ltd must provide market-related compensation that will allow the current land users to have the same or better ability to sustain their livelihood.

Ensure that the final infrastructure layout remains within the fenced off area of the development footprint.

Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area.

The use of main access routes by construction vehicles and equipment must do so with consideration of nearby agricultural land users who use the same access routes for farming activities.

All left-over construction material must be removed from site once construction on a land portion is completed.

No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.

No boundary fence must be opened without the landowners' permission.

No open fires made by the construction teams are allowable during the construction phase.

	POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			
	CONFIDENCE LEVEL				
High					

Table 7-66: SPH3: Impact significance of soil loss through erosion during the construction phase

		SOIL LOSS THROUGH EROSION				
PROJECT PHASE	Constructio	Construction Phase				
DIRECT IMPACT	Loss of soil	particles from areas where const	ruction activities result in	the removal of		
DIRECT IMPACT	vegetation	from the surface.				
INDIRECT IMPACT	Sparse to no	o vegetation growth in eroded area	s.			
CUMULATIVE IMPACT	Increase in	areas exposed to soil erosion				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3		
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area				
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-54	moderate - negative				
_	P	ROPOSED MITIGATION MEASURES	<u> </u>			

PROPOSED MITIGATION MEASURES

Limit vegetation removal from the soil surface to the areas of infrastructure development such as access routes as well as around the foundations of the PV arrays and buildings.

Vegetation clearance must only be undertaken immediately prior to construction activities and only within the development footprint

Once construction of an area has been completed, level any remaining soil removed from excavation pits (where the PV arrays will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface where it is exposed to rain and wind. This is applicable to all construction areas, except where topsoil stockpiles must remain for site rehabilitation of specific areas.

Stormwater channels on site must be designed to minimise the soil erosion risk that results from surface water runoff. Where possible, conduct the construction activities outside of the rainy season.

POST-MITIGATION					
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-	2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,			

cultural and social functions

and processes are minimally

Irreplaceable resources will be

CONFIDENCE LEVEL

Table 7-67: SPH3: Impact significance of impaired soil functionality caused by compaction

affected

impacted.

very low negative

1

-15

IMPACT ON IRREPLACEBLE

RESOURCES

High

SIGNIFICANCE

access routes.

IMPAIRED SOIL FUNCTIONALITY				
PROJECT PHASE	T PHASE Construction Phase			
DIRECT IMPACT	The weig compacti	ht and movement of vehicles and equipme on.	ent over the surfac	e will result in soil
INDIRECT IMPACT		ed soil have reduced pore space and water in the rate of surface water runoff, especially af		pacted soil surfaces
CUMULATIVE IMPACT	Increase I	in areas affected by soil compaction.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	moderate - negative		
		PROPOSED MITIGATION MEASURES		

Only allow vehicles and equipment to travel on designated access routes and not anywhere else within the development

Use existing main access routes and internal farm roads where possible and avoid using other areas in the site as temporary

Definite

Negligible

Vehicles and equipment must park in designated parking areas. Materials must be off-loaded and stored in designated laydown area. Where possible, conduct the construction activities outside of the rainy season as wet soil compacts easily as opposed to dry soil. **POST-MITIGATION** The duration of the activity associated **DURATION** 3 with the impact will last 18 months-5 years and as such is rated as Medium term -5 3 The extent of the impact is rated as **EXTENT** 1 footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the **SEVERITY** -1 environment in such a way that natural, cultural and social functions and Definite Negligible processes are minimally affected IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will be impacted. **RESOURCES** SIGNIFICANCE -15 very low negative CONFIDENCE LEVEL High

Table 7-68: SPH3: Impact significance of impaired soil health as a result of soil pollution

		IMPAIRED SOIL HEALTH				
PROJECT PHASE	Construction I	Phase				
DIRECT IMPACT	and material spillage of cor state contained	Soil pollution can be caused by oil and fuel spills from vehicles and equipment as well as domestic and material waste on site. Should the vanadium redox flow batteries be used for the BESS, spillage of corrosive and environmentally toxic electrolyte is possible. In the case that lithium solid state containerised batteries are used, there is a possibility of thermal runaway that will result in the release of toxic and flammable gasses.				
INDIRECT IMPACT CUMULATIVE IMPACT	environmenta	t of pollutant uptake by vegetation within to all and human health.	he development ard	ea that can affect		
DIMENSION	RATING	eas at risk of soil pollution. MOTIVATION	CONSEQUENCE	LIKELIHOOD		
DIMENSION	KATING	PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as Local as it affects the development area and adjacent properties	-21	3		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Highly detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-63	high negative				
		PROPOSED MITIGATION MEASURES				
Maintenance must be u	ndertaken regu	larly on all vehicles and construction equipme	ent to prevent hydro	ocarbon spills.		

Maintenance must be undertaken regularly on all vehicles and construction equipment to prevent hydrocarbon spills.

Any waste generated during construction must be stored into designated containers and removed from the site by the construction teams.

Any left-over construction materials must be removed from the development area.

The development area r	nust be monitor	red by the Environmental Control Officer (ECC)) to detect any ear	ly signs of fuel and
		nust also report any spills from batteries.	,	, 3 ,,
Ensure battery transpor	t and installatio	on is undertaken by accredited staff and contr	ractors.	
Compile (and adhere to) a procedure fo	r the safe handling of battery cells during tra	nsport and installa	tion.
		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	77	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE -15 very low negative				
CONFIDENCE LEVEL				
High				

(b) Aquatic Impact

Construction phase activities would result in disturbance of soil and clearing of vegetation. Water quality impacts may occur from batching of concrete on site, hydrocarbon spills and other construction activities.

Two location alternatives are proposed for the temporary laydown area for SPH3. As both are located beyond aquatic habitats there is no difference between the two options in terms of impacts on aquatic biodiversity.

Two technology options are proposed for the BESS. As the electrical infrastructure compound which contains the BESS in SPH3 is located beyond any aquatic environments there is no difference in the two options in terms of impacts on aquatic biodiversity.

Table 7-69: SPH3: Impact of aquatic ecosystems during the construction phase

		AQUATIC ECOSYSTEM IMPACTS		
PROJECT PHASE	Construction	Phase		
DIRECT IMPACT	Disturbance	of aquatic habitat; water quality impacts		
INDIRECT IMPACT	Modification	of flow and alien vegetation invasion in aquatic fe	eatures	
CUMULATIVE IMPACT	Degradation	of the ecological condition of aquatic ecosystems	;	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	-	PRE-MITIGATION		
DUDATION.	2	The duration of the activity associated with the		
DURATION		impact will last 6-18 months and as such is rated asShort term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON	0	No irreplaceable resources will be impacted.		

DRODOCED MITICATION MEACUREC					
SIGNIFICANCE	-4	Very low negative			
RESOURCES					
IRREPLACEBLE					

PROPOSED MITIGATION MEASURES

A buffer of at least 250 m between the significant aquatic ecosystems (larger pans) and all the proposed project activities should be maintained (noting that this is already honoured in the proposed layout for all facilities).

Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers, while retaining the topography and cover vegetation within the wider drainage areas through the site is preferred to reduce the potential modification to the way in which water drains through these areas.

The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.

During the construction phase, site management must be undertaken at the laydown and construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities such as hydrocarbon spills. The solar panels will be washed with water and a biodegradable/greendetergent.

Any stormwater that does arise within the construction sites must be handled appropriately to trap sediments and reduce flow velocities where necessary.

Development within the drainage areas, where located within a proposed facility, will however need to consider stormwater management measures and should avoid impacting on the movement of water through the more seasonally wet areas. Minimal disturbance to the topography and cover vegetation in these areas is recommended.

	POST-MITIGATION					
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated asTemporary	-2	1		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	-2 v	very low negative				
CONFIDENCE LEVEL						
High						

(c) Avifaunal Impact

(i) Habitat destruction associated with the construction of the facility

Habitat destruction and alteration will occur during the construction phase of SPH1. The majority of the development footprint would be transformed from its current state to a renewable energy facility. SPH3 will transform approximately 225ha of habitat. Most of this is in a fairly natural state currently, or in the case of arable lands is still accessible and useable for birds foraging.

Table 7-70: SPH3: Formal rating of destruction of bird habitat during construction

	DESTRU	ICTION OF BIRD HABITAT DURING CONSTRUCTION)N	
PROJECT PHASE	Construction			
DIRECT IMPACT		tion of natural habitat into PV facility		
INDIRECT IMPACT	Transjonna	tion of natural nation in V facility		
CUMULATIVE IMPACT	Yes - Larger	area transformed from natural habitat		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
DIVILIAZION	INATINO	PRE-MITIGATION	CONSEQUENCE	LIKELITOOD
	I	The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
DORATION	4	such is rated as Long Term		
		The extent of the impact is rated as footprint	-12	3
EXTENT	1	as it only affects the area in which the		
EXTENT	1	proposed activity will occur		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
324211111	_	albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems or	Slightly	Definite
		communities are negatively affected	Detrimental	Dejiiite
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES		, , , , , , , , , , , , , , , , , , ,		
SIGNIFICANCE	-36	low – negative		
		PROPOSED MITIGATION MEASURES		
There is no specific mitigat	tion required.	Impact avoidance has already been implemente	ed in the design ph	ase through the
adherence to no-go buffers				
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	-12	3
		The extent of the impact is rated as footprint	-12	3
EXTENT	1	as it only affects the area in which the		
		proposed activity will occur		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
		albeit in a modified way; and valued,	Slightly	Definite
		important, sensitive or vulnerable systems or	Detrimental	Dejiinte
		communities are negatively affected		
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES	3.5	land appetitus		
SIGNIFICANCE	-36	low - negative		
High		CONFIDENCE LEVEL		
High				

(ii) Disturbance of birds & displacement effects

Disturbance of avifauna during the construction (and thereafter during maintenance and operational and decommissioning) of the facility and all development alternatives and associated infrastructure is likely to occur. Disturbance of breeding birds is typically of

greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. It is noted that no breeding sites have been identified on site at this stage.

There is no difference between the location and technology options in terms of disturbance and displacement of birds.

Table 7-71: SP3: Formal rating of disturbance of birds during construction

PROJECT PHASE	Constructio	n phase & operations phase to lesser extent		
DIRECT IMPACT	Birds distur	bed from their normal activities through the inc with construction	creased noise and	activity levels
INDIRECT IMPACT				
CUMULATIVE IMPACT	More projec	cts will result in overall higher disturbance levels		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Omikely
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
		d as there are no particularly sensitive features ia		
		should be implemented during construction in te	erms of control of	vehicles, staff,
minimising the impact on	the receiving	environment as much as possible.		
	T	POST-MITIGATION		1
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		,
SIGNIFICANCE	-5	very low negative		
CONFIDENCE LEVEL				
Medium				

(d) Bats Impact

SPH3 does not overlap any medium or high sensitivity areas from bat perspective. During the construction of SPH3 habitat modification would occur, disturbance and displacement of bats may occur and bat roosts may be disturbed or destroyed.

Two location alternatives for the temporary laydown areas are under consideration for SPH3. The alternatives are both located similar habitats and do not overlap any sensitive features for bats. As such, both alternatives are equally acceptable. Two technology options are under consideration for the BESS. For bat impacts the type of technology used for the BESS is not considered relevant. Both technology options are considered equally acceptable.

Table 7-72: SPH3: Bat habitat modification

IMPACT ON POSSIBLE HABITAT MODIFICATION					
PROJECT PHASE					
DIRECT IMPACT		n of habitat through the removal of vegetation cove	er and water source	2.S	
INDIRECT IMPACT	Displaceme	, , , , , , , , , , , , , , , , , , , ,		<u> </u>	
CUMULATIVE IMPACT	Loss of fora	ging resources for local bat population			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Nogliaiblo	Unlikoly	
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.	– Negligible	Unlikely	
SIGNIFICANCE	-4	very low negative			
	DPODOSED MITIGATION MEASURES				

PROPOSED MITIGATION MEASURES

This impact may be reduced by limiting the removal of vegetation and available water sources, as far as possible.

Avoid all high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction, rehabilitation of all disturbed areas, inclusive of that beyond permanent infrastructure footprints, (e.g. temporary access tracks and laydown areas) must be undertaken.

	POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	4	4	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.			
SIGNIFICANCE	-4	very low negative			
CONFIDENCE LEVEL					
Medium					

Table 7-73: SPH3: Disturbance and displacement effects for bats

IRECT IMPACT Displacement UNDIRECT IMPACT Displacement UNDIRECT IMPACT Unavailability of suitable foraging resources in the broader environment for displaced individuals MOTIVATION CONSEQUENCE LIKELIHOOD		IMPACT (ON POSSIBLE DISTURBANCE & DISPLACEMENT EFF	ECTS			
Displacement UMULATIVE IMPACT Unavailability of suitable foraging resources in the broader environment for displaced individuals	PROJECT PHASE	Construction	n phase				
DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD PREMITIGATION URATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term The severity of the impact is rated as Low negative as the impact will plant construction activities to daylight hours only and minimise lighting at night, as far as possible. Working has been achieved. Should the currently assessed project footprint only. PROPOSED MITIGATION The duration of the activity associated with the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected. PROPOSED MITIGATION MEASURES World high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently sessessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. If construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term 2 The severity of the impact is rated as Low negative as the impact will last 6 to 18 months and as site as it will affect only the development area The severity of the impact is rated as Low negative as the impact is rated as Low negative	DIRECT IMPACT	Disturbance	Disturbance of bats during construction activities				
DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD PRE-MITIGATION 1 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term 2 The extent of the impact is rated as site as it will offected of functions and processes are minimally affected PROPOSED MITIGATION 1 The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected PROPOSED MITIGATION MEASURES Imit construction activities to daylight hours only and minimise lighting at night, as far as possible. With the layouts currently assessed, this has been achieved. Should the currently ssessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Il construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term 2 The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely Unlikely Unlikely Line and a such is rated as Low negative as the impact is rated as Low negative as the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely	INDIRECT IMPACT	Displaceme	nt				
URATION 2 impact will last 6 to 18 months and as suchis rated as Short term XTENT 2 The extent of the impact is rated as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact and processes are minimally affected MPACT ON Interpolate 1 Irreplaceable resources will beimpacted. ESOURCES FORD MITIGATION MEASURES World high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently sessessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Il construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term 2 The severity of the impact is rated as Low negative areas the impact as the impact as the impact as the will affect only the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely Unlikely Unlikely	CUMULATIVE IMPACT	Unavailabili	ity of suitable foraging resources in the broader env	rironment for displa	iced individuals		
URATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely WPACT ON REPIACEBLE 1 Irreplaceable resources will beimpacted. ESOURCES IGNIFICANCE -5 very low negative PROPOSED MITIGATION MEASURES Imit construction activities to daylight hours only and minimise lighting at night, as far as possible. With the layouts currently assessed, this has been achieved. Should the currently sessessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Il construction activities should be limited to the assessed project footprint only. POST-MITIGATION URATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact is rated as Low negative as the impact is rated as Low negative as the impact of sict as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions andprocesses are minimally affected Negligible Unlikely	DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
URATION 2 impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact is rated as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected MPACT ON REPLACEBLE 1 Irreplaceable resources will beimpacted. BESOURCES IGNIFICANCE -5 Very low negative PROPOSED MITIGATION MEASURES Waster areas completely. With the layouts currently assessed, this has been achieved. Should the currently sessessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Ill construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term -5 1 EVERITY -1 The extent of the impact is rated as Low negative as the impact of fects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely Unlikely Unlikely Negligible Unlikely			PRE-MITIGATION				
URATION 2 impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact is rated as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected MPACT ON REPLACEBLE 1 Irreplaceable resources will beimpacted. BESOURCES IGNIFICANCE -5 Very low negative PROPOSED MITIGATION MEASURES Waster areas completely. With the layouts currently assessed, this has been achieved. Should the currently sessessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Ill construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term -5 1 EVERITY -1 The extent of the impact is rated as Low negative as the impact of fects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely Unlikely Unlikely Negligible Unlikely			The duration of the activity associated with the				
The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions andprocesses are minimally affected MPACT ON REPLACEBLE 1 Irreplaceable resources will beimpacted. ESOURCES IGNIFICANCE -5 very low negative PROPOSED MITIGATION MEASURES Imit construction activities to daylight hours only and minimise lighting at night, as far as possible. Void high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Ill construction activities should be limited to the assessed project footprint only. POST-MITIGATION URATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term -5 1 XTENT 2 The extent of the impact is rated as Low negative as the impact of fects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely	DURATION	2	impact will last 6 to 18 months and as suchis				
APACT ON AREPLACEBLE 1 Irreplaceable resources will beimpacted. BENORIES BOURCES IGNIFICANCE -5 very low negative WITH CONSTRUCTION activities to daylight hours only and minimise lighting at night, as far as possible. Woold high sensitive areas completely. With the layouts currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Il construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact is rated as Low negative as the impact of the timpact is rated as Low negative as the impact of the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely Unlikely Unlikely Negligible Unlikely			rated as Short term	-5	1		
EVERITY -1 The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected MPACT ON REPLACEBLE 1 Irreplaceable resources will be impacted. BINIFICANCE -5 Very low negative PROPOSED MITIGATION MEASURES Imit construction activities to daylight hours only and minimise lighting at night, as far as possible. Vivoid high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. Ill construction activities should be limited to the assessed project footprint only. POST-MITIGATION 1 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term 2 The extent of the impact is rated as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact offects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely	EVENIT	2	The extent of the impact israted as site as it will				
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	SEVERITY	-1	in such a way that natural, cultural and social				
/PACT ON			functions andprocesses are minimally affected	Negligible	Unlikely		
	IMPACT ON]			
RREPLACEBLE 1 Irreplaceable resources will beimpacted.	IRREPLACEBLE	1	Irreplaceable resources will beimpacted.				
ESOURCES	RESOURCES						
IGNIFICANCE -5 very low negative	SIGNIFICANCE	-5	very low negative				
CONFIDENCE LEVEL							
1edium	Medium						

Table 7-74: SPH3: Bat roost disturbance

IMPACT ON POSSIBLE ROOST DISTURBANCE					
PROJECT PHASE	Construction	n phase			
DIRECT IMPACT	Disturbance	e of roosting bats during construction activities			
INDIRECT IMPACT	Roost aban	donment			
CUMULATIVE IMPACT	Unavailabili	ity of suitable roosting resources in the broader envi	ronment for abandonedir	ndividuals	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	2	
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected	Slightly Detrimental	Likely	

		communities are negatively affected
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be impacted.
RESOURCES SIGNIFICANCE	-20	low negative

PROPOSED MITIGATION MEASURES

 ${\it All construction activities should be limited to the assessed project footprint only.}$

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough toidentify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
CONFIDENCE LEVEL				
Medium				•

Table 7-75: SPH3: Bat Roost destruction

IMPACT OF POSSIBLE ROOST DESTRUCTION				
PROJECT PHASE	Construction phase			
DIRECT IMPACT	Destruction of potential bat roosting features			
INDIRECT IMPACT	Reduction of available roosting sites and/or Mortality			
	Insufficient roosting resources to support the local population and potential increased bat			
CUMULATIVE IMPACT	mortality			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated withthe impact will last 6 to 18 months and as such is rated as Short term	-5	1
EXTENT	2	The extent of the impact is rated as site as it will affect only thedevelopment area		
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continuealbeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE	-	Very low negative		
PROPOSED MITIGATION MEASURES TO BE INCLUDED IN THE EMPr				
Avoid the destruction or r	emoval of exis	sting farmsteads and trees, as far as possible.		

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be huffered according to

best practice.	iirinea (ajte	r the 5-year perioa, as described above), then these	snoula be bujjere	ea according to
All construction activities s	hould be lin	nited to the assessed project footprint only.		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated withthe impact will last 6 to 18 months and as such is rated as Short term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impactaffects the environment in such away that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE	-8	very low negative		
CONFIDENCE LEVEL				
Medium				

(e) Botanical Impacts

The development of SPH3 would result in extensive but localized loss of relatively undisturbed (unploughed but grazed) Western Free State Clay Grasslands.

The shade effect of the panels on the grassland vegetation is not known and it not easily predicted. There will be space under the panels for grass and other plants to grow. However, the microclimate is likely to be different to that of open grassland, so a different suite of plant species is likely to colonize the space under the solar panels.

Two location alternatives for the temporary laydown area are proposed for SPH3 and two technology options for the BESS. The location and technology alternatives will make no difference on the botanical impact assessment and as such these alternatives are covered in the Table 7-19.

Table 7-76: SPH3: Impact of loss of Western Free State Clay Grassland

LOSS OF VEGETATION					
PROJECT PHASE	Construction Phase				
DIRECT IMPACT	Removal of natural vegetation: Western Free State Clay Grasslands				
INDIRECT IMPACT	None determined				
CUMULATIVE IMPACT	Loss of Western Free State Clay Grasslands				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term.	-15	3	
EXTENT	3	The impacts will be localized to the designated target areas.			
SEVERITY	-2	The severity of the potential impact will be moderate negative.	Moderately Detrimental	Definite	

IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	
SIGNIFICANCE	-45	medium - negative	

PROPOSED MITIGATION MEASURES

The first mitigation measures necessary would be the relocation of **Ammocharis coranica** bulbs if they cannot be avoided. Ideally the bulb should be lifted when they area dormant (winter) but that would mean traversing the entire area of the SPH sites in the preceding summer and marking every occurrence of these plants. A more practical approach would be to unearth the bulbs during the construction phase and relocating and planting them soon after removal.

Secondly, all areas that are disturbed during construction and that are not needed during the operational phase should be rehabilitated, using natural grasses that occur in the area. It would be possible for some grasses and forbs to survive under the panels, but it is difficult to predict the extent of such growth, nor which plant species would grow effectively under the panels.

pulleis.				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.	_	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
Hiah				

(f) Groundwater Impact

The water required during the construction phase of SPH3 is approximately $9,000\text{m}^3$ per year. The water requirement lies well within the yield potential of the underlying fractured rock aquifer (i.e. 0.5-2.0 L/s). It must be noted that at present the use of groundwater is not proposed however if this changes the potential impacts of groundwater abstraction are shown in **Table 7-20**.

Earthmoving plant and/or construction vehicles will be used on site during the construction phase. Use of vehicles presents a risk of groundwater contamination by fuel and oil leakage.

Two location alternatives for the temporary laydown area and two technology options (lithium-ion vs redox flow batteries) were considered for SPH3. The alternatives considered are equally preferred.

Table 7-77: SPH3: Impact table for the lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place).

	Potential imp	act on groundwater level due to over ab	straction	
PROJECT PHASE	Construction F			
DIRECT IMPACT	Lowering of gi	roundwater level due to over abstraction	1	
INDIRECT IMPACT	Drying of sprir	ngs in the area		
CUMULATIVE IMPACT	Permanent da	mage to the aquifer system in the area		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated		
		with the impact will last 18 months-5		
		years and as such is rated as		
		Medium term		_
EXTENT	3	The extent of the impact is rated as	-14	2
		Local as it affects the development		
		area		
		and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
		cultural and social functions and processes continue albeit in a		
		modified way; and valued,	0.4 a da wasta la	
		important, sensitive or vulnerable	Moderately Detrimental	Likely
		systems or communities are	Detrimentai	
		negatively affected		
IMPACT ON	1	Irreplaceable resources will be		
IRREPLACEBLE RESOURCES	_	impacted.		
SIGNIFICANCE	-28	low - negative		
	,	PROPOSED MITIGATION MEASURES		
If boreholes are used it mu	ist be correctly y	vield tested according to the National Si	tandard (SANS 102	99-4:2003, Part 4 –
		ludes a Step Test, Constant Discharge Te		
Adhere to the borehole's so	afe yield and to r	monitor water levels and flow.		
Groundwater abstraction v	olumes must be	monitored.		
		POST-MITIGATION		
DURATION	3	The duration of the activity		
- ·····		associated with the impact will last		
		18 months-5 years and as such is		
		rated as Medium		
		term	0	1
EXTENT	1	The extent of the impact is rated	J	1
		as footprint as it only affects the		
		area in		
		which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be	Negligible	Unlikely
RESOURCES		impacted.		
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
		CONFIDENCE LEVEL		

The main risk associated with the construction phase is groundwater contamination from the use of construction vehicles and heavy machinery on-site.

Table 7-78: SPH3: Impact of contamination of groundwater as a result of accidental oil spillages or fuel leakages during the construction and decommissioning phases.

DDO IECT DILACE		quality as a result of accidental oil spillages o		
PROJECT PHASE		n and Decommissioning Phase		
DIRECT IMPACT INDIRECT IMPACT		er contamination		
CUMULATIVE IMPACT		the vegetation or ecosystem it the area		
		reduced groundwater quality	CONCEOUENCE	LIVELIHOOD
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
DUDATION	1 2	PRE-MITIGATION	T T	
DURATION	3	The duration of the activity associated		
		with the impact will last 18 months-5		
		years and as such is rated as Medium	-	2
EXTENT	1	term	5	2
EXTENT	1	The extent of the impact is rated as		
		footprint as it only affects the area in		
CEVEDITY	+	which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the		
		environment in such a way that natural,		
		cultural and social functions and		
		processes are minimally affected		
IMPACT ON IRREPLACEBLE	1		Negligible	Likely
RESOURCES	1	Irreplaceable resources will be		
		impacted.		
SIGNIFICANCE	-10	very low negative		
		very low negative		
Vehicles must be maintained	regularly and	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed t	o be discharged into	the surroundir
Vehicles must be maintained Dirty water should be captur environment.	I regularly and ed, to be re-us	PROPOSED MITIGATION MEASURES kept in a good working order.		
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic	I regularly and red, to be re-us cles to be left in te.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION		
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic	I regularly and ed, to be re-us	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity		
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib	I regularly and red, to be re-us cles to be left in te.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18		
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Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	d regularly and ed, to be re-us cles to be left in the.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to mexcavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	to be used under st	
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	I regularly and red, to be re-us cles to be left in te.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as		ationary vehicl
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	d regularly and ed, to be re-us cles to be left in the.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in	to be used under st	ationary vehicl
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	d regularly and ed, to be re-us cles to be left in the.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity	to be used under st	ationary vehicl
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	d regularly and ed, to be re-use cles to be left in the left in th	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to mexcavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	to be used under st	ationary vehicl
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	d regularly and ed, to be re-us cles to be left in the.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low	to be used under st	ationary vehicl
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	d regularly and ed, to be re-use cles to be left in the left in th	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the	to be used under st	ationary vehicl
Vehicles must be maintained Dirty water should be captur environment. No heavy equipment or vehic and machinery where possib DURATION	d regularly and ed, to be re-use cles to be left in the left in th	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,	to be used under st	ationary vehicl
Vehicles must be maintained Dirty water should be capturenvironment. No heavy equipment or vehicand machinery where possiben DURATION	d regularly and ed, to be re-use cles to be left in the left in th	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and	to be used under st	ationary vehicl
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Vehicles must be maintained Dirty water should be capture environment. No heavy equipment or vehicand machinery where possibe DURATION EXTENT SEVERITY	d regularly and led, to be re-use cles to be left in le.	PROPOSED MITIGATION MEASURES kept in a good working order. ed where possible. No dirty water is allowed to the excavation area when not in use. Drip trays POST-MITIGATION The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted.	to be used under st	ationary vehicle

(g) Heritage Impact

(i) Impacts to archaeological resources

Impacts to archaeological resources at SHP3 are limited to the possible destruction of isolated background scatter artefacts which have very low to no cultural significance. Impacts will be

direct and permanent but because of the low cultural significance the severity is very low negative.

Two location alternatives were considered for the temporary laydown area, neither of the footprints contain heritage resources. As such, both are equally preferred.

Two technology alternatives were considered for the battery technology for the BESS. Both technology options are equally preferred.

Table 7-79: SPH3: Assessment of construction phase impacts to archaeological sites.

		Archaeological impacts		
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT	Destruction	n of isolated artefacts		
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	None			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-18	very low negative		
		PROPOSED MITIGATION MEASURES		
None required as the rule recorded.	in is in poor	condition and does not have any special arc	hitectural qualities ti	hat need to be further
No materials to be remo	ved from an	y other ruins in the wider project area.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	<u> </u>	J
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-18	very low negative		•
		CONFIDENCE LEVEL		
High				

(ii) Impacts to graves

Impacts to graves for SPH3 are not expected because all identified graves have been avoided by the facility layout. There is still the chance of an unmarked grave being present, or even a marked grave that was not found during the survey. The chances are considered low, however.

Table 7-80: SPH3: Assessment of construction phase impacts to graves

		IMPACTS TO GRAVES		
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT	Destructio	n of graves, including their coverings and possibly l	human remains	
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	Destructio	n of graves, including their coverings and possibly i	human remains	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	•	PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-10	2
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Likely
IMPACT ON		, , , , , , , , , , , , , , , , , , ,		
IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
	- 36	Irreplaceable resources will be impacted. low - negative PROPOSED MITIGATION MEASURES		
RESOURCES SIGNIFICANCE Farm-style wire fences sh portion affected by constitution away from all graves.	-36 ould be erec ruction. Pede	low – negative		
RESOURCES SIGNIFICANCE Farm-style wire fences sh portion affected by constitution away from all graves.	-36 ould be erec ruction. Pede	low – negative PROPOSED MITIGATION MEASURES ted around all known and unfenced graves (i.e. wa estrian access gates must be provided and the fenc		
RESOURCES SIGNIFICANCE Farm-style wire fences sh portion affected by constimaway from all graves. All graves to be treated and DURATION	-36 ould be erectoruction. Pedalos no-go area	Iow – negative PROPOSED MITIGATION MEASURES Ited around all known and unfenced graves (i.e. was estrian access gates must be provided and the fence is with temporary signage as required. POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as		
RESOURCES SIGNIFICANCE Farm-style wire fences sh portion affected by constitution makes and mak	-36 ould be erec ruction. Pede s no-go area	Iow – negative PROPOSED MITIGATION MEASURES Ited around all known and unfenced graves (i.e. was estrian access gates must be provided and the fence is with temporary signage as required. POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	es must be located	a minimum of 5
RESOURCES SIGNIFICANCE Farm-style wire fences sh portion affected by constimaway from all graves. All graves to be treated and DURATION	-36 ould be erectoruction. Pedalos no-go area	Iow – negative PROPOSED MITIGATION MEASURES ted around all known and unfenced graves (i.e. wa estrian access gates must be provided and the fence is with temporary signage as required. POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed	es must be located	a minimum of 5
RESOURCES SIGNIFICANCE Farm-style wire fences sh portion affected by constimaway from all graves. All graves to be treated and DURATION EXTENT	-36 ould be erectoruction. Pedals no-go area 4	Iow – negative PROPOSED MITIGATION MEASURES ted around all known and unfenced graves (i.e. wa estrian access gates must be provided and the fence is with temporary signage as required. POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities	-18 Moderately	a minimum of 5
Farm-style wire fences sh portion affected by constimaway from all graves. All graves to be treated and DURATION EXTENT IMPACT ON IRREPLACEABLE	-36 ould be erector. Peda s no-go area 4 1 -3	Iow – negative PROPOSED MITIGATION MEASURES Ited around all known and unfenced graves (i.e. was estrian access gates must be provided and the fence is with temporary signage as required. POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	-18 Moderately	a minimum of 5

(iii) Impacts to the cultural landscape SPH 3

No landscape features such as hills and pans will be impacted by SPH3. The impact on cultural landscape is due to the construction activities (construction vehicles and equipment) on site which is a rural landscape.

Table 7-81: SPH3 Assessment of construction phase impacts to the cultural landscape

PROJECT PHASE	Construction			
DIRECT IMPACT		of the rural landscape character through the i	ntroduction of const	ruction equipment
INDIDECT IMPACT	None	es and all the associated activities on site		
CUMULATIVE IMPACT		II be greater with multiple facilities being con	structed at once	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
DIMENSION	KATING	PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	low - negative		
<i>y</i> , , , , , , , , , , , , , , , , , , ,	, ,	PROPOSED MITIGATION MEASURES		
Keep construction period		ossible. ing operation as soon as possible.		
Kenabilitate any areas no	t needed dun	POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
		1	1	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
IRREPLACEABLE	0 - 30	1		

(h) Palaeontological Impact

Palaeontological impacts would be the destruction of fossils from construction activities. The site as a whole is considered as low sensitivity in terms of palaeontology.

Table 7-82: SPH3: Assessment of the potential impacts to possible paleontological resources considers the criteria below

DIRECT IMPACT INDIRECT MPACT CUMULATIVE IMPACT DIMENSION RATING MOTIVATION DURATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Low negative as their macroscopic for undustring functions and processes are minimally affected. IMPACT The severity of the impact is rated as Low negligible Definite IMPACT ON O No irreplaceable resources will be sent to a palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university will loccur The duration of the activity associated with the impact is rated as Low negative as the impact offects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Negligible Definite Negligible Definite The Severity of the impact is rated as Low negative PROPOSED MITIGATION MEASURES If fossils are found once excavations for foundations and amenities have commenced then they should be photographed processed and in a recognised facility such as a museum or palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university if no fossils are found, no action will be required POST-MITIGATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Low positive as the impact will last 0-6 months and as such is rated as Low positive as the impact will last 0-6 months and as such is rated as Low positive as the impact diffects the environment in such a way that natural, cultural and social functions and processes are minimally improved Negligible Definite			PALAEONTOLOGY IMPACTS		
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IMPACT DUMENSION RATING MOTIVATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY -1 The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected. RESOURCES SIGNIFICANCE -6 Very Low Negative PROPOSED MITIGATION MEASURES If fossils are found once excavations for foundations and amenities have commenced then they should be photographed and storage in a recognised facility such as a museum or palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university if no fossils are found, no action will be required POST-MITIGATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Femporary EXTENT 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The extent of the impact is rated as Low positive as the impact affects the area in which the proposed activity will occur SEVERITY 1 The everity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON No irreplaceable resources will be impacted. Regligible Definite	INDIRECT IMPACT				
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IMPACT ON 0 No irreplaceable resources will be impacted. RESOURCES SIGNIFICANCE -6 Very Low Negative PROPOSED MITIGATION MEASURES If fossils are found once excavations for foundations and amenities have commenced then they should be photographed removed and put in a safe place. Photographs should be sent to a palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university of in a fossils are found, no action will be required POST-MITIGATION DURATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON 0 No irreplaceable resources will be impacted. IMPACT ON 0 Very Low Positive	SEVERITY	-1	negative as the impact affects the environment in such a way that natural, cultural and social	Nogligible	Dofinito
PROPOSED MITIGATION MEASURES If fossils are found once excavations for foundations and amenities have commenced then they should be photographed removed and put in a safe place. Photographs should be sent to a palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university of the impact in a university of the impact is rated as such is rated as as Temporary EXTENT 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as as Temporary EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON 0 No irreplaceable resources will be impacted. Negligible Definite RESOURCES SIGNIFICANCE 6 Very Low Positive	IMPACT ON IRREPLACEBALE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite
If fossils are found once excavations for foundations and amenities have commenced then they should be photographed removed and put in a safe place. Photographs should be sent to a palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university of the impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON O No irreplaceable resources will be impacted. Negligible Definite RESOURCES SIGNIFICANCE 6 Very Low Positive	SIGNIFICANCE	-6	Very Low Negative		
removed and put in a safe place. Photographs should be sent to a palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university. If no fossils are found, no action will be required. POST-MITIGATION DURATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary. EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur. SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved. IMPACT ON No irreplaceable resources will be impacted. IRREPLACEABLE RESOURCES SIGNIFICANCE 6 Very Low Positive	PROPOSED MITIGATIO	ON MEASUI	RES		
POST-MITIGATION DURATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON 0 No irreplaceable resources will be impacted. IRREPLACEABLE RESOURCES SIGNIFICANCE 6 Very Low Positive	removed and put in a fossils are important th and storage in a recog	safe place. ne palaeont nised facilit	Photographs should be sent to a palaeontologist to ologist must obtain a permit from SAHRA, visit the sitely such as a museum or palaeontology department in	o assess their scient e and remove the fos	ific value. If the
DURATION 1 The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON 0 No irreplaceable resources will be impacted. IRREPLACEABLE RESOURCES SIGNIFICANCE 6 Very Low Positive	<u>, , , , , , , , , , , , , , , , , , , </u>	no action v	vill be required		
impact will last 0-6 months and as such is rated as Temporary EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON 0 No irreplaceable resources will be impacted. IRREPLACEABLE RESOURCES SIGNIFICANCE 6 Very Low Positive				T	T
EXTENT 1 The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur SEVERITY 1 The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON 0 No irreplaceable resources will be impacted. IRREPLACEABLE RESOURCES SIGNIFICANCE 6 Very Low Positive			impact will last 0-6 months and as such is rated as Temporary	2	3
as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved IMPACT ON 0 No irreplaceable resources will be impacted. IRREPLACEABLE RESOURCES SIGNIFICANCE 6 Very Low Positive	EXTENT	1	only affects the area in which the proposed activity will occur		-
IRREPLACEABLE RESOURCES SIGNIFICANCE 6 Very Low Positive	SEVERITY	1	as the impact affects the environment in such a way that natural, cultural and social functions	Negligible	Definite
	IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
CONFIDENCE LEVEL	SIGNIFICANCE	6	Very Low Positive		
	CONFIDENCE LEVEL				

(i) Socio-Economic Impact

(i) Stimulation of the Economy during construction

The size of the Tokologo LM's economy was estimated at R2,170 million at current prices (2022) and primarily comprises of the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. That being said, it is likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the development of SPH3 through local procurement.

The stimulation of the economy will not be dependent on the layout or technology options of the SPH3; thus, alternatives are equally preferred.

Table 7-83: SPH3: Impact of Economic Stimulation during construction

		IMPACT ON ECONOMY		
PROJECT PHASE	Construc	tion Phase		
DIRECT IMPACT	Tempora	ry increase in production and GDP in the local	economy	
INDIRECT IMPACT	Improved	household income and increased business sal	es in the local econd	оту
CUMULATIVE IMPACT	Tempora	ry increase in production and GDP in the regio	nal economy	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	,
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
		PROPOSED MITIGATION MEASURES		
To optimise the stimulatio applied where possible:	n of the lo	cal economy through direct, indirect and indi	uced effects, the fo	llowing should be
Procure construction mater	ials, goods	, and products from local and domestic supplie	ers if feasible	
Employ local contractors w	here possik	ole		
Note: The proposed mitigat not affect the weighting the		res will possibly increase the positive impact on	the local economy;	however, this will
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	30	low positive			
	CONFIDENCE LEVEL				
High			·	·	

(ii) Creation of Employment during construction

The construction of SPH3 will require temporary employment of construction workers, foremen, and engineers On-site. Construction is expected to last twelve months where at the peak of construction about 150 people will be working on-site. The creation of between 100 and 150 temporary employment opportunities for SPH3 throughout the duration of construction which equates to about 50 FTE.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

SPH3 will create the same number of employment opportunities, regardless of its layout on the site; thus, layout alternatives are equally preferred.

Table 7-84: SPH3: Assessment of Employment during construction

IMPACT ON EMPLOYMENT						
PROJECT PHASE	Constructi	Construction Phase				
DIRECT IMPACT	Creation o	f temporary employment opportunities C	On-site			
INDIRECT IMPACT	Improved	income of households whose members a	re employed on the pr	oject		
CUMULATIVE IMPACT	Creation o	f temporary employment opportunities i	n the area			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development	10	3		
SEVERITY	2	area and adjacent properties The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important,	Slightly Beneficial	Definite		

High				
	-	CONFIDENCE LEVEL		
SIGNIFICANCE	30	low positive		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SEVERITY	2	area and adjacent properties The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
EXTENT	3	The extent of the impact is rated as Local as it affects the development	10	3
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term		
,		POST-MITIGATION		_
Utilise local suppliers, whe				
Employ local residents and				
Employ labour intensive m			ann anc iocai commun	icies, where jeasible.
The following is recommen	ded to incre	ase the employment opportunities created	~	ities where feasible:
SIGNIFICANCE	30	low positive PROPOSED MITIGATION MEASURE	c	
IMPACT ON IRREPLACEABLE RESOURCES SIGNIFICANCE	0 30	No irreplaceable resources will be impacted.		
		sensitive or vulnerable systems or communities are positively affected		

(iii) Reduction of Land Area available for productive farming

The proposed site of SPH3 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH3 as being of low to very low agricultural potential with small isolated patches of low – moderate and moderate potential land on the edges of the facility. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH3 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH3.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant

differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-85: SPH3: Assessment of Impact on agricultural production

	Reduc	tion of Land Area available for Productive	Farming	
PROJECT PHASE		ion and Operational Phase		
DIRECT IMPACT		gricultural production within the footprint a	lue to land sterilisatio	on
INDIRECT IMPACT	Negligibi	e to no indirect impact		
CUMULATIVE IMPACT	Negligible	e to no cumulative effects		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	•	PRE-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	6	3
		The extent of the impact is rated as	b	3
EXTENT	1	footprint as it only affects the area in		
		which the proposed activity will occur		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and	Negligible	
		processes are minimally affected		Definite
IMPACT ON		Irreplaceable resources will be		
IRREPLACEABLE	1	impacted.		
RESOURCES		mpactea.		
SIGNIFICANCE	-18	very low negative		
		PROPOSED MITIGATION MEASURES		
•	•	ce at the end of the project's life to allow for	r the land to be used j	for livestock farming
after the closure of the pro	ject.			
	ı	POST-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	6	3
		The extent of the impact is rated as		
EXTENT	1	footprint as it only affects the area in		
		which the proposed activity will occur		
		The severity of the impact is rated as		
051/55/51/		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and	Negligible	Definite
IMPACT		processes are minimally affected		_
IMPACT ON	_	Irreplaceable resources will be		
IRREPLACEABLE	1	impacted.		
RESOURCES SIGNIFICANCE	-18			
SIGNIFICANCE	-18	very low negative CONFIDENCE LEVEL		
I I : b		CONFIDENCE LEVEL		
High				

(iv) Loss of Property

An influx of job seekers to the area during the construction phase may result in stock theft and burglaries. The number of workers and duration of construction will not be affected by the layout alternatives or technology alternatives; thus, all alternatives are equally preferred.

Table 7-86: SPH3: Assessment of loss of property

IMPACT ON CRIME LEVELS						
PROJECT PHASE	Construct					
DIRECT IMPACT		ry increase in crime associated with the influ	ux of neonle			
INDIRECT IMPACT						
CUMULATIVE IMPACT		ligible cumulative impact	Tjucinty			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
DIIVIENSION	KATING	PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD		
	1		I	T		
DUDATION.	2	The duration of the activity associated				
DURATION	2	with the impact will last 6-18 months				
		and as such is rated as Short term	-10	3		
EVEENT	2	The extent of the impact is rated as				
EXTENT	3	Local as it affects the development area				
		and adjacent properties				
		The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural,				
SEVERITY	-2	cultural and social functions and				
		processes continue albeit in a modified	Slightly Detrimental			
		way; and valued, important, sensitive or		Definite		
		vulnerable systems or communities are negatively affected				
IMPACT ON		педалічету ајјества				
	0	No irreplaceable resources will be				
IRREPLACEBLE RESOURCES	U	impacted.				
	20	land manufina				
SIGNIFICANCE	-30	low - negative				
TI C !!	, . ,	PROPOSED MITIGATION MEASURES		11		
		to be instituted to minimise and possible el	liminate the impact o	iitogetner:		
Ensure proper fencing and						
		to locals as far as practically possible. Recr				
	ke place on	-site. This will reduce the probability of work	c seekers loitering in t	ne area surrounaing		
the project sites		to a the constant the constant				
Hire additional security pe	rsonnei aur	ing the construction period				
	1	POST-MITIGATION	T			
		The duration of the activity associated				
DURATION	2	with the impact will last 6-18 months				
		and as such is rated as Short term	-5	3		
	_	The extent of the impact is rated as				
EXTENT	3	Local as it affects the development area				
		and adjacent properties				
		The severity of the impact is rated as				
CEL (EDIT)		Low negative as the impact affects the				
SEVERITY	-1	environment in such a way that natural,				
		cultural and social functions and	Negligible	Definite		
IN A DA CT		processes are minimally affected				
IMPACT ON		No irreplaceable resources will be				
IDDEDLACEDLE	0	*				
IRREPLACEBLE		impacted.				
RESOURCES						
	-15	very low negative				
RESOURCES						

(j) Terrestrial Biodiversity & Faunal Impact

(i) Direct Impact - Destruction of faunal habitat

Clearing or disturbance to natural vegetation for the construction of SPH3 will remove up to 259ha of natural grassland habitat. This includes the burrows of many fossorial species as well as termite mounds which provide a source of food for species such as aardvark and mongoose.

There are two location alternatives for the temporary laydown area for SPH3. Noting that if both are not approved, the area of the second one would likely comprise solar PV panels, therefore the difference in terms of the impact of clearance of natural habitat is negligible. Two technology alternatives for the battery to be used in the BESS have been proposed. As the type of battery used will not alter the footprint of the BESS the alternatives are rated as equal for the impact of clearance of natural habitat.

Table 7-87: SPH3: Destruction of faunal habitat

		DESTRUCTION OF FAUNAL HABITAT		
PROJECT PHASE	PROJECT PHASE Construction phase			
DIRECT IMPACT	Destructi	on of faunal habitat		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of ho	abitat and habitat connectivity		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		J
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-63	high negative		
		PROPOSED MITIGATION MEASURES		

Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays. Only indigenous grasses found in the area must be used for rehabilitation

Undertake vegetation clearing during the dry season, and outside of the breeding season of burrowing fauna

If possible, the movement of animals through the sites must be permitted during operations. The use of fencing that will allow the movement of small to medium fauna through would help mitigate the effect of fences acting as barriers. This can be achieved by constructing a fence that has places for animals to crawl through and is not difficult for fleeing animals and birds to see. For example, black mesh panel fencing can be used where gaps of approximately 30 cm high and 50 cm wide and spaced at regular intervals are cut/installed. The tops of these gaps must be smoothed off to limit the chance of wildlife being injured when passing through. The use of barbed wire must be avoided

The proposed activities must remain within the project footprint

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or

relocated in an ecologically app a suitably qualified zoologist an	•	anner, just prior to vegetation clearing comn sary permits must be in place	nences. This must b	e undertaken by
All mitigation measures prescrib	bed by the	avifaunal specialist must be strictly adhered	to	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-10	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-30	low negative		
CONFIDENCE LEVEL				
Medium				

(ii) Direct Impact - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death. The clearing of ground for the foundations of the PV arrays will destroy burrows, potentially causing injury or death to burrowing animals. Furthermore, the presence of the construction site and personnel may result in negative interactions with fauna, such as hunting or killing animals perceived to be pests.

Regarding the technology alternative for the type of battery used in the BESS for all facilities, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

The alternative locations for the temporary laydown area will not change the ratings for this impact.

Table 7-88: SPH3: Injury or death to fauna

INJURY OR DEATH TO FAUNA				
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	Injury or	death to fauna		
INDIRECT IMPACT				
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	10	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-18	3

SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be		
RESOURCES SIGNIFICANCE	-54	impacted moderate negative		

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

No wild animal may under any circumstance be handled, removed or be interfered with by construction workers

To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

Ideally construction should not continue at night so as to avoid potential collisions with nocturnal fauna

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
High				

(iii) Indirect Impacts – Pollution and contamination of natural areas

During construction, dust from exposed areas and roads, and litter from construction workers have the potential to pollute the surrounding natural vegetation. The use of dust suppressants, as well as hydrocarbons from vehicles and machinery, have the potential to contaminate soils and ground water, and be washed into the nearby natural pans during high rainfall events. The battery technology alternatives and location alternatives of the temporary laydown area are rated the same and hence are covered in the same table.

Table 7-89: SPH3: Pollution and contamination of natural areas including wetlands and pans

	POLLUTION	AND CONTAMINATION OF NATURAL AR	EAS	
PROJECT PHASE	Construction	n Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Pollution a	nd contamination of natural areas		
CUMULATIVE IMPACT	Habitat deg	gradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	45	2
		The extent of the impact is rated as	-15	3
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		High negative as the natural, cultural		
		or social functions and processes are		
		altered to the extent that the natural		
SEVERITY	-3	process will temporarily or		Definite
		permanently cease; and valued,	Moderately	
		important, sensitive or vulnerable	detrimental	
		systems or communities are		
		substantially affected		
IMPACT ON IRREPLACEABLE	_	No irreplaceable resources will be		
RESOURCES	0	impacted		
SIGNIFICANCE	-45	moderate negative		
	P	ROPOSED MITIGATION MEASURES		
An independent Environmental	Control Offic	er (ECO) must be appointed to oversee al	l construction activit	ies
		for leaks and serviced on a regular basis		
		in the most appropriate manner		
No washing of vehicles must ta				
	•	ads must be suppressed using a water tar	nker	
		luding cigarette butts and litter by constru		he prohibited
		ust be provided for workers during constr		be promoted
Appropriate sona waste dispose	ar jaemees m	POST-MITIGATION	4000	
	I	The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
DONATION		and as such is rated as Short term		
		The extent of the impact is rated as	-4	1
EXTENT	2	site as it will affect only the		
LATEINT		development area		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that		
SEVERITI	_	natural, cultural and social functions	Negligible	Unlikely
		and processes are minimally affected	recyngibic	Onnikery
IMPACT ON IRREPLACEABLE		No irreplaceable resources will be		
RESOURCES	0	impacted		
SIGNIFICANCE	-4	very low negative		
JIGHT ICANEL		CONFIDENCE LEVEL		

(iv) Indirect Impacts – Increased potential of invasion by alien vegetation

During construction, the removal of natural vegetation and disturbance to the soil will increase the likelihood of invasion by alien plant species. Alien species establish easily and quickly on bare soil by colonisation or from seeds existing in the seed bank of the soil. Infestation by alien and invasive species will lead to degradation of the surrounding natural habitat and will increase the potential of spread into the greater landscape. In addition, the vehicles and

equipment were likely used on various other sites and could introduce alien invasive plant seeds. This impact is relevant to all the proposed arrays equally and has therefore been assessed in one table for the construction phase.

The location alternative for the temporary laydown area and the technology alternatives for the BESS will not change the ratings for this impact.

Table 7-90: SPH3: Increased potential of invasion by alien vegetation

IN	CREASED P	OTENTIAL OF INVASION BY ALIEN VEGETA	ATION	
PROJECT PHASE	Construct	ion Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Increased	potential of invasion by alien vegetation		
CUMULATIVE IMPACT	Habitat d	egradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-42	moderate - negative		
	F	PROPOSED MITIGATION MEASURES		

An independent Environmental Control Officer (ECO) must be appointed to oversee all construction activities monthly

All areas cleared of natural vegetation must be rehabilitated. Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays and other cleared areas. Only indigenous grasses found in the area must be used for rehabilitation. This must be advised by the botanist

An invasive alien plant species management and monitoring plan must be implemented during the construction phase. Monitoring should continue into the operational phase and through and for a period after decommissioning. This should be advised by the botanist

All alien seedlings and saplings must be removed as they become evident for the duration of construction and during the operational phase. Manual / mechanical removal is preferred to chemical control

All construction vehicles and equipment must be free of plant material before entering the site

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	4	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted			
SIGNIFICANCE	-4	very low negative			
CONFIDENCE LEVEL					
High					

(k) Transport Impact

Traffic impacts anticipated to occur during the construction phase of the project are construction related traffic and noise and dust pollution.

Two location alternatives for the temporary laydown area and two technology alternative for the BESS have been proposed. There is no difference in the impacts from a traffic perspective between the alternatives.

Table 7-91: SPH3: Traffic Impacts – Construction Phase

		TRAFFIC IMPACT		
PROJECT PHASE	Constructi	ion phase		
DIRECT IMPACT		ngestion due to an increase in traffic o Ind staff to site	caused by the trans	portation ofequipment,
INDIRECT IMPACT		ion traffic on roads might generate dus	t and noise.	
CUMULATIVE IMPACT		ays on the surrounding road network.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY IMPACT ON	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IRREPLACEBLE RESOURCES		No irreplaceable resources will beimpacted.		
SIGNIFICANCE	-30	low negative		
		POSED MITIGATION MEASURES		
Stagger component delivery t				
Reduce the construction perio				
		l roads and the access road to the site)		
Regular maintenance of groconstruction phase.	ıvel roads (internal roads and the access road i	to the site) by the	Contractor during the
The use of mobile batching pl	ants and qu	arries in close proximity to the site (if a	vailable and feasibl	le); and
Staff and general trips should	occur outsi	de of peak traffic periods.		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is ratedas Short term	5	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent		

SEVERITY	-1	properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will beimpacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
Medium				

(I) Landscape and Visual Impact

Four visual impacts were identified for SPH3 during the construction, operational phase and decommissioning phase

- Landscape change
- Impact on Protected Areas
- Impact on local roads
- Impact on homesteads
- Light pollution

These impacts would all occur during the construction, operation and decommissioning phase. Impacts would peak once the facility is constructed, remain relatively constant during the operational phase and then decrease during the decommissioning phase.

There is no significant difference in the impact assessment rating for the temporary laydown area alternatives so they are assessed together in the tables below. The type of battery technology used in the BESS would not impact on the assessment of visual impacts and so the tables below cover both technology options.

Table 7-92: SPH3 Landscape change

	LANDSCAPE CHANGE				
	Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on				
	completion	of construction, be relatively constant	during operation	and decrease again from	
PROJECT PHASE	peak levels	during decommissioning.			
DIRECT IMPACT	Change of c	haracter due to industrialisation of a No	atural Landscape		
INDIRECT IMPACT					
CUMULATIVE IMPACT	Extension of	flandscape industrialisation due to othe	er electrical infrasti	ructure projects	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and	Moderately Detrimental	Definite	

SIGNIFICANCE
IMPACT ON IRREPLACEBLE RESOURCES

PROPOSED MITIGATION MEASURES

Plan to maintain the height of structures as low as possible relative to existing ground levels;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

Monitor areas for vegetation cover post-decommissioning and implement remedial actions.

POST-MITIGATION POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			

CONFIDENCE LEVEL

High

NOTES

- 3. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 4. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-93: SPH3 Industrialization of the landscape as seen from Nielsview NR

SPH3 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM NIELSVIEW NR						
		Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on				
	completion	of construction, be relatively constant (during operation and ded	crease again from peak		
PROJECT PHASE	levels during	g decommissioning.				
DIRECT IMPACT	Industrialisa	ition of the view from Nielsview NR du	e to this project.			
INDIRECT IMPACT						
	Extension o	Extension of industrialisation of views from Protected Areas due to this and other electrical				
CUMULATIVE IMPACT	infrastructu	re projects				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last	0	3		

			PROPOSED MITIGATION MEASU	RES	
SIGNIFICANCE		0	very low negative		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.	Negligible	Definite
SEVERITY		0	Negligible		
EXTENT		3	rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties		
			more than 5 years and as such is		

Plan to maintain the height of structures as low as possible relative to existing ground levels;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

	POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite	
SIGNIFICANCE	0	very low negative	•	•	
CONFIDENCE LEVEL					

High

NOTES

- 3. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 4. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-94: Industrialization of the landscape as seen from local roads, SPH3

INE	INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM LOCAL ROADS, SPH3				
PROJECT PHASE	Construction	Construction, Operational & Decommissioning Phases			
DIRECT IMPACT	Industrialisa	ition of the view from local roads due to t	this project.		
INDIRECT IMPACT					
	Extension of	of industrialisation of views from loca	al roads due to this a	and other electrical	
CUMULATIVE IMPACT	infrastructu	re projects			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as affected environment is altered but natural,	Moderately Detrimental	Definite	

IMPACT ON IRREPLACEBLE RESOURCES	0	modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected. No irreplaceable resources will be impacted.	
SIGNIFICANCE	-42	moderate negative	

Plan site levels to minimise earthworks to ensure that levels are not elevated;

Plan to maintain the height of structures as low as possible;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Construct and/ or plant a 2m high screen along the southern edge of the array cluster

Plan to protect existing natural site features such as drainage pans;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

	POST-MITIGATION POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Longt term	-7	3			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties					
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.					
SIGNIFICANCE	-15	very low negative					
		CONFIDENCE LEVEL	CONFIDENCE LEVEL				

High

NOTES

- The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 6. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-95 SPH3: Industrialization of the landscape as seen from local homesteads

SPH3 I	SPH3 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM LOCAL HOMESTEADS					
		Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on completion of construction, be relatively constant during operation and decrease again from peak				
PROJECT PHASE		g decommissioning.	ning operation and decre	use ugum from peuk		
DIRECT IMPACT	•	tion of the view from local homesteads o	lue to this proiect.			
INDIRECT IMPACT		, ,	, ,			
	Extension of industrialisation of views from local homesteads due to this and other electrical					
CUMULATIVE IMPACT	infrastructu	re projects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity				

			DDODOCED MITICATION MEACURE		
SIGNIFICANCE		-42	moderate - negative		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SEVERITY		-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

PROPOSED MITIGATION MEASURES

Plan to maintain the height of structures as low as possible;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Construct / grow 2m high screen along SW and E edges of solar cluster closest to affected homesteads;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		

CONFIDENCE LEVEL

High

NOTES

- 3. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 4. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-96 SPH 3 Light pollution

		SPH3 LIGHT POLLUTION		
		n, Operational & Decommissioning Phases. In	•	•
		of construction, be relatively constant during op	peration and decrea	ise again from peak
PROJECT PHASE		g decommissioning.		
DIRECT IMPACT	Light pollut	ion from the project spoiling the night time env	ironment and nuisc	ince to neighbors.
INDIRECT IMPACT				
CUMULATIVE IMPACT	Extension o	f light pollution due to this and other electrical	infrastructure proje	ects
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and		
		as such is rated as Long Term	-14	3
		The extent of the impact is rated as Local as	-14	3
EXTENT	3	it affects the development area and		
		adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
		albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems	Moderately	Definite
		or communities are negatively affected	Detrimental	20,0
IMPACT ON		5 , 3		
IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES		The mephadeaste researces sim se impassear	<i>'.</i>	
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURES		
Use low key lighting arou	nd buildings a	nd operational areas that is triggered only whe	en people are prese	nt;
Utilise infra-red security s	ystems or mo	tion sensor triggered security lighting;		
		evelopment with no light spillage outside the si	te;	
No tall mast lighting shou	ld be used;			
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	2	the impact will last 6-18 months and as such		
		is rated as Short term	0	3
		The extent of the impact is rated as		3
EXTENT	1	footprint as it only affects the area in which		
		the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON			No ali:l-1-	Definite
IRREPLACEBLE	0	No irreplaceable resources will be impacted.	Negligible	Definite
RESOURCES				
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
High				

- 3. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 4. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

7.4.4 Operational Phase

(a) Agricultural Impact

During the operational phase, areas that where vegetation will remain cleared such as access routes, will remain at risk of soil loss through erosion. During the operation phase, staff and maintenance personnel will access the development area to maintain the infrastructure and make repairs, where required. Biodegradable detergents and water will be used to clean the panels, however this is not expected to result in impacts from an agricultural perspective. The assessment of these impacts are summarised in **Table 7-44** and **Table 7-45**.

Table 7-97: SPH3 Impact significance of soil loss through erosion during the operation phase

		SOIL LOSS THROUGH EROSION		
PROJECT PHASE	Operatio	n Phase		
DIRECT IMPACT		ere soil surfaces will remain bare such as ac t risk of soil erosion.	ccess routes and bet	ween PV arrays, will
INDIRECT IMPACT	Eroded a	reas can expand into nearby areas and resul	t in land degradation	١.
CUMULATIVE IMPACT	Increase	in areas at risk of soil erosion.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURES		
		ternal access routes, as well as areas bor y signs of soil erosion on-set.	dering on the devel	opment area, must
		ust be stabilised using geo-textiles and facili	tated re-vegetation.	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	Ü	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite

IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-18	very low negative		
CONFIDENCE LEVEL					
High				•	

Table 7-98: SPH3 Impact significance of soil pollution during the operation phase

SIGNIFICANCE	-6	very low negative CONFIDENCE LEVEL				
IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
IMPACT ON	4					
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	U	1		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	1		
negalarly monitor the bes	J ureu jor t	POST-MITIGATION	c presence of waste.			
authorised waste dumping	g area.	be left at the site and must be transporte any signs of oil, grease and fuel spillage or th				
Maintenance must be und	lertaken reg	gularly on all vehicles and maintenance macl	hinery to prevent hyd	lrocarbon spills.		
		PROPOSED MITIGATION MEASURES				
SIGNIFICANCE	-14	very low negative				
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SEVERITY	-2	Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Unlikely		
EXTENT	2	as it will affect only the development area The severity of the impact is rated as				
DURATION	4	with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as site	-14	1		
	Ī	PRE-MITIGATION The duration of the activity associated				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
INDIRECT IMPACT CUMULATIVE IMPACT	environm	Increased risk of pollutant uptake by vegetation within the development area that can affect environmental and human health Increase in areas at risk of soil pollution				
DIRECT IMPACT	site. The	replacement of electrolyte of the redox flow	batteries, also pose s	soil pollution risk.		
PROJECT PHASE			aca materials and do	mostic wasta laft o		
PROJECT PHASE		nal phase tion caused by oil and fuel spills or maintenar	nce materials and do	mestic waste left (

(b) Aquatic Impact

During the operation phase, the solar arrays will operate largely unattended and with low maintenance required for more than 20 years. The hard surfaces created by the development may lead to increased runoff. This may lead to increased erosion and sedimentation of the downslope areas. A localised long-term impact (more than 20 years) of low intensity (depending on the distance between the solar arrays and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified aquatic ecosystems in the area.

The only potentially toxic or hazardous materials which would be present in relatively small amounts would be of lubricating oils and hydraulic and insulating fluids. Therefore, contamination of surface or groundwater or soils is highly unlikely.

Significance of impacts after mitigation: The overall significance of the impact on the aquatic ecosystems is expected to be very low. The impacts are also rated the same for the location alternatives for the temporary laydown area and the battery technology options for the BESS.

Table 7-99: SPH3 Operational phase aquatic ecosystem impacts

		AQUATIC ECOSYSTEM IMPACTS				
PROJECT PHASE	Operation	al phase				
DIRECT IMPACT	Disturban	ce of aquatic habitat; water quality impacts				
INDIRECT IMPACT	Modificati	ion of flow and alien vegetation invasion in aquation	c features			
CUMULATIVE						
IMPACT	Degradati	on of the ecological condition of aquatic ecosyste	ms			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with				
		the impact will last more than 5 years and as		1		
		such israted as Long Term	-5			
EXTENT	1	The extent of the impact is rated as footprint	-5			
		as it only affects the area in which the				
		proposed activitywill occur				
SEVERITY	-1	The severity of the impact is rated as Low				
		negative as the impact affects the environment				
		in such a waythat natural, cultural and social				
		functions and processes are minimally affected	Negligible	Unlikely		
IMPACT ON	0	No irreplaceable resources will be impacted.		·		
IRREPLACEBLE		·				
RESOURCES						
SIGNIFICANCE	-5	very low negative				
PROPOSED MITIGATION MEASURES						

Any disturbance during the operation phase should be limited to the approved development footprints and should avoid disturbance of the soil and natural vegetation cover.

Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areasdo not become infested with invasive alien plants.

Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwaterleaving developed areas.

Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider. In a scenario where services are installed, these systems need to be adequately installed and maintained to prevent any potential contamination of the water resources on site.

POST-MITIGATION					
DURATION	4	The duration of the activity associated with	-5	1	

Medium		CONFIDENCE LEVEL		
SIGNIFICANCE		5 very low negative CONFIDENCE LEVEL		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur		
		the impact will last more than 5 years and as such israted as Long Term		

(c) Avifaunal Impact

(i) Bird fatality at PV facility

Bird fatalities could occur at the site through a number of mechanisms, including collision with PV panels, entanglement in perimeter fence (less likely since developer has chosen to use mesh panel fencing which has a tight weave and birds are less likely to become entangled), electrocution in substations/electrical compounds and others. The location alternatives for the temporary laydown area and the battery technology options for the BESS are rated the same and are all covered in the same table.

Table 7-100: SPH3 bird fatality during operational phase

BIRD FATALITY AT PV FACILITY						
PROJECT PHASE	PROJECT PHASE Operational phase					
DIRECT IMPACT	Birds killed	Birds killed through various interaction with facility infrastructure				
INDIRECT IMPACT						
CUMULATIVE IMPACT	More projec	ts will result in overall higher fatality rates in th	ne area			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	1		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-8	very low negative				
		PROPOSED MITIGATION MEASURES				

None required at this stage. Once operational, if facility staff identify any fatalities this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. Operational phase bird monitoring should be conducted for at least one year as per the best practice guidelines – see Section 8.

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DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		
CONFIDENCE LEVEL				
Medium			•	

(ii) Nesting & other use of facility infrastructure by birds

Certain species, in particular doves, pigeons, weavers and crows, are likely to use some of the facility infrastructure for nesting, perching and roosting. At face value this is a positive impact for birds and has been rated as VERY LOW POSITIVE significance both pre and post mitigation. However, where nesting interferes with the operation of the facility this could cause conflict and require management. Nesting on infrastructure also increases the likelihood of bird fatalities occurring through the various mechanism, particularly of young inexperienced birds. No mitigation is required for the impact of the facility on birds through nesting. For the impact of the birds nesting on the facility, the specialist recommends nest management on a case by case basis under the supervision of an avifaunal specialist, and in conformance with all relevant national and provincial legislation. The impact is rated the same for the temporary laydown area and the battery technology options for the BESS.

Table 7-101: SPH3 impact of bird nesting and other use of facility infrastructure by birds

BIRD NESTING, PERCHING & ROOSTING AT PV FACILITY						
PROJECT PHASE	Operational	Operational phase				
DIRECT IMPACT						
INDIRECT IMPACT	Birds use inj	frastructure to perch, roost or nest on				
	More proje	cts in the area will probably diminish the likel	ihood of this happ	pening as perch		
CUMULATIVE IMPACT	availability	will increase				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	7			
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				

SIGNIFICANCE	7	very low positive		
		PROPOSED MITIGATION MEASURES		
be reported on fully through	the sites incation measur	ional, if facility staff identify any nesting which intident reporting system. A suitably qualified ornithies. All nest management measures should only lead in this reaard.	ologist should be o	onsulted for any
The state of the s		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	7	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	,	
SIGNIFICANCE 7 very low positive				
		CONFIDENCE LEVEL		
Medium			·	·

(d) Bats Impact

Day to day operation and maintenance of the facility may result in disturbance and displacement of bats. The impact is rated the same for the temporary laydown area infrastructure location alternatives and the battery technology options for the BESS.

Table 7-102: SPH3 disturbance and displacement effects for bats

	IMPACT OF	N POSSIBLE DISTURBANCE & DISPLACEMENT EFF	ECTS		
PROJECT PHASE	Operational	Operational phase			
DIRECT IMPACT	Disturbance	e of bats during operational activities			
INDIRECT IMPACT	Displaceme	nt			
CUMULATIVE IMPACT	Unavailabili	ty of suitable foraging resources in the broader en	vironment for displa	ced individuals	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1	
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.	Detrimental	,	
SIGNIFICANCE	-7	very low negative			
	PROPOSED MITIGATION MEASURES				
Limit operational and main	tenance activi	ties to daylight hours, as far as possible, and min	imise lighting at nig	nt.	
All lighting should preferab	y use low pre	ssure sodium and warm white LED lights.			

Operational and maintenan	ce activities s	hould be limited to the immediate project footpri	nt only.	
Site access should be strictly	y controlled, t	o avoid unnecessary disturbance.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE	-7	very low negative		
		CONFIDENCE LEVEL		
Medium				

Table 7-103: SPH3 bat roost disturbance

		MPACT ON POSSIBLE ROOST DISTURBANCE			
PROJECT PHASE	Operational	Phase			
DIRECT IMPACT	•	Disturbance of roosting bats during operational activities			
INDIRECT IMPACT	Roost abandonment				
	Unavailabili	ty of suitable roosting resources in the bro	ader environment	for abandoned	
CUMULATIVE IMPACT	individuals				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Unlikely	
IIMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-7	Very low negative			
	PROPOSED	MITIGATION MEASURES TO BE INCLUDED IN TH	E EMPr		
All lighting should preferabl	y use low pre	ssure sodium and warm white LED lights.			
Operational and maintenar	ce activities s	hould be limited to the immediate project area.			
Site access should be strictly	controlled, t	o avoid unnecessary disturbance.			
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as such is rated as Long Term	-7	1	
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,	Slightly detrimental	Unlikely	

			cultural and social functions and processes are minimally affected	
IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resourceswill be impacted.	
SIGNIFICANCE		-7	very low negative	
			CONFIDENCE LEVEL	
Medium				

(e) Botanical Impacts

Maintenance activities will require management of vegetation which may result in loss of natural vegetation. The impact is rated the same for the temporary laydownarea location alternatives and the battery technology options for the BESS.

Table 7-104: SPH3 loss of Western Free State Grassland during operational phase

		LOSS OF VEGETATION		
PROJECT PHASE	Operationa	Phase		
DIRECT IMPACT	Direct impa	ct		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	PRE-MITIGATION			
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	-5	1
		The extent of the impact is the footprint as it	-5	1
EXTENT	1	only affects the area in which the proposed		
		activity will occur.		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes are		
		minimally affected	Negligible	Unlikely
IMPACT ON				
IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
When and where possible, v	egetation cle	aring should be undertaken during the dry seasor).	
Only clear vegetation where	absolutely n	ecessary; and		
Stockpile areas for cleared	vegetation v	vill be decided and approved by the Project M	anager and appoin	ted ECO before
construction commences or	site and sho	uld not be located within drainage lines.		
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	1	the impact will last 0-6 months and as such is		
		rated as Temporary	-2	1
		The extent of the impact is rated as footprint	-2	1
EXTENT	1	as it only affects the area in which the		
		proposed activity will occur		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,	Negligible	Unlikely
		cultural and social functions and processes are		
		minimally affected		

IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		-2	very low negative		
CONFIDENCE LEVEL					
Medium					

(f) Groundwater Impact

Similar to the construction phase, the operational phase of the SPH3 will require approximately 1,000 m^3/a (0.03 L/s). This does not exceed the regionally mapped yield of the underling aquifer (0.5 – 2.0 L/s). It is not currently planned to use groundwater for the operational phase of this project however if this changes a water use licence will need to be applied for and the potential impacts and mitigation measures are presented in **Table 7-52**.

The principal risks for groundwater contamination that have been identified are the use of cleaning agents for cleaning of PV panels and for dust suppression of internal roads. If required, it is encouraged that water alone is used to conduct these tasks. Alternatively, the PV cleaning agents and dust suppression mixes must be environmentally friendly and should breakdown naturally without causing ingression of harmful chemicals into the environment. The risks and status of groundwater contamination occurring during the operational phase of SPH3 is presented in **Table 7-56**.

The proposed development will require a BESS. Currently two different technologies are being considered, i.e. either Solid State Lithium Batteries (SSLB) or Vanadium Redox Flow Battery Energy Storage Systems (VRFB). Both of these two BESS systems require an electrolyte. The SSLB contain an ethylene carbonate or di-ethyl carbonate electrolyte and the VRFB system will require that an estimate of 3 000 m³ of sulfuric acid solution with vanadium ions electrolyte is stored on site for each Springhaas Facility. The BESS systems will also require cooling systems and these systems could potentially either be water based or it may be refrigerant based systems which used chemicals such as ethylene glycol- based coolants.

The containers that the BESS systems are held in are equipped with a "Clean agent" which is a fires suppression systems that can release a powder/gas into the container to snuff fires. These systems usually leave a residue on the equipment that will need to be cleaned off. With any chemical storage there is always a risk of chemical fires that will need to be put out with water or foam and the waste water from these activities could contain contaminants that should not be let to run off into the environment.

The fire safety systems, refrigerants, electrolyte solutions and the waste products produced from these systems could contaminate the soil and groundwater and all measures should be taken to prevent leaks or spills on the ground. The risks and mitigations for the BESS are presented in **Table 7-57**.

The impact on groundwater levels is rated the same for the temporary laydown area location alternatives and the battery technology options for the BESS.

Table 7-105 SPH3: Impact of lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place)

	Potent	ial impact on groundwater level due to over abs	straction			
PROJECT PHASE	Operational	Phase				
DIRECT IMPACT	Lowering of	Lowering of groundwater level due to over abstraction				
INDIRECT IMPACT		Drying of springs in the area				
CUMULATIVE IMPACT		Permanent damage to the aquifer system in the area				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION	<u> </u>			
DURATION	4	The duration of the activity associated with				
		the impact will last more than 5 years and as				
		such is rated as Long Term				
EXTENT	3	The extent of the impact is rated as Local as	-16	2		
		it affects the development area and				
		adjacent properties				
SEVERITY	-2	The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural, cultural				
		and social functions and processes continue				
		albeit in a modified way; and valued,				
		important, sensitive or vulnerable systems or	Moderately	Likely		
		communities are negatively affected	Detrimental			
IMPACT ON		Irreplaceable resources will be impacted.				
IRREPLACEBLE	1	irreplaceable resources will be irripacted.				
RESOURCES						
SIGNIFICANCE	-32	low – negative				
ordining area	5 2	PROPOSED MITIGATION MEASURES				
If boreholes are used	it must be cor	rectly yield tested according to the National Sta	ndard (SANS 1029	9-4:2003, Part 4 –		
-		This includes a Step Test, Constant Discharge Te	· · · · · · · · · · · · · · · · · · ·			
		and to monitor water levels and flow.	ŕ	<u> </u>		
Groundwater abstrac	tion volumes	must be monitored.				
		POST-MITIGATION				
DURATION	4	The duration of the activity associated with				
		the impact will last more than 5 years and as				
		such is rated as Long Term	0	1		
EXTENT	1	The extent of the impact is rated as	U	1		
		footprint as it only affects the area in				
		which the proposed activity will occur				
SEVERITY	0	Negligible				
IMPACT ON	1	Irreplaceable resources will be impacted.	Negligible	Unlikely		
IRREPLACEBLE	<u> </u>		Negligible	Officely		
RESOURCES						
SIGNIFICANCE	0	very low negative				
		CONFIDENCE LEVEL				
Medium						

Table 7-106: SPH3 Impact of contamination of groundwater as a result of cleaning agents used for cleaning the solar panels

Potential impact on groundwater as a result of cleaning agents used for cleaning the solar panels.					
PROJECT PHASE	Operational	Phase			
DIRECT IMPACT	Contaminat	ion of groundwater			
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area		•	
CUMULATIVE IMPACT	Long-term r	Long-term reduced groundwater quality			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and	-16	2	

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		
		PROPOSED MITIGATION MEASURES		
Use environmentall that will not cause o			dable detergents/g	reen soaps) and
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		-
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
Medium				

Redox flow batteries contain electrolyte solution which needs to be replaced approximately every 15 to 20 years. During replacement of electrolyte there is a risk of leaks or spills. This impact is only applicable to the redox flow batteries as lithium-ion batteries are solid state batteries.

Table 7-107: SPH3 Impact table for contamination of groundwater quality as a result of leaking or spills from the electrolyte solution from the battery energy storage system (BESS)

Potential impact on g	roundwater qualit	ry as a result of leaking or spills from t	he electrolyte solut	ion from the
	batt	ery energy storage system (BESS)		
PROJECT PHASE	Operational Pho	ase		
DIRECT IMPACT	Contamination	of groundwater		
INDIRECT IMPACT	Damage to the	vegetation or ecosystem it the area		
CUMULATIVE IMPACT Long-term reduced groundwater quality				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent		

		properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or Communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		
	PRO	POSED MITIGATION MEASURES		
reliable leak detection, and not on bare soil.	nunciation in plac	red or used on site have secondary e. Ensure that all chemicals are hand 5 systems should be removed and disp	led on concrete bun	ded surfaces and
	•	uld not be allowed to runoff into the e		ziy.
	, - :,	POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	_	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed	0	1

activity will occur

very low negative

CONFIDENCE LEVEL

Irreplaceable resources will be

Negligible

impacted.

0

1

(g) Heritage Impact

SEVERITY

Medium

RESOURCES

SIGNIFICANCE

IMPACT ON IRREPLACEBLE

(i) Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts during operation of SPH3 relate only to the presence of the facility in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the facility. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a degree of change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. The impacts are the same for the location alternatives for the temporary laydown area and the technology options for the batteries for the BESS.

Table 7-108: SPH3: Assessment of operation phase impacts to the cultural landscape

	CULTURAL LANDSCAPE IMPACTS
PROJECT PHASE	Operation Phase
DIRECT IMPACT	Alteration of the rural landscape character through the presence of a solar energy facility
INDIRECT IMPACT	None

Unlikely

Negligible

CUMULATIVE IMPACT Impacts will be greater with multiple facilities being present					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		J	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental	·	
SIGNIFICANCE	-21	low - negative			
		PROPOSED MITIGATION MEASURES			
Keep all maintenance wor	k within the	authorised footprint.			
Minimise night-time light	pollution in t	he area (visual recommendations to be followed	d to achieve this).		
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-7	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			
		CONFIDENCE LEVEL			
High				<u> </u>	

(h) Socio-Economic Impact

(i) Stimulation of the Local Economy during operations

The operational period of SPH3 is a minimum of 20 years. Of the money spent annually during the operations period, a significant portion will likely comprise of salaries and wages of the Springhaas employees. The operations of the facility will make some contribution towards the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

No differentiate can be made between the location alternatives for temporary laydown area and battery technology for the BESS. All alternatives are considered in **Table 7-56** and **Table 7-57**.

Table 7-109: 3Assessment of Economic stimulation during operations

	ECONONIA	DURING OPERATIONS				
PROJECT PHASE	Operation	Operational Phase				
DIRECT IMPACT	Long-term	n increase in production and GDP in the local ecor	поту			
INDIRECT IMPACT	Improved	household income and increased business sales in	n the local econom	у		
CUMULATIVE IMPACT	Increase i	n production and GDP in the regional economy				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
		The duration of the activity associated with				
DURATION	4	the impact will last more than 5 years and as				
		such is rated as Long Term	0	2		
		The extent of the impact is rated as Regional	8	3		
EXTENT	4	as the effects of the impact extends beyond				
		municipal boundaries				
		The severity of the impact is rated as Low				
		positive as the impact affects the environment				
SEVERITY	1	in such a way that natural, cultural and social				
		functions and processes are minimally	Slightly	D-finit-		
		improved	Beneficial	Definite		
IMPACT ON IRREPLACEABLE	0	No important and a second				
RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	24	low positive				
PROPOSED MITIGATION MEA	SURES		l .			
Where feasible, procure good	s and servic	es required for the operation of the plant from th	e local economy			
POST-MITIGATION			<u> </u>			
		The duration of the activity associated with				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as				
DURATION	4	the impact will last more than 5 years and as				
DURATION	4	the impact will last more than 5 years and as such is rated as Long Term	16	3		
DURATION	4	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional	16	3		
		the impact will last more than 5 years and as such is rated as Long Term	16	3		
		the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	16	3		
		the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond	16	3		
		the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected	16	3		
		the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural		3		
EXTENT	4	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected	Moderately			
EXTENT	4	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued,		3 Definite		
EXTENT	4	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue	Moderately			
EXTENT	2	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately			
EXTENT	4	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or	Moderately			
EXTENT SEVERITY IMPACT ON IRREPLACEABLE	2	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately			
EXTENT SEVERITY IMPACT ON IRREPLACEABLE RESOURCES	2	the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected No irreplaceable resources will be impacted.	Moderately			

(ii) Creation of Employment and increased household income during operations

The operation of SPH3 will require functional and maintenance employees. It is envisaged that about eight direct jobs per facility will be created during the operations phase, which will occur for a duration of 20 years. About 70% of these jobs are to be filled by people from the local communities as they will be low-skilled employment opportunities. Employment of the eight

individuals for the entire operational period will increase their household income, improve their standard of living and benefit their families.

SPH3 will create the same number of employment opportunities, regardless of its location on the site; thus, layout alternatives are equally preferred. The type of battery used in the BESS will also not significantly affect employment alternatives, thus both technology alternatives are equally preferred.

Table 7-110: SPH3 Assessment of employment during operations

	AND INCILL	ASED HOUSEHOLD INCOME DURING OPERATION	ONS		
PROJECT PHASE	Operational Phase				
DIRECT IMPACT	Creation of permanent employment opportunities in the local and regional economy				
INDIRECT IMPACT	Improved	income of households whose members are em	ployed on the proje	ect	
CUMULATIVE IMPACT	Creation o	of permanent employment opportunities in the	region		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION	I.			l .	
		The duration of the activity associated with			
DURATION	4	the impact will last more than 5 years and			
		as such is rated as Long Term	_	_	
		The extent of the impact is rated as	- 8	3	
EXTENT	4	Regional as the effects of the impact			
		extends beyond municipal boundaries			
_		The severity of the impact is rated as Low			
		positive as the impact affects the			
SEVERITY	1	environment in such a way that natural,	Slightly Beneficial		
		cultural and social functions and processes			
		are minimally improved		Definite	
IMPACT ON IRREPLACEABLE		No irreplaceable resources will be	Denejielar		
THE THE PARTY OF T					
RESOURCES	0	1			
RESOURCES SIGNIFICANCE	_	impacted.			
SIGNIFICANCE	24	1			
SIGNIFICANCE PROPOSED MITIGATION MEA	24 SURES	impacted. low positive			
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t	24 SURES	impacted.			
SIGNIFICANCE PROPOSED MITIGATION MEA	24 SURES	impacted. low positive by labour from the local community			
PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION	24 SURES he positions	impacted. low positive by labour from the local community The duration of the activity associated with			
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t	24 SURES	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and			
PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION	24 SURES he positions	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	. 8	3	
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION DURATION	24 SURES he positions	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as	8	3	
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION DURATION	24 SURES he positions	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact	- 8	3	
PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION	24 SURES he positions	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	. 8	3	
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION DURATION	24 SURES he positions	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low	. 8	3	
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION DURATION EXTENT	24 SURES he positions 4	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the	- 8	3	
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION DURATION EXTENT	24 SURES he positions	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural,			
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION DURATION EXTENT	24 SURES he positions 4	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes	Slightly Beneficial	J. Definite	
SIGNIFICANCE PROPOSED MITIGATION MEA: Where feasible, aim to fill all t POST-MITIGATION DURATION EXTENT SEVERITY	24 SURES he positions 4	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly		
PROPOSED MITIGATION MEAN Where feasible, aim to fill all to post-mitigation DURATION EXTENT SEVERITY IMPACT ON IRREPLACEABLE	24 SURES he positions 4	impacted. Iow positive Self by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved No irreplaceable resources will be	Slightly		
PROPOSED MITIGATION MEAN Where feasible, aim to fill all to POST-MITIGATION DURATION EXTENT IMPACT ON IRREPLACEABLE RESOURCES	24 SURES he positions 4 4	impacted. low positive by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved No irreplaceable resources will be impacted.	Slightly		
PROPOSED MITIGATION MEAN Where feasible, aim to fill all to post-mitigation DURATION EXTENT IMPACT ON IRREPLACEABLE	24 SURES he positions 4	impacted. Iow positive Self by labour from the local community The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved No irreplaceable resources will be	Slightly		

(iii) Improved municipal service delivery

SPH3 will have a capacity of up to 150MWac and will be connected to the national grid through Eskom substation and generated electricity will be sold nationwide. The proposed project, albeit relatively small, will contribute towards improving National electricity availability; thus, improving the government service delivery, and could potentially also aid in growing the local economy by increasing the overall supply of electricity in the local economy. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas.

The layout alternatives and BESS technology alternatives will not affect the capacity of the solar facility; thus all alternatives are equally preferred.

Table 7-111: SPH3: Assessment of service delivery improvement

IMPROVED MUNICIPAL SE	IMPROVED MUNICIPAL SERVICE DELIVERY					
PROJECT PHASE	Operation	Operational phase				
DIRECT IMPACT	It will like	It will likely Improve the local electricity supply if fed to the grid				
INDIRECT IMPACT	Improved	proved standard of living within the region				
CUMULATIVE IMPACT	Improved	electricity availability				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3		
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries				
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	48	moderate positive				
PROPOSED MITIGATION M	EASURES		1	•		
No mitigations proposed						

(iv) Reduction of Land Area available for productive farming

The proposed site of SPH3 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH3 as being of low to very low agricultural potential with small isolated patches of low – moderate and moderate potential land on the edges of the facility. The farmers with livestock on the land proposed for the

facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH3 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH3.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The location alternative for the temporary laydown area will not affect the impact ratings.

Table 7-112: SPH3: Assessment of Impact on agricultural production

Reduction of Land Area available for Productive Farming							
PROJECT PHASE	Operation		•				
DIRECT IMPACT	Loss of a	gricultural production within the footprint a	lue to land sterilisatio	on			
INDIRECT IMPACT	Negligib	le to no indirect impact					
CUMULATIVE IMPACT	Negligible	gligible to no cumulative effects					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
	PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		2			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	6	3			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite			
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.					
SIGNIFICANCE	-18	very low negative					
		PROPOSED MITIGATION MEASURES					
Rehabilitation of land shou after the closure of the pro		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming			
	I	POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	_	_			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	6	3			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite			

IMPACT IRREPLACEABLE RESOURCES	ON	1	Irreplaceable resources will be impacted.
SIGNIFICANCE		-18	very low negative
			CONFIDENCE LEVEL
High			

(i) Terrestrial Biodiversity and Animal Species

(i) Direct Impacts - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death.

Regarding the technology alternative for the type of battery used in the BESS for SPH3, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place. The impact ratings will be same irrespective of the layout alternatives of the temporary laydown area.

Table 7-113: SPH3 Injury or death to fauna

		ALL FACILITIES			
PROJECT PHASE	Operation	Operational Phase			
DIRECT IMPACT	Injury or o	Injury or death to fauna			
INDIRECT IMPACT					
CUMULATIVE IMPACT					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	2	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately detrimental	Likely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-32	low negative			

PROPOSED MITIGATION MEASURES

No wild animal may under any circumstance be handled, removed or be interfered with by maintenance staff

To prevent possible collisions with animals, drivers of maintenance vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

Adequate fire prevention and safety measures must be in place. A fire emergency management plan must be in place

All electrical equipment must be maintained on a regular basis to minimise the risk of fire

POST-MITIGATION

High		CONFIDENCE LEVEL		
SIGNIFICANCE	-6	very low negative		·
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	1
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	1

(ii) Indirect Impacts – Pollution and contamination of natural areas

During operations, release of grey water into the environment can cause contamination by detergents. Grey water from cleaning of the solar panels has the potential to contaminate soils and ground water and be washed into the nearby natural pans during high rainfall events. This includes biodegradable detergents used for cleaning the panels, which can accumulate in the soil and be washed into the nearby pans before they break down. Biodegradable detergents can alter the balance of freshwater ecosystems as they promote bacterial growth and lower oxygen levels. The impacts are rated the same for both location alternatives for the temporary laydown area and the battery technology alternatives for the BESS.

Table 7-114: SPH3 Pollution and contamination of natural areas

	POLLUTIO	ON AND CONTAMINATION OF NATURAL	AREAS		
PROJECT PHASE	Operation	Operational Phase			
DIRECT IMPACT					
INDIRECT IMPACT	Pollution	and contamination of natural areas – no i	nearby pans or weti	lands	
CUMULATIVE IMPACT	Habitat a	egradation			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	2	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately detrimental	Likely	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted			
SIGNIFICANCE	-28	low negative			
		PROPOSED MITIGATION MEASURES			

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		_	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-6	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted			
SIGNIFICANCE	-6	very low negative			
CONFIDENCE LEVEL					
High					

Table 7-115: SPH3: Pollution and contamination of natural areas including pans and wetlands

POLLUTION AND CONTAMINATION OF NATURAL AREAS INCLUDING PANS AND WETLANDS						
PROJECT PHASE	Operation	nal Phase				
DIRECT IMPACT						
INDIRECT IMPACT	Pollution	Pollution and contamination of natural areas – including nearby pans or wetlands				
CUMULATIVE IMPACT	Habitat d	egradation				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-21	3		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural and social functions and processes are altered to the extent that the natural process with temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted				
SIGNIFICANCE	-63	High negative				
		PROPOSED MITIGATION MEASURES				

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-12	2
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-24	very low negative		
CONFIDENCE LEVEL				
High				

(iii) Indirect Impacts – Disturbance and displacement of fauna

Security lights for SPH3 during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The impacts are rated the same for both location alternatives for the temporary laydown area and the battery technology alternatives for the BESS.

Table 7-116: SPH3 Disturbance and displacement of fauna

DISTURBANCE AND DISPLACEMENT OF FAUNA					
PROJECT PHASE	Operation	nal Phase			
DIRECT IMPACT					
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland		
CUMULATIVE IMPACT Displacement of fauna					
DIMENSION	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			

SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-32	low negative		

PROPOSED MITIGATION MEASURES

Operations during the night must be avoided to minimise the need for artificial lighting and to reduce the impact of light and noise on nocturnal animals

Lighting during operations should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-7	very low negative		
CONFIDENCE LEVEL				
High				

(j) Traffic Impact

During the operational phase there will be approximately 8 full time employees on site. Vehicles would access the site for daily operations and maintenance as and when required. The impacts are rated the same for both location alternatives for the temporary laydown area and the battery technology alternatives for the BESS.

Table 7-117 SPH3: Traffic impacts during operation phase

		TRAFFIC IMPACTS			
PROJECT PHASE	Operation	al Phase			
DIRECT IMPACT	Traffic con	gestion due to the trips generated by the op	eration of the facility		
INDIRECT IMPACT	The associ	ated noise and dust pollution			
CUMULATIVE IMPACT	CUMULATIVE IMPACT Traffic delays on the surrounding road network				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will lastmore than 5 years and as such is rated as Lona Term	0	3	

EXTENT	3	The extent of the impact is rated as		
		Local as it affects the developmentarea		
		and adjacent properties		
SEVERITY	0	Negligible		
IMPACT ON	0	No irreplaceable resources will be		
IRREPLACEBLE		impacted.	Negligible	Definite
RESOURCES	_			
SIGNIFICANCE	0	very low negative		
		PROPOSED MITIGATION MEASURES		
		ur outside of peak traffic periods; and		
		at regular maintenance of gravel roads (locate		lary,including the
access road to the site) o	ccurs during o	peration phase to minimise/mitigate dust pollu	ution.	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated		
DORATION		with the impact will lastmore than 5		
		years and as such is rated as Long		
		Term	0	3
EXTENT	2	The extent of the impact is rated assite		
		as it will affect only the development		
		area		
SEVERITY	0	Negligible		
IMPACT ON	0	No irreplaceable resources will be	Negligible	Definite
IRREPLACEBLE		impacted.	Negligible	Dejinite
RESOURCES		'		
SIGNIFICANCE	0	very low negative	Į.	
		CONFIDENCE LEVEL		
High		COM IDENCE LEVEL		

7.4.5 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered **Section 7.7**.

7.4.6 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities and is covered in **Section 7.8.**

7.4.7 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The cumulative impact assessment is available in **Section 7.9.**

Table 7-118: SPH3 impact summary

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Design/Planning/Pre-Construction Phase			mitigation
No impacts identified			
Construction Phase			
Agricultural impacts			
Land use change from livestock farming to energy generation	Negative	Moderate	Low
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Impaired soil health as a result of soil pollution	Negative	High	Very low
Aquatic impacts			
Disturbance and water quality impacts	Negative	Very low	Very low
Avifaunal impacts			
Destruction of bird habitat during construction	Negative	Low	Low
Disturbance of birds during construction	Negative	Very low	Very low
Bat impacts			
Bat habitat modification	Negative	Very low	Very low
Disturbance and displacement of bats	Negative	Very low	Very low
Possible roost disturbance	Negative	Low	Very low
Bat roost destruction	Negative	Very low	Very low
Botanical impacts			
Loss of vegetation	Negative	Medium	Low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for	Negative	Low	Very low
construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages	Negative	2011	,
or fuel leakages	regutive	Very low	Very low
Heritage impacts			
Impact on archaeological sites	Negative	Very low	Very low
Impact on graves	Negative	Low	Very low
Impact on cultural landscape	Negative	Low	Low
Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-economic impacts			
Stimulation of the economy during construction	Positive	Low	Low
Employment opportunities	Positive	Low	Low
Reduction in land available for productive farming	Negative	Very low	Very low
Loss of property	Negative	Low	Very low
Terrestrial biodiversity and animal species (faunal) impacts			
Destruction of faunal habitat	Negative	High	Low
Injury or death to fauna	Negative	Moderate	Very low
Pollution and contamination of natural areas	Negative	Moderate	Very low
Disturbance and displacement of fauna – natural grassland	Negative	Low	Very low

Impact	Nature	Rating pre-mitigation	Rating post
Spread of invasive alien plant species	Negative	Moderate	mitigation Very low
Traffic impacts		1110001	,
Traffic congestion	Negative	Very low	Very low
Landscape and visual impacts			10.7.0
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature	Negative	Very low	Very low
Reserve	Negative		
Industrialisation of the landscape as seen from local roads	Negative	Moderate	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
Operational Phase			
Agricultural impacts	T		1
Soil loss through erosion	Negative	Moderate	Very low
Soil pollution	Negative	Very low	Very low
Aquatic impacts	T		1
Increased run-off, pollution	Negative	Very low	Very low
Aquatic	T		
Disturbance of aquatic habitat; water quality impacts	Negative	Very low	Very low
Avifauna impacts			
Bird fatality through interaction with infrastructure	Negative	Very low	Very low
Nesting and use of other infrastructure by birds	Positive	Very low	Very low
Bat impacts			
Disturbance and displacement	Negative	Very low	Very low
Roost disturbance	Negative	Very low	Very low
Botanical impacts			
Loss of vegetation	Negative	Very low	Very low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place).	Negative	Low	Very low
Contamination of groundwater from use of cleaning agents	Negative	Low	Very low
Contamination of groundwater from leaks or spills from BESS	Negative	Low	Very low
Heritage impacts			
Impact on cultural landscape	Negative	Low	Low
Socio-economic impacts			
Economic stimulation during operations	Positive	Low	Moderate
Employment opportunities	Positive	Low	Low
Improved service delivery	Positive	Moderate	Moderate
Reduction in land available for productive farming	Negative	Very low	Very low
Terrestrial biodiversity and animal species			
Injury or death of fauna	Negative	Low	Very low
Pollution and contamination of natural areas - no nearby pans or wetlands	Negative	Low	Very low

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Disturbance and displacement of fauna	Negative	Low	Very low
Traffic impact			
Traffic congestion	Negative	Very low	Very low
Palaeontological impacts		•	•
Destruction of fossils	NA	NA	NA
Decommissioning phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Impaired soil health as a result of soil pollution	Negative	High	Very low
	IVEGALIVE	'''5''	very low
Aquatic impacts	I No continue		
Disturbance of aquatic habitat, water quality impacts	Negative	Very low	Very low
Avifaunal impacts	T		
Disturbance of birds	Negative	Very low	Very low
Bat impacts			
Disturbance and displacements	Negative	Very low	Very low
Botanical impacts			
Loss of vegetation	Negative	Low	Low
Groundwater			
Contamination from construction activities	Negative	Very low	Very low
Heritage impacts			
Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site	Negative	Low	Very low
Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-Economic impacts			
Impact on the economy	Positive	Very low	Very low
Creation of temporary employment opportunities in the local and regional economy	Positive	Very low	Very low
Terrestrial biodiversity and animal species			
Destruction of novel ⁴ faunal habitat (i.e. grassed areas under the panels where fauna may recolonise after construction)	Negative	Moderate	Very low
Injury or death to animals (due to collisions with construction vehicles or destruction of burrows that have established under the panels)	Negative	Moderate	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	Moderate	Very low
Disturbance to and displacement to fauna and edge effects – natural grassland	Negative	Low	Very Low
	Negative	Moderate	Very low
Increased potential of invasion by alien vegetation Reestablishment of movement corridors through the landscape			

⁴ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads, with alternative electrical infrastructure compound	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads, with proposed electrical infrastructure compound	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
No-Go Alternative			
Agricultural	Negative	Very low	Very low
Aquatic	Negative	-	Very low- negligible
Avifauna	Negative	Very low	Very low
Bats	Negative	Very low	Very low
Botanical	Negative	Low	Low
Heritage	Negative	Very low	Very low
Transport- Traffic congestion	Negative	Very Low	Very Low
Terrestrial biodiversity and animal species	Negative/ positive	Low negative	Very low positive
Socio-economic Socio-economic	NA- no impact, forgone + impacts	NA	NA
Destruction of fossils	NA	NA	NA
Landscape and Visual	Negligible	No impact/NA	No impact/NA
Groundwater Impacts	Negligible	NA	NA
Cumulative impacts			
Agricultural	Negative	Very low	Very low
Aquatic	Negative	Low	Low
Avi-fauna	Negative	Moderate	Moderate
Bats	Negative	Low	Low
Botanical	Negative	Very low	Very low
Heritage	Negative	Moderate	Low
Socio-economic - Impact on the economy- construction	Positive	-	Moderate
Socio-economic -Creation of employment during construction	Positive	-	Moderate
Socio-economic -Reduction in land available for productive farming	Negative	-	Low
Socio-economic -Stimulation of the economy – operations	Positive	-	Moderate
Socio-economic -Employment - operations	Positive	-	Moderate
Socio-economic -Improved municipal service delivery	Positive	-	Moderate
Socio-economic -Loss of property	Negative	-	Low
Socio-economic - Stimulation of economy - decommissioning	Positive	-	Very low
Terrestrial biodiversity	Negative	High	Moderate
Transport	Negative	Low	Very Low

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Landscape and visual	Negative	-	Low
Destruction of fossils	NA	NA	NA
Groundwater: Aquifer system and water quality	Negative	Low- Very Low	Low – Very Low

7.5 Springhaas 4 Detailed Impact Assessment

7.5.1 Alternatives Considered

(a) Technology Alternatives

Two technology alternatives namely lithium-ion and redox flow batteries were considered for the BESS.

(b) No-Go Alternative

The no-go alternative was considered for all seven of the proposed facilities. The impact of the no-go alternative was rated as the same for all seven facilities. The no-go alternative is assessed in **Section 7.8**.

7.5.2 Pre-construction phase

No significant impacts for the pre-construction phase have been identified by any specialist studies or by the EAP for SPH4.

7.5.3 Construction Phase

(a) Agricultural Impact

The most significant agricultural impacts associated with the development of SPH4 will occur during the construction phase when the site is fenced off, vegetation is removed and the soil surface is prepared for the installation of infrastructure.

The footprint of SPH4 contains two small sections of moderate sensitivity agricultural land. These patches are small and isolated from other areas of viable production. The loss of these areas of moderate sensitivity land are therefore considered the same as the loss of low sensitivity areas.

SPH4 was also classified in terms of agricultural potential. The majority of the site is classified as low to very low potential. There is one patch of low- moderate potential land and two small areas of moderate potential land. As these patches of low- moderate and moderate potential agricultural land are isolated from larger patches of moderate sensitivity land they are not viable from a production perspective.

Tables 7-8 – 7-11 cover the two technology options for the BESS. There was no difference in the alternatives proposed from an agricultural perspective.

Table 7-119: SPH4: Impact of land use change from livestock farming to renewable energy generation

LAN	D USE CHANG	SE FROM LIVESTOCK FARMING TO ENERGY	GENERATION		
PROJECT PHASE	Construction	n Phase			
DIRECT IMPACT	Construction of boundary fence and PV infrastructure will change land use from livestock				
DIRECT IMPACT	farming to renewable energy generation				
	Intensificati	on of agriculture in other areas or otherwi	se reduction of live	stock produced in	
INDIRECT IMPACT	the area				
CUMULATIVE IMPACT	Increase in (areas where agriculture is converted into ot	her land uses		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	21		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-42	moderate - negative			
	•	DDODOSED MITIGATION MEASURES			

PROPOSED MITIGATION MEASURES

Springhaas Solar Facility 3 (Pty) Ltd must provide market-related compensation that will allow the current land users to have the same or better ability to sustain their livelihood.

Ensure that the final infrastructure layout remains within the fenced off area of the development footprint.

Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area.

The use of main access routes by construction vehicles and equipment must do so with consideration of nearby agricultural land users who use the same access routes for farming activities.

All left-over construction material must be removed from site once construction on a land portion is completed.

No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.

No boundary fence must be opened without the landowners' permission.

No open fires made by the construction teams are allowable during the construction phase.

p - ,		and and another about the control	<i>r</i>	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		

SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			
CONFIDENCE LEVEL					
High					

Table 7-120: SPH4: Impact significance of soil loss through erosion during the construction phase

		SOIL LOSS THROUGH EROSION		
PROJECT PHASE	Constructio	n Phase		
DIRECT IMPACT	_	particles from areas where consti from the surface.	ruction activities result in	the removal of
INDIRECT IMPACT	Sparse to n	o vegetation growth in eroded areas	5.	
CUMULATIVE IMPACT	Increase in	areas exposed to soil erosion		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	moderate - negative		
PROPOSED MITIGATION MEASURES				

Limit vegetation removal from the soil surface to the areas of infrastructure development such as access routes as well as around the foundations of the PV arrays and buildings.

Vegetation clearance must only be undertaken immediately prior to construction activities and only within the development footprint

Once construction of an area has been completed, level any remaining soil removed from excavation pits (where the PV arrays will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface where it is exposed to rain and wind. This is applicable to all construction areas, except where topsoil stockpiles must remain for site rehabilitation of specific areas.

Stormwater channels on site must be designed to minimise the soil erosion risk that results from surface water runoff.

Where possible, conduct the construction activities outside of the rainy season.

POST-MITIGATION					
DURATION	3	The duration of the activity associated with the impact will	-5	3	

EXTENT	1	last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
High				

Table 7-121: SPH4: Impact significance of impaired soil functionality caused by compaction

		INADAUDED COU FUNCTIONALITY		
DROJECT DILACE	C	IMPAIRED SOIL FUNCTIONALITY		
DIRECT IMPACT		tion Phase tht and movement of vehicles and equipme on.	ent over the surfac	re will result in soil
INDIRECT IMPACT	increase	ed soil have reduced pore space and water in the rate of surface water runoff, especially aft		pacted soil surfaces
CUMULATIVE IMPACT	Increase	in areas affected by soil compaction.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	moderate - negative		
		PROPOSED MITIGATION MEASURES		
area.	•	o travel on designated access routes and not	•	•
access routes.		nternal farm roads where possible and avoid us	sing other areas in t	he site as temporary
		designated parking areas.		
		red in designated laydown area.		
Where possible, conduct t dry soil.	he constru	ction activities outside of the rainy season as	wet soil compacts (easily as opposed to
		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	3

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-15	very low negative			
	CONFIDENCE LEVEL				
High					

Table 7-122: SPH4: Impact significance of impaired soil health as a result of soil pollution

		IMPAIRED SOIL HEALTH			
PROJECT PHASE	Construction I				
11103201111102		can be caused by oil and fuel spills from vehicl	les and equipment (as well as domestic	
		waste on site. Should the vanadium redox			
DIRECT IMPACT		rosive and environmentally toxic electrolyte is	•		
	, ,	erised batteries are used, there is a possibility	•		
		toxic and flammable gasses.	.,	,	
	Increased risk	of pollutant uptake by vegetation within the	he development ar	ea that can affect	
INDIRECT IMPACT	environmenta	ıl and human health.	·		
CUMULATIVE IMPACT	Increase in ar	Increase in areas at risk of soil pollution.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
		The duration of the activity associated			
DURATION	3	with the impact will last 18 months-5	-21	3	
		years and as such is rated as Medium term			
		The extent of the impact is rated as Local			
EXTENT	3	as it affects the development area and			
		adjacent properties			
		The severity of the impact is rated as High			
		negative as the natural, cultural or social			
		functions and processes are altered to the			
SEVERITY	-3	extent that the natural process will			
SEVERIT	-5	temporarily or permanently cease; and	Highly		
		valued, important, sensitive or vulnerable		Definite	
		systems or communities are substantially affected.	detrimental	Dejinite	
IMPACT ON					
IRREPLACEBLE	1	Irreplaceable resources will be impacted.			
RESOURCES					
SIGNIFICANCE	-63	high negative			
		PROPOSED MITIGATION MEASURES			
Maintenance must be u	ndertaken regu	larly on all vehicles and construction equipme	ent to prevent hydr	ocarbon spills.	
Any waste generated d	uring construct	ion must be stored into designated containe	ers and removed fr	om the site by the	
construction teams.					
		ust be removed from the development area.			
		red by the Environmental Control Officer (ECC	D) to detect any ear	ly signs of fuel and	
		must also report any spills from batteries.			
		on is undertaken by accredited staff and conti			
Compile (and adhere to)	a procedure fo	or the safe handling of battery cells during tra	nsport and installa	tion.	
		POST-MITIGATION			
		The duration of the activity associated			
DURATION	3	with the impact will last 18 months-5	-5	3	
		years and as such is rated as Medium term			

IMPACT ON IRREPLACEBLE	1	cultural and social functions and processes are minimally affected Irreplaceable resources will be impacted.	Negligible	Definite
RESOURCES SIGNIFICANCE	-15	very low negative		

(b) Aquatic Impact

Construction phase activities would result in disturbance of soil and clearing of vegetation. Water quality impacts may occur from batching of concrete on site, hydrocarbon spills and other construction activities.

There is no difference in impacts between the two battery technology options for BESS, the impact assessment table covers both alternatives.

Table 7-123: SPH4: Impact of aquatic ecosystems during the construction phase

		AQUATIC ECOSYSTEM IMPACTS		
PROJECT PHASE	Construction	Phase		
DIRECT IMPACT	Disturbance	of aquatic habitat; water quality impacts		
INDIRECT IMPACT	Modification	of flow and alien vegetation invasion in aquatic fea	itures	
CUMULATIVE IMPACT	Degradation	of the ecological condition of aquatic ecosystems		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
	2	The duration of the activity associated with the		
DURATION		impact will last 6-18 months and as such is rated		
		asShort term	-4	1
	_	The extent of the impact is rated as site as it will	\overline{I}	
EXTENT	2	affect only the development area		
	-1	The severity of the impact is rated as Low negative		
0=1/==1/		as the impact affects the environment in such a		
SEVERITY		waythat natural, cultural and social functions and		
		processes are minimally affected	Negligible	Unlikely
IMPACT ON	0	No irreplaceable resources will be impacted.		· · · · · · · · · · · · · · · · · · ·
IRREPLACEBLE				
RESOURCES				
SIGNIFICANCE	-4	Very low negative PROPOSED MITIGATION MEASURES		

A buffer of at least 250 m between the significant aquatic ecosystems (larger pans) and all the proposed project activities should be maintained (noting that this is already honoured in the proposed layout for all facilities).

Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers, while retaining the topography and cover vegetation within the wider drainage areas through the site is preferred to reduce the potential modification to the way in which water drains through these areas.

The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.

During the construction phase, site management must be undertaken at the laydown and construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities such as hydrocarbon spills. The solar panels will be washed with water and a

biodegradable/ greendetergent.

Any stormwater that does arise within the construction sites must be handled appropriately to trap sediments and reduce flow velocities where necessary.

Development within the drainage areas, where located within a proposed facility, will however need to consider stormwater management measures and should avoid impacting on the movement of water through the more seasonally wet areas. Minimal disturbance to the topography and cover vegetation in these areas is recommended.

POST-MITIGATION POST-MITIGATION					
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated asTemporary	-2	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur			
SEVERITY	-1	The severity of the impact is rated as Lownegative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negliqible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible		
SIGNIFICANCE	-2 \	very low negative			
	CONFIDENCE LEVEL				
High					

(c) Avifaunal Impact

(i) Habitat destruction associated with the construction of the facility

Habitat destruction and alteration will occur during the construction phase of SPH4. The majority of the development footprint would be transformed from its current state to a renewable energy facility. SPH4 will transform approximately 261ha of habitat. Most of this is in a fairly natural state currently, or in the case of arable lands is still accessible and useable for birds foraging.

Table 7-124: SPH4: Formal rating of destruction of bird habitat during construction

DESTRUCTION OF BIRD HABITAT DURING CONSTRUCTION				
PROJECT PHASE	Construction	n phase		
DIRECT IMPACT	Transforma	tion of natural habitat into PV facility		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Yes - Larger	area transformed from natural habitat		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	1	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-12	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite

IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-36	low – negative		
			PROPOSED MITIGATION MEASURES		
There is no specific adherence to no-g	_	•	. Impact avoidance has already been implemented	I in the design pho	ase through the
			POST-MITIGATION		
DURATION		4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	12	2
			The extent of the impact is rated as footprint as	-12	3

High					
			CONFIDENCE LEVEL		
SIGNIFICANCE		-36	low - negative		
IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SEVERITY		-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
EXTENT		1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-12	3
DURATION		4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		

(ii) Disturbance of birds & displacement effects

Disturbance of avifauna during the construction (and thereafter during maintenance and operational and decommissioning) of the facility and all development alternatives and associated infrastructure is likely to occur. Disturbance of breeding birds is typically of greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. It is noted that no breeding sites have been identified on site at this stage.

There is no difference between the location and technology options in terms of disturbance and displacement of birds.

Table 7-125: SP4: Formal rating of disturbance of birds during construction

PROJECT PHASE	Construction	Construction phase & operations phase to lesser extent				
DIRECT IMPACT	Birds disturbed from their normal activities through the increased noise and activity levels					
DIRECT HVIF ACT	associated with construction					
INDIRECT IMPACT						
CUMULATIVE IMPACT	More projec	cts will result in overall higher disturbance levels				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	_	4		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		1		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely		

IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		-5	very low negative		

PROPOSED MITIGATION MEASURES

There is no specific mitigation required as there are no particularly sensitive features identified (such as breeding sites). General good environmental practice should be implemented during construction in terms of control of vehicles, staff, minimising the impact on the receiving environment as much as possible.

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
		CONFIDENCE LEVEL		
Medium				

(d) Bats Impact

The facility boundary for SPH4 encompasses a pan which is a high sensitivity areas from a bat perspective. The pan along with its 250m ecological buffer have been avoided by the infrastructure layout.

During the construction of SPH4 habitat modification would occur, disturbance and displacement of bats may occur and bat roosts may be disturbed or destroyed.

Two technology options are under consideration for the BESS. For bat impacts the type of technology used for the BESS is not considered relevant. Both technology options are considered equally acceptable.

Table 7-126: SPH4: Bat habitat modification

IMPACT ON POSSIBLE HABITAT MODIFICATION					
PROJECT PHASE	Construction	n phase			
DIRECT IMPACT	Modification	n of habitat through the removal of vegetation cove	er and water source	?S	
INDIRECT IMPACT	Displaceme	nt			
CUMULATIVE IMPACT	Loss of forag	ging resources for local bat population			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	_	2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	4	2	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely	

IMPACT IRREPLACEBLE RESOURCES	ON	1	No irreplaceable resources will be impacted.	
SIGNIFICANCE		-8	very low negative	

PROPOSED MITIGATION MEASURES

This impact may be reduced by limiting the removal of vegetation and available water sources, as far as possible.

Avoid all high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should to the layout occur a bat specialist must confirm, that these high sensitive areas have been adequately avoided.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction, rehabilitation of all disturbed areas, inclusive of that beyond permanent infrastructure footprints, (e.g. temporary access tracks and laydown areas) must be undertaken.

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
Medium				

Table 7-127: SPH4: Disturbance and displacement effects for bats

	IMPACT (ON POSSIBLE DISTURBANCE & DISPLACEMENT EFFE	ECTS	
PROJECT PHASE	Construction	n phase		
DIRECT IMPACT	Disturbance	e of bats during construction activities		
INDIRECT IMPACT	Displaceme	nt		
CUMULATIVE IMPACT	Unavailabili	ity of suitable foraging resources in the broader env	ironment for displa	iced individuals
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions andprocesses are minimally affected	Manihila	Hallinda.
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.	- Negligible	Unlikely
SIGNIFICANCE	-5	very low negative		

PROPOSED MITIGATION MEASURES

Limit construction activities to daylight hours only and minimise lighting at night, as far as possible.

Avoid high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided.

All construction activities should be limited to the assessed project footprint only.

POST-MITIGATION

DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1		
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.				
SIGNIFICANCE	-5	very low negative				
	CONFIDENCE LEVEL					
Medium						

Table 7-128: SPH4: Bat roost disturbance

		IMPACT ON POSSIBLE ROOST DISTURBANCE		
PROJECT PHASE	Construction	n phase		
DIRECT IMPACT	Disturbance	of roosting bats during construction activities		
INDIRECT IMPACT	Roost aband	donment		
CUMULATIVE IMPACT	Unavailabili	ty of suitable roosting resources in the broader environme	ent for abandonedir	ndividuals
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-10	2
EXTENT	2	The extent of the impact israted as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.	Maglizible	Unlikalı
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	- Negligible	Unlikely
SIGNIFICANCE	-20	low negative		

PROPOSED MITIGATION MEASURES

All construction activities should be limited to the assessed project footprint only.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough toidentify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

			POST-MITIGATION		
DURATION		2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT		2	The extent of the impact israted as site as it will affect only the development area		
SEVERITY		-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely
IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-5	very low negative		
			CONFIDENCE LEVEL		

Table 7-129: SPH4: Bat Roost destruction

		IMPACT OF POSSIBLE ROOST DESTRUCTION		
PROJECT PHASE	Constructio	n phase		
DIRECT IMPACT	Destruction	of potential bat roosting features		
INDIRECT IMPACT	Reduction c	of available roosting sites and/or Mortality		
CUMULATIVE IMPACT	Insufficient mortality	roosting resources to support the local populat	ion and potential	increased bat
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated withthe impact will last 6 to 18 months and as such is rated as Short term	-10	1
EXTENT	2	The extent of the impact is rated as site as it will affect only thedevelopment area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continuealbeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected		Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE	-20	Low negative		
		MITIGATION MEASURES TO BE INCLUDED IN THE	EMPr	
		sting farmsteads and trees, as far as possible.		
		dders status has been awarded), a bat specialist sho		
		if construction does not take place within 5 years of		
If occupied roosts are conbest practice.	firmed (after	r the 5-year period, as described above), then these	e should be buffere	d according to
•	should be lim	ited to the assessed project footprint only.		
, conot. action activities		POST-MITIGATION		
		The duration of the activity associated withthe		
DURATION	2	impact will last 6 to 18 months and as such is rated as Short term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	7	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impactaffects the environment in such away that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON	1	Irreplaceable resourceswill be impacted.	- -	,
IRREPLACEBLE RESOURCES	1			
	-8	very low negative		
RESOURCES				

(e) Botanical Impacts

The development of SPH4 would result in extensive but localized loss of relatively undisturbed (unploughed but grazed) Western Free State Clay Grasslands.

The shade effect of the panels on the grassland vegetation is not known and it not easily predicted. There will be space under the panels for grass and other plants to grow. However, the microclimate is likely to be different to that of open grassland, so a different suite of plant species is likely to colonize the space under the solar panels.

Two technology options are proposed for the BESS. The technology alternatives will make no difference on the botanical impact assessment and as such these alternatives are covered in the **Table 7-19**.

Table 7-130: SPH4: Impact of loss of Western Free State Clay Grassland

LOSS OF VEGETATION					
PROJECT PHASE	Construction	onstruction Phase			
DIRECT IMPACT	Removal of	natural vegetation: Western Free State Clay Gras.	slands		
INDIRECT IMPACT	None deteri	mined			
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term.	-15	3	
EXTENT	3	The impacts will be localized to the designated target areas.	1		
SEVERITY	-2	The severity of the potential impact will be moderate negative.			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Moderately Detrimental	Definite	
SIGNIFICANCE	-45	medium - negative			
PROPOSED MITIGATION MEASURES					

PROPOSED MITIGATION MEASURES

The first mitigation measures necessary would be the relocation of **Ammocharis coranica** bulbs if they cannot be avoided. Ideally the bulb should be lifted when they area dormant (winter) but that would mean traversing the entire area of the SPH sites in the preceding summer and marking every occurrence of these plants. A more practical approach would be to unearth the bulbs during the construction phase and relocating and planting them soon after removal.

Secondly, all areas that are disturbed during construction and that are not needed during the operational phase should be rehabilitated, using natural grasses that occur in the area. It would be possible for some grasses and forbs to survive under the panels, but it is difficult to predict the extent of such growth, nor which plant species would grow effectively under the panels.

POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.	-5		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			
CONFIDENCE LEVEL					
High					

(f) Groundwater Impact

The water required during the construction phase of SPH4 is approximately $9,000\text{m}^3$ per year. The water requirement lies well within the yield potential of the underlying fractured rock aquifer (i.e. 0.5-2.0 L/s). It must be noted that at present the use of groundwater is not proposed however if this changes the potential impacts of groundwater abstraction are shown in **Table 7-20**.

Earthmoving plant and/or construction vehicles will be used on site during the construction phase. Use of vehicles presents a risk of groundwater contamination by fuel and oil leakage.

Two technology options (lithium-ion vs redox flow batteries) were considered for SPH4. The alternatives considered are equally preferred.

Table 7-131: SPH4: Impact table for the lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place).

	Potential imp	act on groundwater level due to over ab	straction			
PROJECT PHASE	Construction I	Phase				
DIRECT IMPACT	Lowering of g	roundwater level due to over abstraction	1			
INDIRECT IMPACT		ngs in the area				
CUMULATIVE IMPACT	Permanent do	mage to the aquifer system in the area				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term				
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	2		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely		
IMPACT ON	1	Irreplaceable resources will be				
IRREPLACEBLE RESOURCES		impacted.				
SIGNIFICANCE	-28	low - negative				
		PROPOSED MITIGATION MEASURES				
If boreholes are used it must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 — Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring. Adhere to the borehole's safe yield and to monitor water levels and flow.						
Groundwater abstraction volumes must be monitored.						
	POST-MITIGATION					
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	0	1		

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur			
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be	Negligible	Unlikely	
RESOURCES		impacted.			
SIGNIFICANCE	0	very low negative			
CONFIDENCE LEVEL					
Medium					

The main risk associated with the construction phase is groundwater contamination from the use of construction vehicles and heavy machinery on-site.

Table 7-132: SPH4: Impact of contamination of groundwater as a result of accidental oil spillages or fuel leakages during the construction and decommissioning phases.

Potential impact on o	roundwater	quality as a result of accidental oil spillages o	r fuel leakages	
PROJECT PHASE		n and Decommissioning Phase	Писпсакавез	
DIRECT IMPACT		er contamination		
INDIRECT IMPACT		the vegetation or ecosystem it the area		
CUMULATIVE IMPACT		educed groundwater quality		
DIMENSION	RATING	MOTIVATION	CONSEQUENC	LIKELIHOOD
21111211011011			E	22
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		_
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		-. ,
SIGNIFICANCE	-10	very low negative		
		PROPOSED MITIGATION MEASURES		
Dirty water should be captu surrounding environment.	ured, to be re	kept in a good working order. -used where possible. No dirty water is a		
No heavy equipment or vehice and machinery where possible	-	excavation area when not in use. Drip trays t	o be used under st	ationary vehicles
	_	POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	7	-
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,	Negligible	Unlikely

		cultural and social functions and processes are minimally affected		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
Medium				

(g) Heritage Impact

(i) Impacts to archaeological resources

Impacts to archaeological resources at SHP4 are limited to the possible destruction of isolated background scatter artefacts which have very low to no cultural significance. Impacts will be direct and permanent but because of the low cultural significance the severity is very low negative.

Two technology alternatives were considered for the battery technology for the BESS. Both technology options are equally preferred.

Table 7-133: SPH4: Assessment of construction phase impacts to archaeological sites.

Archaeological impacts								
PROJECT PHASE	Construction	on Phase						
DIRECT IMPACT	Destruction	n of a isolated artefacts						
INDIRECT IMPACT	None							
CUMULATIVE IMPACT	None							
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD				
	PRE-MITIGATION							
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	2				
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	3				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	t I	Definite				
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.						
SIGNIFICANCE	-18	very low negative						
		PROPOSED MITIGATION MEASURES						
None required as the rui recorded.	n is in poor o	condition and does not have any special architectu	ral qualities that ne	ed to be further				
No materials to be remo	ved from any	other ruins in the wider project area.						
		POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3				
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	3				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment	Negligible	Definite				

			in such a way that natural, cultural and social functions and processes are minimally affected		
IMPACT IRREPLACEABLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-18	very low negative		
CONFIDENCE LEVEL					
High					

(ii) Impacts to graves

Impacts to graves for SPH4 are not expected because all identified graves have been avoided by the facility layout. There is still the chance of an unmarked grave being present, or even a marked grave that was not found during the survey. The chances are considered low, however. The impact on graves applies equally to both technology alternatives.

Table 7-134: SPH4: Assessment of construction phase impacts to graves

		IMPACTS TO GRAVES		
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT	Destruction	n of graves, including their coverings and possibly	human remains	
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	Destruction	n of graves, including their coverings and possibly	human remains	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-18	2
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-36	low – negative		
portion affected by const. m away from all graves.	ruction. Pede	ted around all known and unfenced graves (i.e. wa estrian access gates must be provided and the fenc		
All graves to be treated a	s no-go area	is with temporary signage as required.		
DURATION	4	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such		
EXTENT	1	is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-18	1

SEVERITY		-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Unlikely
IMPACT IRREPLACEABLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-18	very low negative		
CONFIDENCE LEVEL					
High					

(iii) Impacts to the cultural landscape SPH4

No landscape features such as hills and pans will be impacted by SPH4. The impact on cultural landscape is due to the construction activities (construction vehicles and equipment) on site which is a rural landscape.

Table 7-135: SPH4 Assessment of construction phase impacts to the cultural landscape

		CULTURAL LANDSCAPE IMPACTS		
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT	Alteration (of the rural landscape character through the in	troduction of constru	ction equipment
DIRECT IIVIPACT	and vehicle	es and all the associated activities on site		
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	Impacts wi	ll be greater with multiple facilities being cons	tructed at once	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	10	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
Keep construction period	as short as po	ossible.		
Rehabilitate any areas no	t needed dur	ing operation as soon as possible.		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3

SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	low – negative		
CONFIDENCE LEVEL				
High			•	

(h) Palaeontological Impact

Palaeontological impacts would be the destruction of fossils from construction activities. The site as a whole is considered as low sensitivity in terms of palaeontology.

Table 7-136: SPH4: Assessment of the potential impacts to possible paleontological resources considers the criteria below

PALAEONTOLOGY IMPACTS					
PROJECT PHASE Construction, Operational and de commissioning Phases					
DIRECT IMPACT	Destruction of fossils in the footprint				
INDIRECT IMPACT					
CUMULATIVE	Loss of fossil heritage and scientific knowledge				
IMPACT					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	-2	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-2		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible Negligible	Definite	
IMPACT ON	0	No irreplaceable resources will be impacted.	Negligible	Dejiiite	
IRREPLACEBALE					
RESOURCES					
SIGNIFICANCE	-6	Very Low Negative			
PROPOSED MITIGATION MEASURES					
removed and put in a fossils are important th and storage in a recog	safe place. he palaeont inised facilit	ons for foundations and amenities have commenced Photographs should be sent to a palaeontologist t ologist must obtain a permit from SAHRA, visit the sit ry such as a museum or palaeontology department in	o assess their scienti e and remove the fos	ific value. If the	
If no fossils are found, no action will be required					
POST-MITIGATION	ı		T		
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	2	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	2		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a	Negligible	Definite	

			way that natural, cultural and social functions		
			and processes are minimally improved		
IMPACT OI	7	0	No irreplaceable resources will be impacted.		
IRREPLACEABLE					
RESOURCES					
SIGNIFICANCE		6	Very Low Positive		
CONFIDENCE LEVEL					
High					

(i) Socio-Economic Impact

(i) Stimulation of the Economy during construction

The size of the Tokologo LM's economy was estimated at R2,170 million at current prices (2022) and primarily comprises of the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. That being said, it is likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the development of SPH4 through local procurement.

The stimulation of the economy will not be dependent on the technology options of the SPH4; thus, the battery technology alternatives are equally preferred.

Table 7-137: SPH4: Impact of Economic Stimulation during construction

	IMPACT ON ECONOMY				
PROJECT PHASE	Construction Phase				
DIRECT IMPACT	Temporary increase in production and GDP in the local economy				
INDIRECT IMPACT	Improved household income and increased business sales in the local economy				
CUMULATIVE IMPACT	Temporary increase in production and GDP in the regional economy				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3	
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	30	low positive			
PROPOSED MITIGATION MEASURES					

To optimise the stimulation of the local economy through direct, indirect and induced effects, the following should be applied where possible:

Employ local contractors w	here possib	. and products from local and domestic supplier le		
	tion measur	es will possibly increase the positive impact on t	the local economy;	however, this wil
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
		CONFIDENCE LEVEL		

(ii) Creation of Employment during construction

The construction of SPH4 will require temporary employment of construction workers, foremen, and engineers On-site. Construction is expected to last twelve months where at the peak of construction about 150 people will be working on-site. The creation of between 100 and 150 temporary employment opportunities for SPH4 throughout the duration of construction which equates to about 50 FTE.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

SPH4 will create the same number of employment opportunities, regardless of its layout on the site; thus, layout alternatives are equally preferred.

Table 7-138: SPH4: Assessment of Employment during construction

IMPACT ON EMPLOYMENT					
PROJECT PHASE	Construction Phase				
DIRECT IMPACT	Creation of temporary employment opportunities On-site				
INDIRECT IMPACT	Improved income of households whose members are employed on the project				
CUMULATIVE IMPACT	Creation of temporary employment opportunities in the area				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
		The duration of the activity associated			
DURATION	2	with the impact will last 6-18 months	10	3	
		and as such is rated as short term			

			-			
		The extent of the impact is rated as				
EXTENT	3	Local as it affects the development				
		area and adjacent properties				
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite		
IMPACT ON		No formation of the management will be				
IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	30	low positive				
PROPOSED MITIGATION MEASURES						
The following is recommend	ded to incred	ase the employment opportunities create	d in the local commun	ities, where feasible:		
Employ labour intensive me	ethods in co	nstruction, where feasible				
Employ local residents and	communitie	es, where possible				
Utilise local suppliers, when	re possible					
		POST-MITIGATION				
		The duration of the activity associated				
DURATION	2	with the impact will last 6-18 months				
		and as such is rated as short term	10	3		
		The extent of the impact is rated as				
EXTENT	3	Local as it affects the development				
		area and adjacent properties				
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite		
IMPACT ON		No irreplaceable resources will be				
IRREPLACEABLE RESOURCES	0	impacted.				
SIGNIFICANCE	30	low positive				
	=	CONFIDENCE LEVEL				

(iii) Reduction of Land Area available for productive farming

The proposed site of SPH4 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH4 as being of low to very low agricultural potential with small isolated patches of low – moderate and moderate potential land on the edges of the facility. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH4 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

High

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH4.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-139: SPH4: Assessment of Impact on agricultural production

	Podu	ction of Land Area available for Productive	Earming				
PROJECT PHASE	ı	tion and Operational Phase	. i ai iiiiig				
DIRECT IMPACT		gricultural production within the footprint of	lue to land sterilisation	nn			
INDIRECT IMPACT		le to no indirect impact	iac to iana stermsatio	<i>/</i> //			
CUMULATIVE IMPACT		e to no cumulative effects					
DIMENSION	RATING						
DIVILIAZION	I KATING	PRE-MITIGATION	CONSEQUENCE	LIKELITOOD			
	I	The duration of the activity associated					
DURATION	4	with the impact will last more than 5					
Bolotholt	1	years and as such is rated as Long Term					
		The extent of the impact is rated as	6	3			
EXTENT	1	footprint as it only affects the area in					
EXTER!	_	which the proposed activity will occur					
		The severity of the impact is rated as					
		Low negative as the impact affects the					
SEVERITY	-1	environment in such a way that natural,					
	_	cultural and social functions and					
		processes are minimally affected	Negligible	Definite			
IMPACT ON		, , ,		_ 			
IRREPLACEABLE	1	Irreplaceable resources will be					
RESOURCES		impacted.					
SIGNIFICANCE	-18	very low negative					
		PROPOSED MITIGATION MEASURES					
Rehabilitation of land show after the closure of the pro		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming			
.,	,	POST-MITIGATION					
		The duration of the activity associated					
DURATION	4	with the impact will last more than 5					
		years and as such is rated as Long Term	_	_			
		The extent of the impact is rated as	6	3			
EXTENT	1	footprint as it only affects the area in					
		which the proposed activity will occur					
		The severity of the impact is rated as					
		Low negative as the impact affects the					
SEVERITY	-1	environment in such a way that natural,					
		cultural and social functions and	A11111-1 -	D = 6" = "4 =			
		processes are minimally affected	Negligible	Definite			
IMPACT ON		Irreplaceable resources will be					
IRREPLACEABLE	1	impacted.					
RESOURCES		<u>'</u>					
	-18	very low negative					
SIGNIFICANCE		very low negative					
SIGNIFICANCE		CONFIDENCE LEVEL					

(iv) Loss of Property

An influx of job seekers to the area during the construction phase may result in stock theft and burglaries. The number of workers and duration of construction will not be affected by the technology alternatives; thus, all alternatives are equally preferred.

Table 7-140: SPH4: Assessment of loss of property

		IMPACT ON CRIME LEVELS		
PROJECT PHASE	Construct			
DIRECT IMPACT		y increase in crime associated with the infl	ux of people	
INDIRECT IMPACT		evel of security in and around the proposed		
CUMULATIVE IMPACT		ligible cumulative impact	<i>J</i>	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
The following mitigations	are advised	to be instituted to minimise and possible e	liminate the impact a	ıltogether:
Ensure proper fencing and	monitoring	of the fencing is in place		
advance and should not ta the project sites	ke place on-	to locals as far as practically possible. Recr site. This will reduce the probability of work		
Hire additional security pe	rsonnel dur	ing the construction period		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	3	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
		CONFIDENCE LEVEL		
High				

(j) Terrestrial Biodiversity & Faunal Impact

(i) Direct Impact - Destruction of faunal habitat

Clearing or disturbance to natural vegetation for the construction of SPH4 will remove up to 261ha of natural grassland habitat. This includes the burrows of many fossorial species as well as termite mounds which provide a source of food for species such as aardvark and mongoose.

Two technology alternatives for the battery to be used in the BESS have been proposed. As the type of battery used will not alter the footprint of the BESS the alternatives are rated as equal for the impact of clearance of natural habitat.

Table 7-141: SPH4: Destruction of faunal habitat

		DESTRUCTION OF FAUNAL HABITAT		
PROJECT PHASE	Construction phase			
DIRECT IMPACT	Destructi	on of faunal habitat		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of ho	loss of habitat and habitat connectivity		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-21	3
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		1
SIGNIFICANCE	-63	high negative		
		PROPOSED MITIGATION MEASURES		

Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays. Only indigenous grasses found in the area must be used for rehabilitation

Undertake vegetation clearing during the dry season, and outside of the breeding season of burrowing fauna

If possible, the movement of animals through the sites must be permitted during operations. The use of fencing that will allow the movement of small to medium fauna through would help mitigate the effect of fences acting as barriers. This can be achieved by constructing a fence that has places for animals to crawl through and is not difficult for fleeing animals and birds to see. For example, black mesh panel fencing can be used where gaps of approximately 30 cm high and 50 cm wide and spaced at regular intervals are cut/installed. The tops of these gaps must be smoothed off to limit the chance of wildlife being injured when passing through. The use of barbed wire must be avoided

The proposed activities must remain within the project footprint

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-10	3

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-30	low negative		
CONFIDENCE LEVEL				
Medium				

(ii) Direct Impact - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death. The clearing of ground for the foundations of the PV arrays will destroy burrows, potentially causing injury or death to burrowing animals. Furthermore, the presence of the construction site and personnel may result in negative interactions with fauna, such as hunting or killing animals perceived to be pests.

Regarding the technology alternative for the type of battery used in the BESS for all facilities, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-142: SPH4: Injury or death to fauna

		INJURY OR DEATH TO FAUNA		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	Injury or	death to fauna		
INDIRECT IMPACT				
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	15	3
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-54	moderate negative		

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

No wild animal may under any circumstance be handled, removed or be interfered with by construction workers

To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

Ideally construction should not continue at night so as to avoid potential collisions with nocturnal fauna

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of

All mitigation measures prescrib	ed by the	avifaunal specialist must be strictly adhere	ed to	
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
High				

(iii) Indirect Impacts - Disturbance and displacement of fauna

Construction activities have the potential to cause disturbance to fauna inhabiting the natural grassland through noise, vibrations, and light (if construction continues after dark). Security lights for the solar facilities during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-143: SPH4: Disturbance and displacement of fauna

	DISTUR	RBANCE AND DISPLACEMENT OF FAUNA			
PROJECT PHASE	Construct	tion Phase			
DIRECT IMPACT					
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland		
CUMULATIVE IMPACT	Displacement of fauna				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-	-18	2	

	_	DODOCED ANTICATION MEACHINES		
SIGNIFICANCE	-36	low negative		
RESOURCES	1	impacted		
IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Likely
EXTENT	3	Short term The extent of the impact is rated as Local as it affects the development area and adjacent properties		
		18 months and as such is rated as		

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

Ideally construction activities should cease at night to minimise the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals

Lighting during construction should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-10	very low negative		
CONFIDENCE LEVEL				
Medium	-		·	·

(iv) Indirect Impacts – Pollution and contamination of natural areas

During construction, dust from exposed areas and roads, and litter from construction workers have the potential to pollute the surrounding natural vegetation. The use of dust suppressants, as well as hydrocarbons from vehicles and machinery, have the potential to contaminate soils and ground water, and be washed into the nearby natural pans during high rainfall events. The battery technology alternatives are rated the same and hence are covered in the same table.

Table 7-144: SPH4: Pollution and contamination of natural areas

	POLLUTION	I AND CONTAMINATION OF NATURAL AR	EAS	
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Pollution a	nd contamination of natural areas		
CUMULATIVE IMPACT	Habitat de	gradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-15	3
		The extent of the impact is rated as	-15	3
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		High negative as the natural, cultural		
		or social functions and processes are		
		altered to the extent that the natural		
SEVERITY	-3	process will temporarily or		Definite
		permanently cease; and valued,	Moderately	
		important, sensitive or vulnerable	detrimental	
		systems or communities are		
		substantially affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES	U	impacted		
SIGNIFICANCE	-45	moderate negative		
	P	ROPOSED MITIGATION MEASURES		
An independent Environmental	Control Offic	cer (ECO) must be appointed to oversee all	construction activit	ies
All vehicles and machinery mus	t be checked	for leaks and serviced on a regular basis		
Any spillage must be dealt with	rapidly and	in the most appropriate manner		
No washing of vehicles must ta	ke place on s	iite		
During construction, dust on co	nstruction ro	pads must be suppressed using a water tar	nker	
Dumping of solid waste in natu	ral areas, inc	cluding cigarette butts and litter by constru	uction workers must	be prohibited
Appropriate solid waste dispos	al facilities m	ust be provided for workers during constr	uction	
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	4	1
		The extent of the impact is rated as	-4	1
EXTENT	2	site as it will affect only the		
		development area		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that		
		natural, cultural and social functions	Negligible	Unlikely
		and processes are minimally affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES	U	impacted		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
High				

(v) Indirect Impacts – Increased potential of invasion by alien vegetation

During construction, the removal of natural vegetation and disturbance to the soil will increase the likelihood of invasion by alien plant species. Alien species establish easily and quickly on bare soil by colonisation or from seeds existing in the seed bank of the soil. Infestation by alien and invasive species will lead to degradation of the surrounding natural habitat and will increase the potential of spread into the greater landscape. In addition, the vehicles and

equipment were likely used on various other sites and could introduce alien invasive plant seeds. This impact is relevant to all the proposed arrays equally and has therefore been assessed in one table for the construction phase.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-145: SPH4: Increased potential of invasion by alien vegetation

11	ICREASED P	OTENTIAL OF INVASION BY ALIEN VEGET	TATION	
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT				
NDIRECT IMPACT	Increased	l potential of invasion by alien vegetation		
CUMULATIVE IMPACT	Habitat d	legradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
MPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-42	moderate - negative		
	F	PROPOSED MITIGATION MEASURES		

All areas cleared of natural vegetation must be rehabilitated. Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays and other cleared areas. Only indigenous grasses found in the area must be used for rehabilitation. This must be advised by the botanist

An invasive alien plant species management and monitoring plan must be implemented during the construction phase. Monitoring should continue into the operational phase and through and for a period after decommissioning. This should be advised by the botanist

All alien seedlings and saplings must be removed as they become evident for the duration of construction and during the operational phase. Manual / mechanical removal is preferred to chemical control

All construction vehicles and equipment must be free of plant material before entering the site

POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	4	1	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted				
SIGNIFICANCE	-4	very low negative				
CONFIDENCE LEVEL						
High						

(k) Transport Impact

Traffic impacts anticipated to occur during the construction phase of the project are construction related traffic and noise and dust pollution.

Two technology alternative for the BESS have been proposed. There is no difference in the impacts from a traffic perspective between the alternatives.

Table 7-146: SPH4: Traffic Impacts – Construction Phase

		TRAFFIC IMPACT			
PROJECT PHASE	Constructi				
		ngestion due to an increase in traffic o	caused by the trans	portation ofequipment,	
DIRECT IMPACT	material d	and staff to site			
INDIRECT IMPACT	Constructi	Construction traffic on roads might generate dust and noise.			
CUMULATIVE IMPACT	Traffic del	lays on the surrounding road network.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	_	PRE-MITIGATION			
DURATION	2	The duration of the activity			
		associated with the impact will			
		last 6-18 months and as such is rated as Short term	10	2	
EVIENIT	2		-10	3	
EXTENT	3	The extent of the impact is rated as			
		Local as it affects the development			
CEVEDITY	1	area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated			
		as Moderate negative as the			
		affected environment is altered but			
		natural, cultural and social			
		functions and processes continue			
		albeit in a modified way; and	Slightly		
		valued, important, sensitive or	Detrimental	Definite	
		vulnerable systems or communities			
		are negatively affected			
IMPACT ON		No irreplaceable resources will			
IRREPLACEBLE		beimpacted.			
RESOURCES		,			
SIGNIFICANCE	-30	low negative PPOSED MITIGATION MEASURES			
Stagger component delivery t		PFOSED WITHGATION WEASONES			
Reduce the construction perio		(p)·			
		رح. I roads and the access road to the site)	during the constru	rtion nhase asrequired	
		internal roads and the access road			
construction phase.	ver rouds (michiai rodus una the decess rodu (to the site, by the	contractor daring the	
	lants and au	arries in close proximity to the site (if a	vailable and feasibl	le): and	
Staff and general trips should				-//	
		POST-MITIGATION			
DURATION	2	The duration of the activity			
DURATION		associated with the impact will			
		last 6-18 months and as such is			
		ratedas Short term	5	1	
EXTENT	3	The extent of the impact is rated as			
		Local as it affects the			
		development area and adjacent			
		properties			

SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will beimpacted.			
SIGNIFICANCE	-15	very low negative			
CONFIDENCE LEVEL					
Medium					

(I) Landscape and Visual Impact

Four visual impacts were identified for SPH4 during the construction, operational phase and decommissioning phase

- Landscape change
- Impact on Protected Areas
- Impact on local roads
- Impact on homesteads
- Light pollution

These impacts would all occur during the construction, operation and decommissioning phase. Impacts would peak once the facility is constructed, remain relatively constant during the operational phase and then decrease during the decommissioning phase.

The type of battery technology used in the BESS would not impact on the assessment of visual impacts and so the tables below cover both technology options.

Table 7-147: SPH4 Landscape change

	LANDSCAPE CHANGE				
		Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on completion of construction, be relatively constant during operation and decrease again from			
PROJECT PHASE	peak levels	during decommissioning.			
DIRECT IMPACT	Change of c	haracter due to industrialisation of a No	atural Landscape		
INDIRECT IMPACT					
CUMULATIVE IMPACT	Extension of	f landscape industrialisation due to othe	er electrical infrasti	ructure projects	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	3	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable	Moderately Detrimental	Definite	

			systems or communities are negatively affected	
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.	
SIGNIFICANCE		-42	moderate - negative	
			DDODOGED ANTION MEAGAINE	

Plan to maintain the height of structures as low as possible relative to existing ground levels;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

Monitor areas for vegetation cover post-decommissioning and implement remedial actions.

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			

CONFIDENCE LEVEL

High

NOTES

- 5. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 6. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-148: SPH4 Industrialization of the landscape as seen from Nielsview NR

SP	SPH4 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM NIELSVIEW NR				
PROJECT PHASE	completion	Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on completion of construction, be relatively constant during operation and decrease again from peak levels during decommissioning.			
DIRECT IMPACT	Industrialisa	ition of the view from Nielsview NR du	e to this project.		
INDIRECT IMPACT					
CUMULATIVE IMPACT		Extension of industrialisation of views from Protected Areas due to this and other electrical infrastructure projects			
	,	,			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	3	

DDODOCED MITICATION MEACURES					
SIGNIFICANCE		0	very low negative		
RESOURCES			тристей.		
IRREPLACEBLE		0	impacted.	Negligible	Definite
IMPACT	ON		No irreplaceable resources will be		
SEVERITY		0	Negligible		
EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

Plan to maintain the height of structures as low as possible relative to existing ground levels;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	0	very low negative		

CONFIDENCE LEVEL

High

NOTES

- 5. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 6. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-149: Industrialization of the landscape as seen from local roads, SPH4

INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM LOCAL ROADS, SPH4					
PROJECT PHASE	Construction	Construction, Operational & Decommissioning Phases			
DIRECT IMPACT	Industrialisa	ition of the view from local roads due to	this project.		
INDIRECT IMPACT					
	Extension of	of industrialisation of views from loca	al roads due to this a	and other electrical	
CUMULATIVE IMPACT	infrastructu	re projects			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that	Slightly Detrimental	Definite	

IMPACT ON IRREPLACEBLE RESOURCES	and prod	ultural and social functions sses are minimally affected aceable resources will be
SIGNIFICANCE	-21 low neg	tive

Plan site levels to minimise earthworks to ensure that levels are not elevated;

Plan to maintain the height of structures as low as possible;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Construct and/ or plant a 2m high screen along the southern edge of the array cluster

Plan to protect existing natural site features such as drainage pans;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Longt term	0	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite	
SIGNIFICANCE	-15	very low negative			
	CONFIDENCE LEVEL				

High

NOTES

- 7. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 8. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-150 SPH4: Industrialization of the landscape as seen from local homesteads

SPH4 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM LOCAL HOMESTEADS					
	Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on				
	•	of construction, be relatively constant du	ring operation and decre	rase again from peak	
PROJECT PHASE	levels during	g decommissioning.			
DIRECT IMPACT	Industrialisa	ation of the view from local homesteads o	lue to this project.		
INDIRECT IMPACT					
	Extension o	f industrialisation of views from local h	nomesteads due to this	and other electrical	
CUMULATIVE IMPACT	infrastructure projects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and	Moderately Detrimental	Definite	

Plan to maintain the height of structures as low as possible;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Construct / grow 2m high screen along SW and E edges of solar cluster closest to affected homesteads;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

POST-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-18	very low negative	·	

CONFIDENCE LEVEL

High

NOTES

- 5. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 6. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-151 SPH4 Light pollution

SPH4 LIGHT POLLUTION						
PROJECT PHASE	completion	n, Operational & Decommissioning Pha of construction, be relatively constant dur g decommissioning.	•	•		
DIRECT IMPACT INDIRECT IMPACT	Light polluti	Light pollution from the project spoiling the night time environment and nuisance to neighbors.				
CUMULATIVE IMPACT	Extension of	Extension of light pollution due to this and other electrical infrastructure projects				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3		

PROPOSED MITIGATION MEASURES				
SIGNIFICANCE	-42	moderate - negative		
IMPACT IRREPLACEBLE RESOURCES	ON O	No irreplaceable resources will be impacted.		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

Use low key lighting around buildings and operational areas that is triggered only when people are present;

Utilise infra-red security systems or motion sensor triggered security lighting;

Ensure that lighting is focused on the development with no light spillage outside the site;

No tall mast lighting should be used;

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT OF IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	0	very low negative		•

CONFIDENCE LEVEL

High

NOTES

- 5. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 6. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

7.5.4 **Operational Phase**

(a) Agricultural Impact

During the operational phase, areas that where vegetation will remain cleared such as access routes, will remain at risk of soil loss through erosion. During the operation phase, staff and maintenance personnel will access the development area to maintain the infrastructure and make repairs, where required. Biodegradable detergents and water will be used to clean the panels, however this is not expected to result in impacts from an agricultural perspective. The assessment of these impacts are summarised in Table 7-44 and Table 7-45.

Table 7-152: SPH4 Impact significance of soil loss through erosion during the operation phase

		SOIL LOSS THROUGH EROSION				
PROJECT PHASE	Operation	n Phase				
DIRECT IMPACT	Areas where soil surfaces will remain bare such as access routes and between PV arrays, will					
DIRECT INFACT		remain at risk of soil erosion.				
INDIRECT IMPACT	Eroded a	reas can expand into nearby areas and resul	t in land degradation	1.		
CUMULATIVE IMPACT	Increase	in areas at risk of soil erosion.				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5				
		years and as such is rated as Long Term	-14	3		
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		-		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite		
IMPACT ON						
IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-42	moderate - negative				
SIGNIFICANCE	-42	PROPOSED MITIGATION MEASURES				
The development area in	acludina in	ternal access routes, as well as areas bor	dering on the devel	onment area must		
	_	y signs of soil erosion on-set.	defing on the deven	opinent area, mast		
		ust be stabilised using geo-textiles and facili	tated re-venetation			
ij son crosion is actected,	ine area iii	POST-MITIGATION	tateare regetation.			
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	6	2		
		The extent of the impact is rated as	-6	3		
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				
		The severity of the impact is rated as Low				
		negative as the impact affects the				
SEVERITY	-1	environment in such a way that natural,				
		cultural and social functions and	Negligible	Definite		
IMPACT ON		processes are minimally affected				
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be impacted.				
RESOURCES	1	mepiaceable resources will be impacted.				
SIGNIFICANCE	-18	very low negative	I			
		CONFIDENCE LEVEL				
High						
··· ········						

Table 7-153: SPH4 Impact significance of soil pollution during the operation phase

		SOIL POLLUTION			
PROJECT PHASE	Operation				
DIRECT IMPACT	Soil pollution caused by oil and fuel spills or maintenance materials and domestic waste left on				
DIRECT IIVII ACT	site. The replacement of electrolyte of the redox flow batteries, also pose soil pollution risk.				
		l risk of pollutant uptake by vegetation with	in the development o	area that can affect	
INDIRECT IMPACT		ental and human health			
CUMULATIVE IMPACT	Increase I	in areas at risk of soil pollution			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	T	PRE-MITIGATION			
		The duration of the activity associated			
DURATION	4	with the impact will last more than 5			
		years and as such is rated as Long Term	-14	1	
		The extent of the impact is rated as site	-,	-	
EXTENT	2	as it will affect only the development			
		area			
		The severity of the impact is rated as			
		Moderate negative as the affected			
		environment is altered but natural,			
SEVERITY	-2	cultural and social functions and			
SEVERIT		processes continue albeit in a modified			
		way; and valued, important, sensitive or	Moderately	Unlikely	
		vulnerable systems or communities are	Detrimental	• ····································	
		negatively affected			
IMPACT ON					
IRREPLACEBLE	1	Irreplaceable resources will be impacted.			
RESOURCES					
SIGNIFICANCE	-14	very low negative			
		PROPOSED MITIGATION MEASURES			
		gularly on all vehicles and maintenance mac			
		be left at the site and must be transported	ed with the maintend	ance vehicles to ar	
authorised waste dumping					
Regularly monitor the BES	S area for a	any signs of oil, grease and fuel spillage or th	e presence of waste.		
	ı	POST-MITIGATION			
DUDATION		The duration of the activity associated			
DURATION	4	with the impact will last more than 5			
		years and as such is rated as Long Term	-6	1	
EVTENT.		The extent of the impact is rated as			
EXTENT	1	footprint as it only affects the area in			
		which the proposed activity will occur			
		The severity of the impact is rated as Low			
CEVEDITY	4	negative as the impact affects the			
SEVERITY	-1	environment in such a way that natural,			
		cultural and social functions and	Negligible	Unlikely	
IMPACT ON		processes are minimally affected			
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be impacted.			
RESOURCES		in epiaceable resources will be impacted.			
SIGNIFICANCE	-6	very low negative			
JIGHII ICANCE	<u> </u>	CONFIDENCE LEVEL			
Hiah		CONFIDENCE LEVEL			
High					

(b) Aquatic Impact

During the operation phase, the solar arrays will operate largely unattended and with low maintenance required for more than 20 years. The hard surfaces created by the development may lead to increased runoff. This may lead to increased erosion and sedimentation of the downslope areas. A localised long-term impact (more than 20 years) of low intensity (depending on the distance between the solar arrays and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified aquatic ecosystems in the area.

The only potentially toxic or hazardous materials which would be present in relatively small amounts would be of lubricating oils and hydraulic and insulating fluids. Therefore, contamination of surface or groundwater or soils is highly unlikely.

Significance of impacts after mitigation: The overall significance of the impact on the aquatic ecosystems is expected to be very low. The impacts are rated the same for the battery technology alternatives for the BESS.

Table 7-154: SPH4 Operational phase aquatic ecosystem impacts

		AQUATIC ECOSYSTEM IMPACTS		
PROJECT PHASE	Operation	al phase		
DIRECT IMPACT	Disturban	ce of aquatic habitat; water quality impacts		
INDIRECT IMPACT	Modificati	ion of flow and alien vegetation invasion in aquation	c features	
CUMULATIVE				
IMPACT	Degradati	on of the ecological condition of aquatic ecosyste	ms	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with		
		the impact will last more than 5 years and as	-5	1
		such israted as Long Term		
EXTENT	1	The extent of the impact is rated as footprint		
		as it only affects the area in which the		
		proposed activitywill occur		
SEVERITY	-1	The severity of the impact is rated as Low		
		negative as the impact affects the environment		
		in such a waythat natural, cultural and social		
		functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON	0	No irreplaceable resources will be impacted.		,
IRREPLACEBLE		·		
RESOURCES				
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES	<u>.</u>	

Any disturbance during the operation phase should be limited to the approved development footprints and should avoid disturbance of the soil and natural vegetation cover.

Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areasdo not become infested with invasive alien plants.

Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwaterleaving developed areas.

Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider. In a scenario where services are installed, these systems need to be adequately installed and maintained to prevent any potential contamination of the water resources on site.

POST-MITIGATION						
DURATION	4	The duration of the activity associated with	-5	1		

Medium				
		CONFIDENCE LEVEL		
SIGNIFICANCE	-	5 very low negative		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur		
		the impact will last more than 5 years and as such israted as Long Term		

(c) Avifaunal Impact

(i) Bird fatality at PV facility

Bird fatalities could occur at the site through a number of mechanisms, including collision with PV panels, entanglement in perimeter fence (less likely since developer has chosen to use mesh panel fencing which has a tight weave and birds are less likely to become entangled), electrocution in substations/electrical compounds and others. The battery technology options for the BESS are rated the same and are both covered in the same table.

Table 7-155: SPH4 bird fatality during operational phase

		BIRD FATALITY AT PV FACILITY		
PROJECT PHASE	Operational	l phase		
DIRECT IMPACT	Birds killed	through various interaction with facility infrastr	ucture	
INDIRECT IMPACT				
CUMULATIVE IMPACT	More projec	cts will result in overall higher fatality rates in th	ne area	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		
		PROPOSED MITIGATION MEASURES		

None required at this stage. Once operational, if facility staff identify any fatalities this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. Operational phase bird monitoring should be conducted for at least one year as per the best practice guidelines – see Section 8.

POST-MITIGATION

Medium				
		CONFIDENCE LEVEL		
SIGNIFICANCE	-8	very low negative		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-0	1
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	1

(ii) Nesting & other use of facility infrastructure by birds

Certain species, in particular doves, pigeons, weavers and crows, are likely to use some of the facility infrastructure for nesting, perching and roosting. At face value this is a positive impact for birds and has been rated as VERY LOW POSITIVE significance both pre and post mitigation. However, where nesting interferes with the operation of the facility this could cause conflict and require management. Nesting on infrastructure also increases the likelihood of bird fatalities occurring through the various mechanism, particularly of young inexperienced birds. No mitigation is required for the impact of the facility on birds through nesting. For the impact of the birds nesting on the facility, the specialist recommends nest management on a case by case basis under the supervision of an avifaunal specialist, and in conformance with all relevant national and provincial legislation. The impact is rated the same for the both battery technology alternatives for the BESS.

Table 7-156: SPH4 impact of bird nesting and other use of facility infrastructure by birds

BIRD NESTING, PERCHING & ROOSTING AT PV FACILITY				
PROJECT PHASE	Operational	phase		
DIRECT IMPACT				
INDIRECT IMPACT	Birds use inj	frastructure to perch, roost or nest on		
	More proje	cts in the area will probably diminish the likel	ihood of this happ	ening as perch
CUMULATIVE IMPACT	availability	will increase		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	,	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		

SIGNIFICANCE	7	very low positive		
		PROPOSED MITIGATION MEASURES		
-		ional, if facility staff identify any nesting which int ident reporting system. A suitably qualified ornith		
case specific reactive mitig national and provincial envi		es. All nest management measures should only l gislation in this regard.	be undertaken in (compliance with
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	,	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	·	
SIGNIFICANCE	7	very low positive		
		CONFIDENCE LEVEL		
Medium				

(d) Bats Impact

Day to day operation and maintenance of the facility may result in disturbance and displacement of bats. The impact is rated the same for both battery technology options for the BESS.

Table 7-157: SPH4 disturbance and displacement effects for bats

	IMPACT O	N POSSIBLE DISTURBANCE & DISPLACEMENT EFF	ECTS	
PROJECT PHASE	Operationa	l phase		
DIRECT IMPACT	Disturbanc	e of bats during operational activities		
INDIRECT IMPACT	Displaceme	nt		
CUMULATIVE IMPACT	Unavailabili	ty of suitable foraging resources in the broader en	vironment for displa	ced individuals
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.	Detrimental	·
SIGNIFICANCE	-7	very low negative		
PROPOSED MITIGATION MEASURES				
		ities to daylight hours, as far as possible, and mini	imise lighting at nig	ht.
		ssure sodium and warm white LED lights.		
Operational and maintenan	ce activities s	should be limited to the immediate project footpr	int only.	
Site access should be strictly	y controlled,	to avoid unnecessary disturbance.		

	POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE	-7	very low negative		
		CONFIDENCE LEVEL		
Medium			•	

Table 7-158: SPH4 bat roost disturbance

		MPACT ON POSSIBLE ROOST DISTURBANCE		
PROJECT PHASE	Operationa			
DIRECT IMPACT	•	of roosting bats during operational activities		
INDIRECT IMPACT	Roost aban			
		ity of suitable roosting resources in the bro	ader environment	for abandoned
CUMULATIVE IMPACT	individuals	, -, -,		,
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	-14	2
EVENIT	2	The extent of the impact is rated as site as it		
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue	Slightly Detrimental	
		albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems or		Unlikely
		communities are negatively affected	Detrimentai	
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-28	Low negative		
	PROPOSED	MITIGATION MEASURES TO BE INCLUDED IN TH	E EMPr	
All lighting should preferable	ly use low pre	ssure sodium and warm white LED lights.		
During operational and ma	intenance act	ivities, avoid all movement and noise around med	lium sensitivity ared	15.
		should be limited to the immediate project area.		
Site access should be strictly	y controlled, t	o avoid unnecessary disturbance.		
	Γ	POST-MITIGATION	T	T
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		such is rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it		
	_	will affect only the development area		
		The severity of the impact is rated as Low		
051/55/51/		negative as the impact affects the	Slightly	
SEVERITY	-1	environment in such a way that natural,	detrimental	Unlikely
		cultural and social functions and processes are		
		minimally affected		

IMPACT IRREPLACEBLE	ON	1	Irreplaceable resourceswill be impacted.	
RESOURCES				
SIGNIFICANCE		-7	very low negative	
			CONFIDENCE LEVEL	
Medium				

(e) Botanical Impacts

Maintenance activities will require management of vegetation which may result in loss of natural vegetation. The impact is rated the same for both battery technology options for the BESS.

Table 7-159: SPH4 loss of Western Free State Grassland during operational phase

		LOSS OF VEGETATION		
PROJECT PHASE	Operational	l Phase		
DIRECT IMPACT	Direct impa	ct		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with the		
DURATION	4	impact will last more than 5 years and as such is		
		rated as Long Term	_	1
		The extent of the impact is the footprint as it	-5	1
EXTENT	1	only affects the area in which the proposed		
		activity will occur.		
		The severity of the impact is rated as Low		
SEVERITY	-1	negative as the impact affects the environment		
SEVERIT	_	in such a way that natural, cultural and social		
		functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON			regngible	Omicery
IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
	•	aring should be undertaken during the dry season.		
Only clear vegetation where				
	-	will be decided and approved by the Project Ma	nager and appoin	ted ECO before
construction commences on	site and shou	uld not be located within drainage lines.		
	T	POST-MITIGATION	T	
		The duration of the activity associated with the		
DURATION	1	impact will last 0-6 months and as such is rated		
		as Temporary	-2	1
		The extent of the impact is rated as footprint as	_	
EXTENT	1	it only affects the area in which the proposed		
		activity will occur		
		The severity of the impact is rated as Low		
SEVERITY	-1	negative as the impact affects the environment		
		in such a way that natural, cultural and social		
		functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON				
IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES	_	vom lov monativo	<u> </u>	
SIGNIFICANCE	-2	- 70		
Madium		CONFIDENCE LEVEL		
Medium				

(f) Groundwater Impact

Similar to the construction phase, the operational phase of the SPH4 will require approximately 1,000 m^3/a (0.03 L/s). This does not exceed the regionally mapped yield of the underling aquifer (0.5 – 2.0 L/s). It is not currently planned to use groundwater for the operational phase of this project however if this changes a water use licence will need to be applied for and the potential impacts and mitigation measures are presented in **Table 7-52**.

The principal risks for groundwater contamination that have been identified are the use of cleaning agents for cleaning of PV panels and for dust suppression of internal roads. If required, it is encouraged that water alone is used to conduct these tasks. Alternatively, the PV cleaning agents and dust suppression mixes must be environmentally friendly and should breakdown naturally without causing ingression of harmful chemicals into the environment. The risks and status of groundwater contamination occurring during the operational phase of SPH4 is presented in **Table 7-56**.

The proposed development will require a BESS. Currently two different technologies are being considered, i.e. either Solid State Lithium Batteries (SSLB) or Vanadium Redox Flow Battery Energy Storage Systems (VRFB). Both of these two BESS systems require an electrolyte. The SSLB contain an ethylene carbonate or di-ethyl carbonate electrolyte and the VRFB system will require that an estimate of 3 000 m³ of sulfuric acid solution with vanadium ions electrolyte is stored on site for each Springhaas Facility. The BESS systems will also require cooling systems and these systems could potentially either be water based or it may be refrigerant based systems which used chemicals such as ethylene glycol- based coolants.

The containers that the BESS systems are held in are equipped with a "Clean agent" which is a fires suppression systems that can release a powder/gas into the container to snuff fires. These systems usually leave a residue on the equipment that will need to be cleaned off. With any chemical storage there is always a risk of chemical fires that will need to be put out with water or foam and the waste water from these activities could contain contaminants that should not be let to run off into the environment.

The fire safety systems, refrigerants, electrolyte solutions and the waste products produced from these systems could contaminate the soil and groundwater and all measures should be taken to prevent leaks or spills on the ground. The risks and mitigations for the BESS are presented in **Table 7-57**.

The impact on groundwater levels is rated the same for both battery technology alternatives for the BESS.

Table 7-160 SPH4: Impact of lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place)

	Potent	ial impact on groundwater level due to over abs	straction	
PROJECT PHASE	Operational	Phase		
DIRECT IMPACT	Lowering of	groundwater level due to over abstraction		
INDIRECT IMPACT		rings in the area		
CUMULATIVE IMPACT		damage to the aquifer system in the area		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with		
		the impact will last more than 5 years and as		
		such is rated as Long Term	46	2
EXTENT	3	The extent of the impact is rated as Local as	-16	2
		it affects the development area and		
		adjacent properties		
SEVERITY	-2	The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
		and social functions and processes continue		
		albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems or	Moderately	Likely
		communities are negatively affected	Detrimental	-mery
IMPACT ON		Irreplaceable resources will be impacted.		
IRREPLACEBLE	1	irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-32	low – negative		
	-	PROPOSED MITIGATION MEASURES		
If boreholes are used	it must be cor	rectly yield tested according to the National Sta	ndard (SANS 1029	9-4:2003, Part 4 –
Test pumping of wate	er boreholes).	This includes a Step Test, Constant Discharge Te	est and recovery mo	nitoring.
Adhere to the boreho	le's safe yield	and to monitor water levels and flow.		
Groundwater abstrac	tion volumes	must be monitored.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with		
		the impact will last more than 5 years and as		
		such is rated as Long Term	0	1
EXTENT	1	The extent of the impact is rated as	U	±
		footprint as it only affects the area in		
		which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON	1	Irreplaceable resources will be impacted.	Negligible	Unlikely
IRREPLACEBLE	_		regugible	Ollikely
RESOURCES				
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
Medium				

Table 7-161: SPH4 Impact of contamination of groundwater as a result of cleaning agents used for cleaning the solar panels

Potential impact on groundwater as a result of cleaning agents used for cleaning the solar panels.					
PROJECT PHASE	Operational	l Phase			
DIRECT IMPACT	Contaminat	ion of groundwater			
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area		•	
CUMULATIVE IMPACT	Long-term r	educed groundwater quality			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and	-16	2	

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		
		PROPOSED MITIGATION MEASURES		
Use environmentall that will not cause o			dable detergents/g	reen soaps) and
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		-
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
Medium				

Redox flow batteries contain electrolyte solution which needs to be replaced approximately every 15 to 20 years. During replacement of electrolyte there is a risk of leaks or spills. This impact is only applicable to the redox flow batteries as lithium-ion batteries are solid state batteries.

Table 7-162: SPH4 Impact table for contamination of groundwater quality as a result of leaking or spills from the electrolyte solution from the battery energy storage system (BESS)

Potential impact on groundwater quality as a result of leaking or spills from the electrolyte solution from the							
	battery energy storage system (BESS)						
PROJECT PHASE	Operational Pho	ase					
DIRECT IMPACT	Contamination	of groundwater					
INDIRECT IMPACT	Damage to the	vegetation or ecosystem it the area					
CUMULATIVE IMPACT	Long-term redu	ced groundwater quality					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
	PRE-MITIGATION						
DURATION	4	The duration of the activity	-16	2			
		associated with the impact will					
		last more than 5 years and as					
		such is					
		rated as Long Term					
EXTENT	3	The extent of the impact is					
		rated as Local as it affects the					
		development area and adjacent					

		properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or Communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		

Ensure that all electrolyte or chemicals stored or used on site have secondary containments systems in place with reliable leak detection, annunciation in place. Ensure that all chemicals are handled on concrete bunded surfaces and not on bare soil.

Any waste products produced form the BESS systems should be removed and disposed of appropriately. Waste water produced by fire hydrants should not be allowed to runoff into the environment.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		•
		CONFIDENCE LEVEL		
Medium				

(g) Heritage Impact

(i) Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts during operation of SPH4 relate only to the presence of the facility in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the facility. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a degree of change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. The impacts are the same for both technology options for the batteries for the BESS.

Table 7-163: SPH4: Assessment of operation phase impacts to the cultural landscape

		CULTURAL LANDSCAPE IMPACTS		
PROJECT PHASE	Operation I	Phase		
DIRECT IMPACT	Alteration (of the rural landscape character through the pre	sence of a solar ener	gy facility
INDIRECT IMPACT	None		•	-, -
CUMULATIVE IMPACT	Impacts wi	ll be greater with multiple facilities being presen	t	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as		
EXTENT	3	such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties	-7	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly - Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
		PROPOSED MITIGATION MEASURES		
Keep all maintenance wor				
Minimise night-time light	pollution in t	he area (visual recommendations to be followed	to achieve this).	
		POST-MITIGATION		ı
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	_	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-7	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		_
SIGNIFICANCE	-21	low - negative		
		CONFIDENCE LEVEL		
High				

(h) Socio-Economic Impact

(i) Stimulation of the Local Economy during operations

The operational period of SPH4 is a minimum of 20 years. Of the money spent annually during the operations period, a significant portion will likely comprise of salaries and wages of the Springhaas employees. The operations of the facility will make some contribution towards the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

No differentiate can be made between the and battery technology alternatives for the BESS. The technology alternatives are considered in **Table 7-56** and **Table 7-57**.

Table 7-164: SPH4: Assessment of Economic stimulation during operations

STIMULATION OF THE LOCAL	ECONOMY	DURING OPERATIONS		
PROJECT PHASE	Operation	al Phase		
DIRECT IMPACT	Long-term	n increase in production and GDP in the local ecor	поту	
INDIRECT IMPACT	Improved	household income and increased business sales i	n the local econom	У
CUMULATIVE IMPACT	Increase ii	n production and GDP in the regional economy		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term		
		The extent of the impact is rated as Regional	- 8	3
EXTENT	4	as the effects of the impact extends beyond		
		municipal boundaries		
		The severity of the impact is rated as Low		
		positive as the impact affects the environment		
SEVERITY	1	in such a way that natural, cultural and social		
		functions and processes are minimally	Slightly	Definite
		improved	Beneficial	Definite
IMPACT ON IRREPLACEABLE	0	No importance ble was a visit be incomed at		
RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
PROPOSED MITIGATION MEA	SURES			•
Where feasible, procure good	s and servic	es required for the operation of the plant from th	ne local economy	
POST-MITIGATION				
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term		
		The extent of the impact is rated as Regional	16	3
EXTENT	4	as the effects of the impact extends beyond		
		municipal boundaries		
		The severity of the impact is rated as		
		Moderate positive as the affected		
		environment is altered but natural, cultural		
SEVERITY	2	and social functions and processes continue	0.4 a dayartah.	
		albeit in a modified way; and valued,	Moderately Beneficial	Definite
		important, sensitive or vulnerable systems or	Бепелсіаі	
		communities are positively affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be impacted.		
RESOURCES		Tro mepiaceable resources will be impacted.		
SIGNIFICANCE	48	moderate positive		
CONFIDENCE LEVEL				

(ii) Creation of Employment and increased household income during operations

The operation of SPH4 will require functional and maintenance employees. It is envisaged that about eight direct jobs per facility will be created during the operations phase, which will occur for a duration of 20 years. About 70% of these jobs are to be filled by people from the local communities as they will be low-skilled employment opportunities. Employment of the eight individuals for the entire operational period will increase their household income, improve their standard of living and benefit their families.

SPH4 will create the same number of employment opportunities, regardless of its location on the site; thus, layout alternatives are equally preferred. The type of battery used in the BESS will also not significantly affect employment alternatives, thus both technology alternatives are equally preferred.

Table 7-165: SPH4 Assessment of employment during operations

ND INCREA	SED HOUSEHOLD INCOME DURING OPERATION	S			
Operation	al Phase				
Creation o	reation of permanent employment opportunities in the local and regional economy				
Improved	income of households whose members are emplo	yed on the project			
Creation o	f permanent employment opportunities in the reg	gion			
RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	The duration of the activity associated with				
4	the impact will last more than 5 years and as				
	such is rated as Long Term	- 8	2		
	The extent of the impact is rated as Regional		3		
4	as the effects of the impact extends beyond				
	municipal boundaries				
	The severity of the impact is rated as Low				
	positive as the impact affects the environment				
1	in such a way that natural, cultural and social	Slightly			
	functions and processes are minimally		Definite		
	improved				
0	No irreplaceable resources will be impacted.				
24	low positive				
URES					
ne positions	by labour from the local community				
	The duration of the activity associated with				
4	the impact will last more than 5 years and as				
	such is rated as Long Term	0	2		
	The extent of the impact is rated as Regional	8	3		
4	as the effects of the impact extends beyond				
	municipal boundaries				
	The severity of the impact is rated as Low				
	positive as the impact affects the environment	Climbel.			
1	in such a way that natural, cultural and social		Definite		
	functions and processes are minimally	вепејісіаі			
	·				
	Operation Creation of Improved Creation of RATING 4 4 4 4 4 4 4 4 4 4 4 4 4	Creation of permanent employment opportunities in the local Improved income of households whose members are employeration of permanent employment opportunities in the region of permanent with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved No irreplaceable resources will be impacted. In the duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social	Creation of permanent employment opportunities in the local and regional eco Improved income of households whose members are employed on the project Creation of permanent employment opportunities in the region RATING MOTIVATION CONSEQUENCE The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved O No irreplaceable resources will be impacted. 24 low positive URES The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries The severity of the impact extends beyond municipal boundaries The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and way that natural, cultural and social in such a way that natural, cultural and social Regelical		

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
CONFIDENCE LEVEL			•	_
High				

(iii) Improved municipal service delivery

SPH4 will have a capacity of up to 150MWac and will be connected to the national grid through Eskom substation and generated electricity will be sold nationwide. The proposed project, albeit relatively small, will contribute towards improving National electricity availability; thus, improving the government service delivery, and could potentially also aid in growing the local economy by increasing the overall supply of electricity in the local economy. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas.

The layout alternatives and BESS technology alternatives will not affect the capacity of the solar facility; thus all alternatives are equally preferred.

Table 7-166: SPH4: Assessment of service delivery improvement

IMPROVED MUNICIPAL SE	RVICE DELI	VERY					
PROJECT PHASE	Operation	perational phase					
DIRECT IMPACT	It will like	will likely Improve the local electricity supply if fed to the grid					
INDIRECT IMPACT	Improved	proved standard of living within the region					
CUMULATIVE IMPACT	Improved	proved electricity availability					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
PRE-MITIGATION							
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3			
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries					
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite			
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.					
SIGNIFICANCE	48	moderate positive					
PROPOSED MITIGATION M	IEASURES		1	·			
No mitigations proposed							

(iv) Reduction of Land Area available for productive farming

The proposed site of SPH4 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH4 as being of low to very low agricultural potential with small isolated patches of low – moderate and moderate potential land on the edges of the facility. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH4 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH4.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The different battery technology alternatives will not affect the impact ratings.

Table 7-167: SPH4: Assessment of Impact on agricultural production

	Redu	ction of Land Area available for Productive	Farming				
PROJECT PHASE	Operation	nal Phase	<u> </u>				
DIRECT IMPACT	Loss of ag	gricultural production within the footprint a	lue to land sterilisation	on			
INDIRECT IMPACT	Negligibi	le to no indirect impact					
CUMULATIVE IMPACT	Negligible	gligible to no cumulative effects					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	Ü	3			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite			
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		,			
SIGNIFICANCE	-18	very low negative					
		PROPOSED MITIGATION MEASURES					
Rehabilitation of land shou after the closure of the pro	•	ce at the end of the project's life to allow for	r the land to be used j	for livestock farming			
		POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3			

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Definite		
IMPACT IRREPLACEABLE RESOURCES	ON 1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-1	8 very low negative		
CONFIDENCE LEVEL				
High				

(i) Terrestrial Biodiversity and Animal Species

(i) Direct Impacts – Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death.

Regarding the technology alternative for the type of battery used in the BESS for SPH4, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-168: SPH4 Injury or death to fauna

DIRECT IMPACT INDIRECT IMPACT CUMULATIVE IMPACT	Operatior Injury or d 	nal Phase death to fauna		
INDIRECT IMPACT - CUMULATIVE IMPACT -		death to fauna		
CUMULATIVE IMPACT -				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-16	2
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-32	low negative		

No wild animal may under any circumstance be handled, removed or be interfered with by maintenance staff

To prevent possible collisions with animals, drivers of maintenance vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

Adequate fire prevention and safety measures must be in place. A fire emergency management plan must be in place

All electrical equipment must be	: maintaine	ed on a regular basis to minimise the risk o	of fire	
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-6	very low negative		
CONFIDENCE LEVEL				

(ii) Indirect Impacts – Pollution and contamination of natural areas

During operations, release of grey water into the environment can cause contamination by detergents. Grey water from cleaning of the solar panels has the potential to contaminate soils and ground water and be washed into the nearby natural pans during high rainfall events. This includes biodegradable detergents used for cleaning the panels, which can accumulate in the soil and be washed into the nearby pans before they break down. Biodegradable detergents can alter the balance of freshwater ecosystems as they promote bacterial growth and lower oxygen levels. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-169: SPH4 pollution and contamination of natural areas

High

POLLUTION AND CONTAMINATION OF NATURAL AREAS INCLUIDING PANS AND WETLANDS					
PROJECT PHASE	Operational Phase				
DIRECT IMPACT					
INDIRECT IMPACT	Pollution and contamination of natural areas – including nearby pans or wetlands				
CUMULATIVE IMPACT	Habitat degradation				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties	-21	3	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite	

IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be
RESOURCES	U	impacted
SIGNIFICANCE	-63	high negative

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-24	very low negative		
CONFIDENCE LEVEL				
High				

(iii) Indirect Impacts - Disturbance and displacement of fauna

Security lights for SPH4 during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland and rocky outcrops adjacent to the facility, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-170: SPH4 disturbance and displacement of fauna – natural grassland and rocky outcrops

DISTURBANCE AND DISPLACEMENT OF FAUNA – ROCKY OUTCROPS					
PROJECT PHASE	Operation	Operational Phase			
DIRECT IMPACT					
INDIRECT IMPACT	Disturbar	Disturbance to and displacement of fauna – natural grassland and rocky outcrops			
CUMULATIVE IMPACT	Displacen	Displacement of fauna			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					

SIGNIFICANCE	-48	moderate negative		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3

Operations during the night must be avoided to minimise the need for artificial lighting and to reduce the impact of light and noise on nocturnal animals

Lighting during operations should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light, and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

The rocky outcrops must be declared as no-go areas for maintenance workers. Maintenance workers must remain within the facility boundaries when servicing or cleaning panels and equipment

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light. Lighting must be directed away from the rocky outcrops

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-7	very low negative		
CONFIDENCE LEVEL				
Medium		·	·	

(j) Traffic Impact

During the operational phase there will be approximately 8 full time employees on site. Vehicles would access the site for daily operations and maintenance as and when required. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-171 SPH4: Traffic impacts during operation phase

		TRAFFIC IMPACTS				
PROJECT PHASE	Operation					
DIRECT IMPACT	Traffic congestion due to the trips generated by the operation of the facility					
INDIRECT IMPACT		The associated noise and dust pollution				
CUMULATIVE IMPACT		ays on the surrounding road network				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	<u> </u>	PRE-MITIGATION		T		
DURATION	4	The duration of the activity associated				
DORATION		with the impact will lastmore than 5				
		years and as such is				
		rated as Long Term	0	3		
EXTENT	3	The extent of the impact is rated as	1			
		Local as it affects the developmentarea				
		and adjacent properties				
SEVERITY	0	Negligible				
IMPACT ON	0					
IRREPLACEBLE		No irreplaceable resources will be	No aliminto	Definite		
RESOURCES		impacted.	Negligible	Definite		
	+ -		-			
SIGNIFICANCE	0	very low negative PROPOSED MITIGATION MEASURES				
Ctaff and maintanance to	sins should oos					
		ur outside of peak traffic periods; and				
		t regular maintenance of gravel roads (local		laary,incluaing the		
access road to the site) o	ccurs during of	peration phase to minimise/mitigate dust po POST-MITIGATION	ollution.			
	1 4					
DURATION	4	The duration of the activity associated				
		with the impact will lastmore than 5				
		years and as such is rated as Long				
		Term	0	3		
EXTENT	2	The extent of the impact is rated assite				
		as it will affect only the development				
		area				
SEVERITY	0	Negligible				
IMPACT ON	0	No irreplaceable resources will be	Nauliuli-1-	Definite		
IRREPLACEBLE		impacted.	Negligible	Definite		
RESOURCES						
SIGNIFICANCE	0	very low negative	1	l		
J.SIMII ICAINCL		CONFIDENCE LEVEL				
		CONFIDENCE LEVEL				
High						

7.5.5 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered **Section 7.7**.

7.5.6 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities and is covered in **Section 7.8.**

7.5.7 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The cumulative impact assessment is available in **Section 7.9.**

Table 7-172: SPH4 impact summary

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Design/Planning/Pre-Construction Phase			
No impacts identified			
Construction Phase			
Agricultural impacts			
Land use change from livestock farming to energy generation	Negative	Moderate	Low
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Impaired soil health as a result of soil pollution	Negative	High	Very low
Aquatic impacts			
Disturbance and water quality impacts	Negative	Very low	Very low
Avifaunal impacts			
Destruction of bird habitat during construction	Negative	Low	Low
Disturbance of birds during construction	Negative	Very low	Very low
Bat impacts			
Bat habitat modification	Negative	Very low	Very low
Disturbance and displacement of bats	Negative	Very low	Very low
Possible roost disturbance	Negative	Low	Very low
Bat roost destruction	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Medium	Low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place)	Negative	Low	Very low
Contamination of groundwater as a result of accidental oil spillages or fuel leakages	Negative	Very low	Very low
Heritage impacts			
Impact on archaeological sites	Negative	Very low	Very low
Impact on graves	Negative	Low	Very low
Impact on cultural landscape	Negative	Low	Low

Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-economic impacts			
Stimulation of the economy during construction	Positive	Low	Low
Employment opportunities	Positive	Low	Low
Reduction in land available for productive farming	Negative	Very low	Very low
Loss of property	Negative	Low	Very low
Terrestrial biodiversity and animal species (faunal) impacts			
Destruction of faunal habitat	Negative	High	Low
Injury or death to fauna	Negative	Moderate	Very low
Disturbance and displacement of fauna	Negative	Low	Very low
Pollution and contamination of natural areas	Negative	Moderate	Very low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Traffic impacts			
Traffic congestion	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads	Negative	Low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
Operational Phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Soil pollution	Negative	Very low	Very low
Aquatic impacts			
Increased run-off, pollution	Negative	Very low	Very low
Aquatic			
Disturbance of aquatic habitat; water quality impacts	Negative	Very low	Very low
Avifauna impacts			
Bird fatality through interaction with infrastructure	Negative	Very low	Very low
Nesting and use of other infrastructure by birds	Positive	Very low	Very low
Bat impacts			
Disturbance and displacement	Negative	Very low	Very low
Roost disturbance	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Very low	Very low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place).	Negative	Low	Very low
	Negative	Low	Vomelous
Contamination of groundwater from use of cleaning agents	Negative	LOW	Very low

Employment opportunities Positive Inproved service delivery Positive Moderate Moderate Reduction in land available for productive farming Negative Very low Very low Terrestrial biodiversity and animal species Injury or death of fauna Pollution and contamination of natural areas including pans and Negative High Low Very low Wellands Pollution and contamination of natural areas including pans and Negative High Low Very low Wellands Pollution and contamination of natural areas including pans and Negative Moderate Very low Wellands Pollution and contamination of natural areas including pans and Negative Moderate Very low Wery low Palacentological impacts Traffic congestion Negative Very low Very low Palacentological impacts Destruction of fossils NA NA NA NA NA Parcial Impacts Soil loss through erosion Negative Moderate Very low Impaired soil functionality caused by compaction Negative Moderate Very low Impaired soil functionality caused by compaction Negative Moderate Very low Impaired soil health as a result of soil pollution Negative World Impacts Disturbance of aquatic habitat, water quality impacts Negative Very low Very low Very low Avifaunal impacts Disturbance of birds Negative Very low Very low Very low Sturbance of birds Negative Very low Very low Very low Sturbance of birds Negative Very low Very low Very low Poundard Very low Sturbance of pirds Negative Negative Very low Very low Very low Poundard Very low Poundard Very low Very low Very low Very low Poundard Very low Positive Negative Negative Very low	Heritage impacts			
Economic stimulation during operations	Impact on cultural landscape	Negative	Low	Low
Employment opportunities	Socio-economic impacts	L		
Improved service delivery Reduction in land available for productive farming Reduction in land available for productive farming Negative Very low Pollution and contamination of natural areas including pans and wetlands Disturbance and displacement of fauna – rocky outcrops Negative Negative Very low Very low Very low Very low Very low Palaeontological impacts Destruction of fossils NA N	Economic stimulation during operations	Positive	Low	Moderate
Reduction in land available for productive farming Terrestrial biodiversity and animal species Injury or death of fauna Pollution and contamination of natural areas including pans and wetlands Disturbance and displacement of fauna –rocky outcrops Negative Wery low Very low Very low Traffic impact Traffic congestion Palaeontological impacts Destruction of fossils Na Na Na Na Na Palaeontological impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Negative Avifaunal impacts Disturbance of displacements Negative Very low Very l	Employment opportunities	Positive	Low	Low
Terrestrial biodiversity and animal species Injury or death of fauna Pollution and contamination of natural areas including pans and wegative wetlands Disturbance and displacement of fauna—rocky outcrops Palaeontological impacts Traffic congestion Palaeontological impacts Destruction of fossils Poetromissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil functionality Impaired on the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Impact on the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Impact on the economy Positive Very low (regative) Very low (very low Very low Positive Very low (regative) Very low (regativ	Improved service delivery	Positive	Moderate	Moderate
Terrestrial biodiversity and animal species Injury or death of fauna Pollution and contamination of natural areas including pans and wegative wetlands Disturbance and displacement of fauna – rocky outcrops Negative Moderate Very low Traffic impact Traffic congestion Palaeontological impacts Destruction of fossils NA NA NA NA Palaeontological impacts Destruction of fossils NA NA NA NA NA Pecommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil functionality caused by compaction Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Negative Moderate Very low Wery low Wery low Wery low Wery low Very low Avifaunal impacts Disturbance of aquatic habitat, water quality impacts Negative Very low Wery low Wery low Bat impacts Disturbance and displacements Negative Very low Wery low Bat impacts Ussurbance and displacements Negative Very low Wery low Destruction of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Impact on the economy Positive Very low (negative) Very low Very low Very low Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel® faunal habitat (i.e. grassed areas under the	Reduction in land available for productive farming	Negative	Very low	Very low
Pollution and contamination of natural areas including pans and wetlands Pollution and contamination of natural areas including pans and wetlands	Terrestrial biodiversity and animal species			
wetlands Disturbance and displacement of fauna –rocky outcrops Traffic impact Traffic congestion Palaeontological impacts Destruction of fossils Destruction of fossils NA N	Injury or death of fauna	Negative	Low	Very low
Traffic impact Traffic congestion Negative Very low Very low Palaeontological impacts Destruction of fossils NA		Negative	High	Low
Traffic congestion Negative Very low Very low Palaeontological impacts Destruction of fossils NA	Disturbance and displacement of fauna –rocky outcrops	Negative	Moderate	Very low
Palaeontological impacts Destruction of fossils Description of fossils Disturbance of aquatic habitat, water quality impacts Disturbance of birds Bat impacts Disturbance of birds Bat impacts Disturbance and displacements Disturbance and displacements Botanical impacts Disturbance of birds Negative Very low Very low Very low Very low Disturbance of birds Disturbance of birds Regative Very low Very low Very low Very low Disturbance of birds Disturbance of birds Negative Very low Very low Very low Very low Low Low Low Croundwater Contamination from construction activities Negative Positive Positive Very low (negative) Very low Very low Very low Creation of the mporary employment opportunities in the local and Positive Positive Very low Positive Very low Very lo	Traffic impact			
Destruction of fossils NA NA NA NA NA NA NA Decommissioning phase Agricultural impacts Soil loss through erosion Negative Moderate Very low Impaired soil functionality caused by compaction Negative Moderate Very low Impaired soil health as a result of soil pollution Negative High Very low Aquatic impacts Disturbance of aquatic habitat, water quality impacts Negative Very low Very low Very low Avifaunal impacts Disturbance of birds Negative Very low Very low Very low Sat impacts Disturbance and displacements Negative Very low Very low Very low Sociated Impacts Loss of vegetation Negative Low Low Groundwater Contamination from construction activities Negative Very low Very low Very low Sociated impacts Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative Very low (negative) Very low Socio-Economic impacts Impact on the economy Positive Very low Very low Very low (positive) Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Negative Negative Very low Very l	Traffic congestion	Negative	Very low	Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Negative Very low Very low Very low Avifaunal impacts Disturbance of birds Negative Very low Very low Very low Bat impacts Disturbance and displacements Negative Very low Very low Botanical impacts Loss of vegetation Groundwater Contamination from construction activities Negative Very low	Palaeontological impacts			
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil functionality caused by compaction Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Negative Very low Very low Very low Very low Very low Sat impacts Disturbance and displacements Negative Very low Very low Social impacts Loss of vegetation Groundwater Contamination from construction activities Negative Very low Very low	Destruction of fossils	NA	NA	NA
Soil loss through erosion Negative Impaired soil functionality caused by compaction Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Negative Impaired soil health as a result of soil pollution Negative Impaired soil health as a result of soil pollution Negative Disturbance of aquatic habitat, water quality impacts Negative Negative Very low Negative Very low Very low Low Croundwater Contamination from construction activities Negative Negative Very low Positive Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and positive Positive Very low	Decommissioning phase			
Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Negative Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Negative Very low Positive Very low	Agricultural impacts			
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Negative Very low Bat impacts Disturbance and displacements Negative Very low Very low Very low Botanical impacts Loss of vegetation Regative Contamination from construction activities Negative Very low Very low Very low Low Low Low Very low Construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/ Positive Very low (negative) Very low (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel's faunal habitat (i.e. grassed areas under the	Soil loss through erosion	Negative	Moderate	Very low
Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Negative Very low Very low Very low Very low Very low Bat impacts Disturbance and displacements Negative Very low Very low Very low Botanical impacts Low Low Low Low Contamination from construction activities Negative Very low Construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/ Positive Very low (negative) Very low (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the	Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Disturbance of birds Negative Very low Very low Very low Very low Bat impacts Disturbance and displacements Negative Very low Contamination from construction activities Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/ Positive Very low (negative) Very low Very low Very low Very low Very low Very low Positive Positive Very low (negative) Positive Very low Very low Very low Positive Very low (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Negative) Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Negative) Negative Negative Negative Very low	Impaired soil health as a result of soil pollution	Negative	High	Very low
Avifaunal impacts Disturbance of birds Disturbance and displacements Disturbance and displacements Negative Very low Very low Very low Botanical impacts Loss of vegetation Groundwater Contamination from construction activities Negative Very low Creation of fossils Negative/ Positive Very low (negative) Very low (positive) Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the	Aquatic impacts			
Disturbance of birds Bat impacts Disturbance and displacements Negative Very low Very low Very low Very low Botanical impacts Loss of vegetation Groundwater Contamination from construction activities Heritage impacts Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/Positive Negative/Positive Very low (negative) Very low (positive) Very low (positive) Terestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the	Disturbance of aquatic habitat, water quality impacts	Negative	Very low	Very low
Bat impacts Disturbance and displacements Negative Very low Very low Botanical impacts Loss of vegetation Groundwater Contamination from construction activities Negative Very low Very low Very low Very low Heritage impacts Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/ Positive Very low (negative) Very low (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel's faunal habitat (i.e. grassed areas under the	Avifaunal impacts			
Disturbance and displacements Negative Very low Very low	Disturbance of birds	Negative	Very low	Very low
Botanical impacts Loss of vegetation	Bat impacts			
Loss of vegetation Groundwater Contamination from construction activities Heritage impacts Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/Positive Negative/Positive Very low (negative) Very low (positive) Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the location of temporary employment (lie. grassed areas under the location elements) Negative Very low	Disturbance and displacements	Negative	Very low	Very low
Groundwater Contamination from construction activities Heritage impacts Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/Positive Negative/Positive Very low (negative) (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the	Botanical impacts			
Contamination from construction activities Heritage impacts Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative Positive Very low (negative) Positive Very low (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the	Loss of vegetation	Negative	Low	Low
Heritage impacts Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Negative/Positive Negative/Positive Very low (negative) (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Negative) Negative Very low	Groundwater			
Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Destruction of fossils Negative/Positive Very low (negative) Positive Very low (negative) Positive Very low (positive) Terrestrial biodiversity and animal species Negative/Positive Very low (negative) Positive Very low (very low Very low V	Contamination from construction activities	Negative	Very low	Very low
Construction equipment and vehicles and all the associated activities on site Palaeontological impacts Destruction of fossils Destruction of fossils Negative/Positive Negative/Positive Very low (negative) (positive) Very low (positive) Very low (positive) Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Negative) Negative/Positive Very low (very low Very lo	Heritage impacts			
Palaeontological impacts Destruction of fossils Negative/ Positive Very low (negative) (positive) Socio-Economic impacts Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the locative) Negative/ Positive Very low (negative) (positive) Very low	construction equipment and vehicles and all the associated	Negative	Low	Very low
Destruction of fossils Negative				
Impact on the economy Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the		_	Very low (negative)	
Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Norative Moderate Very low	Socio-Economic impacts			
Creation of temporary employment opportunities in the local and regional economy Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Norative Moderate Very low	Impact on the economy	Positive	Very low	Very low
Terrestrial biodiversity and animal species Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Norative Moderate Very low		Positive		
Destruction of novel ⁵ faunal habitat (i.e. grassed areas under the Nogative Moderate Very low		1 OSILIVE	VCI Y 1000	very low
		l		
·	panels where fauna may recolonise after construction)	Negative	Moderate	Very low

⁵ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

Injury or death to animals (due to collisions with construction			
vehicles or destruction of burrows that have established under the panels)	Negative	Moderate	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Very low
Disturbance to and displacement to fauna and edge effects – natural grassland	Negative	Low	Very Low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Reestablishment of movement corridors through the landscape due to removal of fences and return to open grassland	Negative	Very low	Low positive
Traffic impacts			
Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
No-Go Alternative			
Agricultural	Negative	Very low	Very low
Aquatic	Negative	-	Very low- negligible
Avifauna	Negative	Very low	Very low
Bats	Negative	Very low	Very low
Botanical	Negative	Low	Low
Heritage	Negative	Very low	Very low
Transport- Traffic congestion	Negative	Very Low	Very Low
Terrestrial biodiversity and animal species	Negative/ positive	Low negative	Very low positive
Socio-economic	NA- no		
	impact, forgone +	NA	NA
	impacts		
Destruction of fossils	NA	NA	NA
Landscape and Visual	Negligible	No impact/NA	No impact/NA
Groundwater Impacts	Negligible	NA	NA
Cumulative impacts			
Agricultural	Negative	Very low	Very low
Aquatic	Negative	Low	Low
Avi-fauna	Negative	Moderate	Moderate
Bats	Negative	Low	Low
Botanical	Negative	Very low	Very low
Heritage	Negative	Moderate	Low
Socio-economic - Impact on the economy- construction	Positive	-	Moderate
Socio-economic -Creation of employment during construction	Positive	-	Moderate
	1	I	

Socio-economic -Reduction in land available for productive farming	Negative	-	Low
Socio-economic -Stimulation of the economy – operations	Positive	-	Moderate
Socio-economic -Employment - operations	Positive	-	Moderate
Socio-economic -Improved municipal service delivery	Positive	-	Moderate
Socio-economic -Loss of property	Negative	-	Low
Socio-economic - Stimulation of economy - decommissioning	Positive	-	Very low
Terrestrial biodiversity	Negative	High	Moderate
Transport	Negative	Low	Very Low
Landscape and visual	Negative	-	Low
Destruction of fossils	NA	NA	NA
Groundwater: Aquifer system and water quality	Negative	Low- Very Low	Low – Very Low

7.6 Springhaas 5 Detailed Impact Assessment

7.6.1 Alternatives Considered

(a) Technology Alternatives

Two technology alternatives namely lithium-ion and redox flow batteries were considered for the BESS.

(b) No-Go Alternative

The no-go alternative was considered for all seven of the proposed facilities. The impact of the no-go alternative was rated as the same for all seven facilities. The no-go alternative is assessed in **Section 7.8**.

7.6.2 Pre-construction phase

No significant impacts for the pre-construction phase have been identified by any specialist studies or by the EAP for SPH5.

7.6.3 Construction Phase

(a) Agricultural Impact

The most significant agricultural impacts associated with the development of SPH5 will occur during the construction phase when the site is fenced off, vegetation is removed and the soil surface is prepared for the installation of infrastructure.

The footprint of SPH5 is fully located in low sensitivity agricultural land..

SPH5 was also classified in terms of agricultural potential. The entire site is classified as low to very low potential with the exception of one area of low-moderate potential land. This

patch of low- moderate and moderate potential agricultural land is from larger patches of moderate sensitivity land and is not viable from a production perspective.

Tables 7-8 – 7-11 cover the two technology options for the BESS. There was no difference in the alternatives proposed from an agricultural perspective.

Table 7-173: SPH5: Impact of land use change from livestock farming to renewable energy generation

LANI	D USE CHANG	E FROM LIVESTOCK FARMING TO ENERG	Y GENERATION			
PROJECT PHASE	Construction	n Phase				
DIRECT IMPACT	Construction of boundary fence and PV infrastructure will change land use from livestock					
DIRECT IMPACT	farming to renewable energy generation					
Intensification of agriculture in other areas or otherwise reduction of livestock produced in						
INDIRECT IMPACT	the area					
CUMULATIVE IMPACT	Increase in a	areas where agriculture is converted into o	other land uses			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
DOWNTON	7	years and as such is rated as Long				
		Term	-14	3		
		The extent of the impact is rated as				
EXTENT	2	site as it will affect only the				
		development area				
		The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural,				
SEVERITY	-2	cultural and social functions and				
SEVERIT		processes continue albeit in a				
		modified way; and valued, important,	Moderately	Definite		
		sensitive or vulnerable systems or	Detrimental	Dejinite		
		communities are negatively affected				
IMPACT ON		Irreplaceable resources will be				
IRREPLACEBLE	1	impacted.				
RESOURCES		mpacica.				
SIGNIFICANCE	-42	moderate - negative				
		PROPOSED MITIGATION MEASURES				
		t provide market-related compensation th	hat will allow the cu	rrent land users to		
have the same or better abi						
Ensure that the final infrast	ructure layout	t remains within the fenced off area of the	e development footp	rint.		
_		the landowners to ensure that livestock o	and game animals a	re moved to areas		
where they cannot be injure						
The use of main access routes by construction vehicles and equipment must do so with consideration of nearby agricultural						
land users who use the same access routes for farming activities.						
All left-over construction material must be removed from site once construction on a land portion is completed.						
No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.						
		out the landowners' permission.				
No open fires made by the construction teams are allowable during the construction phase.						
		POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will	-7	3		

		last more than 5 years and as such		
		is rated as Long Term		
		The extent of the impact is rated		
EXTENT	2	as site as it will affect only the		
		development area		
		The severity of the impact is rated		
		as Low negative as the impact		
SEVERITY	-1	affects the environment in such a		
SEVERITI	-1	way that natural, cultural and		
		social functions and processes are	Slightly Detrimental	Definite
		minimally affected		
IMPACT ON		Irreplaceable resources will be		
IRREPLACEBLE	1	impacted.		
RESOURCES		трассеа.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

Table 7-174: SPH5: Impact significance of soil loss through erosion during the construction phase

		SOIL LOSS THROUGH EROSION			
PROJECT PHASE	Constructio	n Phase			
DIRECT IMPACT	Loss of soil particles from areas where construction activities result in the removal of				
		from the surface.			
INDIRECT IMPACT		o vegetation growth in eroded areas	5.		
CUMULATIVE IMPACT		areas exposed to soil erosion		T	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-54	moderate - negative			

Limit vegetation removal from the soil surface to the areas of infrastructure development such as access routes as well as around the foundations of the PV arrays and buildings.

Vegetation clearance must only be undertaken immediately prior to construction activities and only within the development footprint

Once construction of an area has been completed, level any remaining soil removed from excavation pits (where the PV arrays will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface where it is exposed to rain and wind. This is applicable to all construction areas, except where topsoil stockpiles must remain for site rehabilitation of specific areas.

Stormwater channels on site must be designed to minimise the soil erosion risk that results from surface water runoff.

Where possible, conduct the construction activities outside of the rainy season.				
		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE -15 very low negative				
CONFIDENCE LEVEL				
High				

Table 7-175: SPH5: Impact significance of impaired soil functionality caused by compaction

IMPAIRED SOIL FUNCTIONALITY						
PROJECT PHASE	Construct	tion Phase				
DIRECT IMPACT	_	The weight and movement of vehicles and equipment over the surface will result in soil compaction.				
INDIRECT IMPACT	increase	ed soil have reduced pore space and water in the rate of surface water runoff, especially af	•	pacted soil surfaces		
CUMULATIVE IMPACT	Increase	in areas affected by soil compaction.				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3		
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area				
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-54	moderate - negative				

Only allow vehicles and equipment to travel on designated access routes and not anywhere else within the development area.

Use existing main access routes and internal farm roads where possible and avoid using other areas in the site as temporary access routes

Vehicles and equipment must park in designated parking areas.

Materials must be off-loaded and stored in designated laydown area.

Where possible, conduct the construction activities outside of the rainy season as wet soil compacts easily as opposed to dry soil.

POST-MITIGATION

DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-15	very low negative			
CONFIDENCE LEVEL					
High					

Table 7-176: SPH5: Impact significance of impaired soil health as a result of soil pollution

		IMPAIRED SOIL HEALTH			
PROJECT PHASE	Construction I	Phase			
DIRECT IMPACT	and material spillage of cor state containe	Soil pollution can be caused by oil and fuel spills from vehicles and equipment as well as domestic and material waste on site. Should the vanadium redox flow batteries be used for the BESS, spillage of corrosive and environmentally toxic electrolyte is possible. In the case that lithium solid state containerised batteries are used, there is a possibility of thermal runaway that will result in the release of toxic and flammable gasses.			
INDIRECT IMPACT	environmenta	of pollutant uptake by vegetation within the I and human health. Leas at risk of soil pollution.	he development ar	ea that can affect	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as Local as it affects the development area and	-21	3	
SEVERITY	-3	adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Highly detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-63	high negative			

Maintenance must be undertaken regularly on all vehicles and construction equipment to prevent hydrocarbon spills.

Any waste generated during construction must be stored into designated containers and removed from the site by the construction teams.

Any left-over construction materials must be removed from the development area.

The development area must be monitored by the Environmental Control Officer (ECO) to detect any early signs of fuel and oil spills and waste dumping. The ECO must also report any spills from batteries.

Ensure battery transport and installation is undertaken by accredited staff and contractors.

Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation.

POST-MITIGATION

DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-,7	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
High				_

(b) Aquatic Impact

Construction phase activities would result in disturbance of soil and clearing of vegetation. Water quality impacts may occur from batching of concrete on site, hydrocarbon spills and other construction activities.

There is no difference in impacts between the two battery technology options for BESS, the impact assessment table covers both alternatives.

Table 7-177: SPH5: Impact of aquatic ecosystems during the construction phase

		AQUATIC ECOSYSTEM IMPACTS		
PROJECT PHASE	Construction	n Phase		
DIRECT IMPACT	Disturbance	of aquatic habitat; water quality impacts		
INDIRECT IMPACT	Modification	of flow and alien vegetation invasion in aquatic fe	eatures	
CUMULATIVE IMPACT	Degradation	of the ecological condition of aquatic ecosystems		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	•	PRE-MITIGATION		
	4	The duration of the activity associated with the		
DURATION		impact will last more than 5 years and as such		
		is rated as Long term	4.4	2
	_	The extent of the impact is rated as Local as it	-14	3
EXTENT	3	affects only the development area and adjacent		
EXIENI		properties		
	-2	The severity of the impact is rated as Moderate		
		as the affected environment is altered but		
		natural, cultural and social functions and		
SEVERITY		processes continue albeit in a modified way;		
		and valued, important, sensitive or vulnerable		
		systems or communities are negatively	Moderately	Definite
		affected.	Detrimental	-
IMPACT ON	0	No irreplaceable resources will be impacted.		
IRREPLACEBLE				
RESOURCES				
SIGNIFICANCE	-42	Moderate negative		
		PROPOSED MITIGATION MEASURES		

A buffer of at least 250 m between the significant aquatic ecosystems (larger pans) and all the proposed project activities should be maintained (noting that this is already honoured in the proposed layout for all facilities).

Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers, while

retaining the topography and cover vegetation within the wider drainage areas through the site is preferred to reduce the potential modification to the way in which water drains through these areas.

The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.

During the construction phase, site management must be undertaken at the laydown and construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities such as hydrocarbon spills. The solar panels will be washed with water and a biodegradable/ greendetergent.

Any stormwater that does arise within the construction sites must be handled appropriately to trap sediments and reduce flow velocities where necessary.

Development within the drainage areas, where located within a proposed facility, will however need to consider stormwater management measures and should avoid impacting on the movement of water through the more seasonally wet areas. Minimal disturbance to the topography and cover vegetation in these areas is recommended.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last 0-6 months and as such is rated asTemporary	-12	2
EXTENT	2	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur		
SEVERITY	-2	The severity of the impact is rated as Moderate as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.	Slightly Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-24	low negative		
CONFIDENCE LEVEL				
High				

(c) Avifaunal Impact

(i) Habitat destruction associated with the construction of the facility

Habitat destruction and alteration will occur during the construction phase of SPH4. The majority of the development footprint would be transformed from its current state to a renewable energy facility. SPH4 will transform approximately 261ha of habitat. Most of this is in a fairly natural state currently, or in the case of arable lands is still accessible and useable for birds foraging.

Table 7-178: SPH5: Formal rating of destruction of bird habitat during construction

	DESTRUCTION OF BIRD HABITAT DURING CONSTRUCTION				
PROJECT PHASE	Constructio	n phase			
DIRECT IMPACT	Transforma	tion of natural habitat into PV facility			
INDIRECT IMPACT					
CUMULATIVE IMPACT	Yes - Larger	Yes - Larger area transformed from natural habitat			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
		PRE-MITIGATION			
		The duration of the activity associated with			
DURATION	4	the impact will last more than 5 years and as	-12	3	
		such is rated as Long Term			

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-36	low – negative		
		PROPOSED MITIGATION MEASURES		
adherence to no-go buffers		Impact avoidance has already been implemente POST-MITIGATION	a in the design pho	ise through the
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-12	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON	1	Irreplaceable resources will be impacted.		
IRREPLACEBLE RESOURCES				
	-36	low - negative		
RESOURCES	-36	low - negative CONFIDENCE LEVEL		

(ii) Disturbance of birds & displacement effects

Disturbance of avifauna during the construction (and thereafter during maintenance and operational and decommissioning) of the facility and all development alternatives and associated infrastructure is likely to occur. Disturbance of breeding birds is typically of greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. It is noted that no breeding sites have been identified on site at this stage.

There is no difference between the location and technology options in terms of disturbance and displacement of birds.

Table 7-179: SP4: Formal rating of disturbance of birds during construction

PROJECT PHASE	Construction	Construction phase & operations phase to lesser extent			
DIRECT IMPACT		Birds disturbed from their normal activities through the increased noise and activity levels associated with construction			
INDIRECT IMPACT					
CUMULATIVE IMPACT	More projec	ts will result in overall higher disturbance levels			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
PRE-MITIGATION					

DPODOSED MITIGATION MEASURES					
SIGNIFICANCE	_	-5	very low negative		
RESOURCES					
IRREPLACEBLE		0	No irreplaceable resources will be impacted.		
IMPACT	ON			Negligible	Unlikely
SEVERITY		-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected		Unlikak
EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	1
DURATION		2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	1

There is no specific mitigation required as there are no particularly sensitive features identified (such as breeding sites). General good environmental practice should be implemented during construction in terms of control of vehicles, staff, minimising the impact on the receiving environment as much as possible.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
CONFIDENCE LEVEL				
Medium				

(d) Bats Impact

The facility boundary for SPH5 encompasses a pan which is a high sensitivity areas from a bat perspective. The pan along with its 250m ecological buffer have been avoided by the infrastructure layout.

During the construction of SPH5 habitat modification would occur, disturbance and displacement of bats may occur and bat roosts may be disturbed or destroyed.

Two technology options are under consideration for the BESS. For bat impacts the type of technology used for the BESS is not considered relevant. Both technology options are considered equally acceptable.

Table 7-180: SPH4: Bat habitat modification

IMPACT ON POSSIBLE HABITAT MODIFICATION						
PROJECT PHASE	PROJECT PHASE Construction phase					
DIRECT IMPACT	Modificatio	n of habitat through the removal of vegetation cove	er and water source	?S		
INDIRECT IMPACT	Displaceme	nt				
CUMULATIVE IMPACT	Loss of fora	ging resources for local bat population				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	1		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Nogligiblo	Unlikalı		
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.	- Negligible	Unlikely		
SIGNIFICANCE	-4	very low negative				
		PROPOSED MITIGATION MEASURES				

This impact may be reduced by limiting the removal of vegetation and available water sources, as far as possible.

Avoid all high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should any changes or expansion take place to the boundary of the facility a bat specialist must provide input to confirm that these changes are acceptable in terms of the avoidance of high sensitivity areas.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction, rehabilitation of all disturbed areas, inclusive of that beyond permanent infrastructure footprints, (e.g. temporary access tracks and laydown areas) must be undertaken.

POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.			
SIGNIFICANCE	-4	very low negative			
CONFIDENCE LEVEL					
Medium					

Table 7-181: SPH5: Disturbance and displacement effects for bats

PROJECT PHASE DIRECT IMPACT DISturbance of bats during construction activities DIRECT IMPACT Displacement CUMULATIVE IMPACT Unavailability of suitable foraging resources in the broader environment for displaced individuals DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD PRE-MITIGATION DURATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated on so short term os short term The severity of the impact is rated as low negative as the impact will be impact as a serious processes are minimally affected IMPACT ON IRREPLACEBLE RESOURCES SIGNIFICANCE -5 Very low negative PROPOSED MITIGATION MEASURES Limit construction activities to daylight hours only and minimise lighting at night, as far as possible. All construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Short term 1 The extent of the impact is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Short term 2 The extent of the impact is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact will last 6 to 18 months and as such is rated as Low negative as the impact offects the environment in		IMPAC	ON POSSIBLE DISTURBANCE & DISPLACEMENT EFFEC	TS.			
INDIRECT IMPACT Displacement	PROJECT PHASE	Constructio	n phase				
CUMULATIVE IMPACT Unavailability of suitable foraging resources in the broader environment for displaced individuals DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD PRE-MITIGATION DURATION The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Suchis rated as Short term -5 1 EXTENT 2 The extent of the impact is rated as site as it will affectonly the development area os the impact offects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will beimpacted. Negligible Unlikely IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will beimpacted. Negligible Unlikely IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will beimpacted. Negligible Unlikely IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will beimpacted. Negligible Unlikely IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will be seem show been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been achieved. Should the impact w	DIRECT IMPACT	Disturbance	Disturbance of bats during construction activities				
DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD PRE-MITIGATION The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as Short term	INDIRECT IMPACT	Displaceme	nt				
DURATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term 5 1 EXTENT 2 The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will beimpacted. RESOURCES SIGNIFICANCE -5 very low negative PROPOSED MITIGATION MEASURES Limit construction activities to daylight hours only and minimise lighting at night, as far as possible. Avoid high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. All construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact offects the environment in such a way that natural, cultural and social functions and processes are minimally affected Megligible Unlikely IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will beimpacted. Resources SIGNIFICANCE -5 very low negative CONFIDENCE LEVEL	CUMULATIVE IMPACT	Unavailabili	ity of suitable foraging resources in the broader environ	ment for displaced	individuals		
DURATION 2 impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact is rated as site as it will affectonly the development area as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected. RESOURCES IN International processes are minimally affected with the layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. All construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact is rated as Low negative as Short term PROPOSED MITIGATION MEASURES Limit construction activities to daylight hours only and minimise lighting at night, as far as possible. Avoid high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currently assessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. All construction activities should be limited to the assessed project footprint only. POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term 2 The extent of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected IMPACT ON INTERPLACEBLE	DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
DURATION 2 impact will last 6 to 18 months and as suchis rated as Short term 7.5 1 EXTENT 2 The extent of the impact is rated as low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected 8.5 Werl will be impact be as seen adequately avoided. Avoid high sensitive areas completely. With the layouts currently assessed, this has been adequately avoided. All construction activities to had be limited to the assessed project footprint only. POST-MITIGATION 2 impact will last 6 to 18 months and as suchis rated as low negative as the impact of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected 9.5 Wery low negative 9.5 Wery low			PRE-MITIGATION				
EXTENT 2			The duration of the activity associated with the				
EXTENT 2 The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected IMPACT ON IRREPLACEBLE 1 Irreplaceable resources will beimpacted. RESOURCES SIGNIFICANCE -5 very low negative PROPOSED MITIGATION MEASURES Limit construction activities to daylight hours only and minimise lighting at night, as far as possible. Avoid high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should the currentlyassessed layout change, a bat specialist must confirm, that these high sensitive areas have been adequately avoided. All construction activities should be limited to the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term POST-MITIGATION 2 The duration of the activity associated with the impact will last 6 to 18 months and as such is rated as short term 2 The extent of the impact is rated as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Negligible Unlikely IMPACT ON INTERPLACEBLE 1 Irreplaceable resources will beimpacted. RESOURCE 5 Very low negative CONFIDENCE LEVEL	DURATION	2	impact will last 6 to 18 months and as suchis rated				
SEVERITY -1			as Short term	-5	1		
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IRREPLACEBLE 1 Irreplaceable resources will beimpacted. RESOURCES 5 Very low negative CONFIDENCE LEVEL			processes are minimally affected	Negligible	Unlikely		
RESOURCES SIGNIFICANCE -5 very low negative CONFIDENCE LEVEL	IMPACT ON						
SIGNIFICANCE -5 very low negative CONFIDENCE LEVEL	IRREPLACEBLE	1	Irreplaceable resources will beimpacted.				
CONFIDENCE LEVEL	RESOURCES						
	SIGNIFICANCE	-5	very low negative				
Medium			CONFIDENCE LEVEL				
	Medium						

Table 7-182: SPH5: Bat roost disturbance

IMPACT ON POSSIBLE ROOST DISTURBANCE						
PROJECT PHASE	Construction	n phase				
DIRECT IMPACT	Disturbance	e of roosting bats during construction activities				
INDIRECT IMPACT	Roost aban	donment				
CUMULATIVE IMPACT	Unavailabil	ity of suitable roosting resources in the broader environi	ment for abandonedii	ndividuals		
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOO				
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1		
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way	Negligible	Unlikely		

		that natural, cultural and social functions and processes are minimally affected.	
IMPACT OF IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	
SIGNIFICANCE	-5	low negative	

All construction activities should be limited to the assessed project footprint only.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough toidentify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1	
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area			
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-5	very low negative			
CONFIDENCE LEVEL					
Medium	_			_	

Table 7-183: SPH4: Bat Roost destruction

IMPACT OF POSSIBLE ROOST DESTRUCTION						
PROJECT PHASE	Construction	Construction phase				
DIRECT IMPACT	Destruction	of potential bat roosting features				
INDIRECT IMPACT	Reduction o	f available roosting sites and/or Mortality				
CUMULATIVE IMPACT	Insufficient	roosting resources to support the local population and μ	potential increased	batmortality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1		
EXTENT	2	The extent of the impact is rated as site as it will affect only thedevelopment area				
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.				
SIGNIFICANCE	-5	Low negative				

PROPOSED MITIGATION MEASURES TO BE INCLUDED IN THE EMPr

Avoid the destruction or removal of existing farmsteads and trees, as far as possible.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

All construction activities should be limited to the assessed project footprint only.					
		POST-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-4	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposedactivity will occur			
SEVERITY	-1	The severity of the impact is rated as Lownegative as the impactaffects the environment in such away that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.			
SIGNIFICANCE -8 very low negative					
CONFIDENCE LEVEL					
Medium				·	

(e) Botanical Impacts

The development of SPH5 would result in extensive but localized loss of relatively undisturbed (unploughed but grazed) Western Free State Clay Grasslands.

The shade effect of the panels on the grassland vegetation is not known and it not easily predicted. There will be space under the panels for grass and other plants to grow. However, the microclimate is likely to be different to that of open grassland, so a different suite of plant species is likely to colonize the space under the solar panels.

Two technology options are proposed for the BESS. The technology alternatives will make no difference on the botanical impact assessment and as such these alternatives are covered in the **Table 7-19**.

Table 7-184: SPH5: Impact of loss of Western Free State Clay Grassland

	LOSS OF VEGETATION					
PROJECT PHASE	Construction	nstruction Phase				
DIRECT IMPACT	Removal of	natural vegetation: Western Free State Clay Gras.	slands			
INDIRECT IMPACT	None deteri	mined				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term.	-15	3		
EXTENT	3	The impacts will be localized to the designated target areas.				
SEVERITY	-2	The severity of the potential impact will be moderate negative.				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Moderately Detrimental	Definite		
SIGNIFICANCE	-45	medium - negative				
PROPOSED MITIGATION	MEASURES					

The first mitigation measures necessary would be the relocation of **Ammocharis coranica** bulbs if they cannot be avoided. Ideally the bulb should be lifted when they area dormant (winter) but that would mean traversing the entire area of the SPH sites in the preceding summer and marking every occurrence of these plants. A more practical approach would be to unearth the bulbs during the construction phase and relocating and planting them soon after removal.

Secondly, all areas that are disturbed during construction and that are not needed during the operational phase should be rehabilitated, using natural grasses that occur in the area. It would be possible for some grasses and forbs to survive under the panels, but it is difficult to predict the extent of such growth, nor which plant species would grow effectively under the panels.

POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.	-5	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			
CONFIDENCE LEVEL					
High					

(f) Groundwater Impact

The water required during the construction phase of SPH5 is approximately $9,000\text{m}^3$ per year. The water requirement lies well within the yield potential of the underlying fractured rock aquifer (i.e. 0.5-2.0 L/s). It must be noted that at present the use of groundwater is not proposed however if this changes the potential impacts of groundwater abstraction are shown in **Table 7-20**.

Earthmoving plant and/or construction vehicles will be used on site during the construction phase. Use of vehicles presents a risk of groundwater contamination by fuel and oil leakage.

Two technology options (lithium-ion vs redox flow batteries) were considered for SPH5. The alternatives considered are equally preferred.

Table 7-185: SPH5: Impact table for the lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place).

Potential impact on groundwater level due to over abstraction					
PROJECT PHASE Construction Phase					
DIRECT IMPACT	Lowering of g	roundwater level due to over abstraction	n		
INDIRECT IMPACT	Drying of sprii	ngs in the area			
CUMULATIVE IMPACT	Permanent da	mage to the aquifer system in the area			
DIMENSION	DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-14	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development			

		area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON	1	Irreplaceable resources will be impacted.		
IRREPLACEBLE RESOURCES SIGNIFICANCE	-28	·		
SIGNIFICANCE	_	low - negative PROPOSED MITIGATION MEASURES		
Groundwater abstraction v	olumes must be	e monitored. POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	·	-
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
SIGNIFICANCE	0	very low negative CONFIDENCE LEVEL		

The main risk associated with the construction phase is groundwater contamination from the use of construction vehicles and heavy machinery on-site.

Table 7-186: SPH5: Impact of contamination of groundwater as a result of accidental oil spillages or fuel leakages during the construction and decommissioning phases.

Potential impact on	Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages				
PROJECT PHASE	Construction	Construction and Decommissioning Phase			
DIRECT IMPACT	Groundwate	er contamination			
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area			
CUMULATIVE IMPACT	Long term r	educed groundwater quality			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term		2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	5		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the	Negligible	Likely	

		environment in such a way that natural, cultural and social functions and processes are minimally affected
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.
SIGNIFICANCE	-10	very low negative

Vehicles must be maintained regularly and kept in a good working order.

Dirty water should be captured, to be re-used where possible. No dirty water is allowed to be discharged into the surrounding environment.

No heavy equipment or vehicles to be left in excavation area when not in use. Drip trays to be used under stationary vehicles and machinery where possible.

		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
Medium			•	

(g) Heritage Impact

(i) Impacts to archaeological resources

Impacts to archaeological resources at SHP4 are limited to the possible destruction of isolated background scatter artefacts which have very low to no cultural significance. Impacts will be direct and permanent but because of the low cultural significance the severity is very low negative.

Two technology alternatives were considered for the battery technology for the BESS. Both technology options are equally preferred.

Table 7-187: SPH5: Assessment of construction phase impacts to archaeological sites.

		Archaeological impacts		
PROJECT PHASE	Construction			
DIRECT IMPACT	Destruction	n of isolated artefacts		
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	None			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	-6	3
		The extent of the impact is rated as	-0	
EXTENT	1	footprint as it only affects the area in		
		which the proposed activity will occur		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and		
		processes are minimally affected	Negligible	Definite
IMPACT ON				
IRREPLACEABLE	1	Irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-18	very low negative		
		PROPOSED MITIGATION MEASURES		1
recorded.		condition and does not have any special arc	hitectural qualities ti	hat need to be further
No materials to be remo	ved from an	y other ruins in the wider project area.		
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	-6	3
		The extent of the impact is rated as	J	
EXTENT	1	footprint as it only affects the area in		
		which the proposed activity will occur		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and	Negligible	Definite
IN AD A CT		processes are minimally affected		
IMPACT ON	1	Irranka aabla rasaurasaill ba isaa aabad		
IRREPLACEABLE	1	Irreplaceable resources will be impacted.		
RESOURCES SIGNIFICANCE	-18	very low negative		
SIGNIFICANCE	-19	CONFIDENCE LEVEL		
11:		CONFIDENCE LEVEL		
High				

(ii) Impacts to graves

Impacts to graves for SPH5 are not expected because all identified graves have been avoided by the facility layout. There is still the chance of an unmarked grave being present, or even a marked grave that was not found during the survey. The chances are considered low, however. The impact on graves applies equally to both technology alternatives.

Table 7-188: SPH5: Assessment of construction phase impacts to graves

		IMPACTS TO GRAVES		
PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Destruction	n of graves, including their coverings and po	essibly human rema	ins
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	Destruction	n of graves, including their coverings and po	ssibly human rema	ins
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-10	2
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-36	low – negative		

Farm-style wire fences should be erected around all known and unfenced graves (i.e. waypoints 362 & 404) within the farm portion affected by construction. Pedestrian access gates must be provided and the fences must be located a minimum of 5 m away from all graves.

All graves to be treated as no-go areas with temporary signage as required.

POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	1		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-18	1		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Unlikely		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	SIGNIFICANCE -18 very low negative					
		CONFIDENCE LEVEL				
High						

(iii) Impacts to the cultural landscape SPH4

No landscape features such as hills and pans will be impacted by SPH5. The impact on cultural landscape is due to the construction activities (construction vehicles and equipment) on site which is a rural landscape.

Table 7-189: SPH5 Assessment of construction phase impacts to the cultural landscape

PROJECT PHASE DIRECT IMPACT INDIRECT IMPACT	Construction of	n Phase		
INDIRECT IMPACT	Alteration			
		of the rural landscape character through the sand all the associated activities on site	e introduction of cons	truction equipment
	None			
CUMULATIVE IMPACT	Impacts wil	ll be greater with multiple facilities being c	constructed at once	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	10	2
		The extent of the impact is rated as	-10	3
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
CEVEDITY	-2	cultural and social functions and		
SEVERITY	-2	processes continue albeit in a modified		
		way; and valued, important, sensitive	Slightly	5 6
		or vulnerable systems or communities	Detrimental	Definite
		are negatively affected		
IMPACT ON		No imperiore this many many will be		
IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted.		
SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
Keep construction period				
Rehabilitate any areas no	t needed duri	ng operation as soon as possible.		
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-10	3
		The extent of the impact is rated as	-10	3
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
SEVERITY	-2	cultural and social functions and		
JL V L N I I I	-2	processes continue albeit in a modified	Slightly	
		way; and valued, important, sensitive	Detrimental	Definite
		or vulnerable systems or communities	Detrimental	
		are negatively affected		
IMPACT ON		No irreplaceable resources will be		
IRREPLACEABLE	0	impacted.		
RESOURCES		·		
SIGNIFICANCE	-30	low – negative		
CONFIDENCE LEVEL				

(h) Palaeontological Impact

Palaeontological impacts would be the destruction of fossils from construction activities. The site as a whole is considered as low sensitivity in terms of palaeontology.

Table 7-190: SPH5: Assessment of the potential impacts to possible paleontological resources considers the criteria below

		PALAEONTOLOGY IMPACTS		
PROJECT PHASE	Construct	ion, Operational and de commissioning Phases		
DIRECT IMPACT	Destruction	on of fossils in the footprint		
INDIRECT IMPACT				
CUMULATIVE	Loss of fo	ssil heritage and scientific knowledge		
IMPACT		,		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-2	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Noglizible	Definite
IMPACT ON IRREPLACEBALE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	-6	Very Low Negative		
PROPOSED MITIGATION				
		ons for foundations and amenities have commenced		
		Photographs should be sent to a palaeontologist t		
		ologist must obtain a permit from SAHRA, visit the sit		ssils for curation
		ty such as a museum or palaeontology department ii	n a university	
If no fossils are found,	no action v	vill be required		
POST-MITIGATION	ı			T
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	2	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	2	3
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	6	Very Low Positive		
CONFIDENCE LEVEL				
High				

(i) Socio-Economic Impact

(i) Stimulation of the Economy during construction

The size of the Tokologo LM's economy was estimated at R2,170 million at current prices (2022) and primarily comprises of the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. That being said, it is likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the development of SPH5 through local procurement.

The stimulation of the economy will not be dependent on the technology options of the SPH5; thus, the battery technology alternatives are equally preferred.

Table 7-191: SPH5: Impact of Economic Stimulation during construction

		IMPACT ON ECONOMY		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	Tempora	ry increase in production and GDP in the local	economy	
INDIRECT IMPACT	Improved	l household income and increased business sal	es in the local econd	оту
CUMULATIVE IMPACT	Tempora	ry increase in production and GDP in the region	nal economy	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
		PROPOSED MITIGATION MEASURES		
applied where possible:		cal economy through direct, indirect and ind		llowing should be
		, and products from local and domestic supplie	ers if feasible	
Employ local contractors w				
Note: The proposed mitigat not affect the weighting the		res will possibly increase the positive impact on	the local economy;	however, this will
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
CONFIDENCE LEVEL				
High		<u> </u>	·	·

(ii) Creation of Employment during construction

The construction of SPH5 will require temporary employment of construction workers, foremen, and engineers On-site. Construction is expected to last twelve months where at the peak of construction about 150 people will be working on-site. The creation of between 100 and 150 temporary employment opportunities for SPH5 throughout the duration of construction which equates to about 50 FTE.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

SPH4 will create the same number of employment opportunities, regardless of its layout on the site; thus, layout alternatives are equally preferred.

Table 7-192: SPH5: Assessment of Employment during construction

IMPACT ON EMPLOYMENT				
PROJECT PHASE Construction Phase				
DIRECT IMPACT	Creation o	f temporary employment opportunities C	On-site	
INDIRECT IMPACT	Improved	income of households whose members a	re employed on the pi	roject
CUMULATIVE IMPACT	Creation o	f temporary employment opportunities i	n the area	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development	10	3
SEVERITY	2	area and adjacent properties The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important,	Slightly Beneficial	Definite

		sensitive or vulnerable systems or communities are positively affected		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
		PROPOSED MITIGATION MEASURE	S	
The following is recommend	ded to incred	ase the employment opportunities created	d in the local commun	ities, where feasible:
Employ labour intensive me	ethods in co	nstruction, where feasible		
Employ local residents and	communitie	es, where possible		
Utilise local suppliers, wher	re possible			
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
		CONFIDENCE LEVEL		
High				

(iii) Reduction of Land Area available for productive farming

The proposed site of SPH5 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH4 comprised entirelty of low to very low agricultural potential with one small isolated patches of low — moderate potential land. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH5 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH5.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant

differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-193: SPH5: Assessment of Impact on agricultural production

		tion of Land Area available for Productive	I allilling	
PROJECT PHASE	Construct	ion and Operational Phase	•	
DIRECT IMPACT	Loss of ag	ricultural production within the footprint a	lue to land sterilisatio	n
INDIRECT IMPACT	Negligibl	e to no indirect impact		
CUMULATIVE IMPACT	Negligible	e to no cumulative effects		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	6	3
		The extent of the impact is rated as	D	3
EXTENT	1	footprint as it only affects the area in		
		which the proposed activity will occur		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		Definite
		cultural and social functions and	Negligible	
		processes are minimally affected		
IMPACT ON		Irreplaceable resources will be		
IRREPLACEABLE	1	impacted.		
RESOURCES		тристеи.		
SIGNIFICANCE	-18	very low negative		
		PROPOSED MITIGATION MEASURES		
-		ce at the end of the project's life to allow for	the land to be used f	or livestock farming
after the closure of the pro	ject.	POST-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
DONATION	4	years and as such is rated as Long Term		
		The extent of the impact is rated as	6	3
EXTENT	1	footprint as it only affects the area in		
LATEINI	_	which the proposed activity will occur		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
SEVERIIT	_	cultural and social functions and		
		processes are minimally affected	Negligible	Definite
IMPACT ON				
IRREPLACEABLE	1	Irreplaceable resources will be		
RESOURCES	_	impacted.		
SIGNIFICANCE	-18	very low negative		
		CONFIDENCE LEVEL		

(iv) Loss of Property

An influx of job seekers to the area during the construction phase may result in stock theft and burglaries. The number of workers and duration of construction will not be affected by the technology alternatives; thus, all alternatives are equally preferred.

Table 7-194: SPH5: Assessment of loss of property

		IMPACT ON CRIME LEVELS					
PROJECT PHASE Construction Phase							
DIRECT IMPACT	Temporar	ry increase in crime associated with the infl	ux of people				
INDIRECT IMPACT		Reduced level of security in and around the proposed facility					
CUMULATIVE IMPACT		ligible cumulative impact	,				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		<u> </u>			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.					
SIGNIFICANCE	-30	low - negative					
		PROPOSED MITIGATION MEASURES					
The following mitigations (are advised	to be instituted to minimise and possible e	liminate the impact o	ıltogether:			
advance and should not ta the project sites	l allocation ke place on-	of the fencing is in place to locals as far as practically possible. Recresite. This will reduce the probability of work ing the construction period					
,,		POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term The extent of the impact is rated as	-5	3			
EXTENT	3	Local as it affects the development area and adjacent properties					
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.					
SIGNIFICANCE	-15	very low negative					
		CONFIDENCE LEVEL					
High							

(j) Terrestrial Biodiversity & Faunal Impact

(i) Direct Impact - Destruction of faunal habitat

Clearing or disturbance to natural vegetation for the construction of SPH5 will remove up to 177ha of natural grassland habitat. This includes the burrows of many fossorial species as well

as termite mounds which provide a source of food for species such as aardvark and mongoose.

Two technology alternatives for the battery to be used in the BESS have been proposed. As the type of battery used will not alter the footprint of the BESS the alternatives are rated as equal for the impact of clearance of natural habitat.

Table 7-195: SPH5: Destruction of faunal habitat

		DESTRUCTION OF FAUNAL HABITAT		
PROJECT PHASE	Construct	ion phase		
DIRECT IMPACT	Destructi	on of faunal habitat		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of ho	abitat and habitat connectivity		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-21	3
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-63	high negative		
		PROPOSED MITIGATION MEASURES		

Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays. Only indigenous grasses found in the area must be used for rehabilitation

Undertake vegetation clearing during the dry season, and outside of the breeding season of burrowing fauna

If possible, the movement of animals through the sites must be permitted during operations. The use of fencing that will allow the movement of small to medium fauna through would help mitigate the effect of fences acting as barriers. This can be achieved by constructing a fence that has places for animals to crawl through and is not difficult for fleeing animals and birds to see. For example, black mesh panel fencing can be used where gaps of approximately 30 cm high and 50 cm wide and spaced at regular intervals are cut/installed. The tops of these gaps must be smoothed off to limit the chance of wildlife being injured when passing through. The use of barbed wire must be avoided

The proposed activities must remain within the project footprint

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-10	2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-10	3	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected	Slightly detrimental	Definite	

		environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted	
SIGNIFICANCE	-30	low negative	
		CONFIDENCE LEVEL	
Medium			

(ii) Direct Impact - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death. The clearing of ground for the foundations of the PV arrays will destroy burrows, potentially causing injury or death to burrowing animals. Furthermore, the presence of the construction site and personnel may result in negative interactions with fauna, such as hunting or killing animals perceived to be pests.

Regarding the technology alternative for the type of battery used in the BESS for all facilities, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-196: SPH5: Injury or death to fauna

		INJURY OR DEATH TO FAUNA			
PROJECT PHASE	Construct	Construction Phase			
DIRECT IMPACT	Injury or o	death to fauna			
INDIRECT IMPACT					
CUMULATIVE IMPACT					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-18	3	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-54	moderate negative			
		PROPOSED MITIGATION MEASURES		_	

activities of faunal species

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding

No wild animal may under any circumstance be handled, removed or be interfered with by construction workers

To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

Ideally construction should not continue at night so as to avoid potential collisions with nocturnal fauna

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	4	4
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
High				

(iii) Indirect Impacts – Disturbance and displacement of fauna

Construction activities have the potential to cause disturbance to fauna inhabiting the natural grassland through noise, vibrations, and light (if construction continues after dark). Security lights for the solar facilities during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-197: SPH5: Disturbance and displacement of fauna

DISTURBANCE AND DISPLACEMENT OF FAUNA					
PROJECT PHASE	Construct	ion Phase			
DIRECT IMPACT					
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland		
CUMULATIVE IMPACT	Displacement of fauna				
DIMENSION	RATING MOTIVATION CONSEQUENCE LIKELIHOOI				
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	2	

		DODGED MITIGATION MEAGUIDES		
SIGNIFICANCE	-36	low negative		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Likely
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

Ideally construction activities should cease at night to minimise the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals

Lighting during construction should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-10	very low negative		
		CONFIDENCE LEVEL		
Medium				

(iv) Indirect Impacts – Pollution and contamination of natural areas

During construction, dust from exposed areas and roads, and litter from construction workers have the potential to pollute the surrounding natural vegetation. The use of dust suppressants, as well as hydrocarbons from vehicles and machinery, have the potential to contaminate soils and ground water, and be washed into the nearby natural pans during high rainfall events. The battery technology alternatives are rated the same and hence are covered in the same table.

Table 7-198: SPH5: Pollution and contamination of natural areas

POLLUTION AND CONTAMINATION OF NATURAL AREAS				
PROJECT PHASE	Construction Phase			
DIRECT IMPACT				

INDIRECT IMPACT	Pollution a	nd contamination of natural areas		
CUMULATIVE IMPACT	Habitat deg			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	ı	PRE-MITIGATION		T
		The duration of the activity associated		3
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	15	
		The extent of the impact is rated as		
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		High negative as the natural, cultural		
		or social functions and processes are		
	_	altered to the extent that the natural		
SEVERITY	-3	process will temporarily or		
		permanently cease; and valued,	Moderately	Definite
		important, sensitive or vulnerable	detrimental	Seyinic
		systems or communities are		
		substantially affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted		
SIGNIFICANCE	-45	moderate negative		
		ROPOSED MITIGATION MEASURES		
		cer (ECO) must be appointed to oversee all	construction activit	ies
· · · · · · · · · · · · · · · · · · ·		for leaks and serviced on a regular basis		
		in the most appropriate manner		
No washing of vehicles must ta				
		pads must be suppressed using a water tar		
		cluding cigarette butts and litter by constru		be prohibited
Appropriate solid waste dispos	al facilities m	ust be provided for workers during constr	uction	
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-4	1
		The extent of the impact is rated as	7	1
EXTENT	2	site as it will affect only the		
		development area		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that		
		natural, cultural and social functions	Negligible	Unlikely
		and processes are minimally affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted		
	-4	very low negative		
SIGNIFICANCE		CONFIDENCE LEVEL		

(v) Indirect Impacts – Increased potential of invasion by alien vegetation

During construction, the removal of natural vegetation and disturbance to the soil will increase the likelihood of invasion by alien plant species. Alien species establish easily and quickly on bare soil by colonisation or from seeds existing in the seed bank of the soil. Infestation by alien and invasive species will lead to degradation of the surrounding natural habitat and will increase the potential of spread into the greater landscape. In addition, the vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds. This impact is relevant to all the proposed arrays equally and has therefore been assessed in one table for the construction phase.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-199: SPH5: Increased potential of invasion by alien vegetation

IN	CREASED P	OTENTIAL OF INVASION BY ALIEN VEGET	TATION	
PROJECT PHASE	PROJECT PHASE Construction Phase			
DIRECT IMPACT				
INDIRECT IMPACT	Increased	l potential of invasion by alien vegetation		
CUMULATIVE IMPACT	Habitat d	egradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-42	moderate - negative		
	F	PROPOSED MITIGATION MEASURES		

An independent Environmental Control Officer (ECO) must be appointed to oversee all construction activities monthly All areas cleared of natural vegetation must be rehabilitated. Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays and other cleared areas. Only indigenous grasses found in the area must be used for rehabilitation. This must be advised by the botanist

An invasive alien plant species management and monitoring plan must be implemented during the construction phase. Monitoring should continue into the operational phase and through and for a period after decommissioning. This should be advised by the botanist

All alien seedlings and saplings must be removed as they become evident for the duration of construction and during the operational phase. Manual / mechanical removal is preferred to chemical control

All construction vehicles and equipment must be free of plant material before entering the site

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	_	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		_
Hiah				

(k) Transport Impact

Traffic impacts anticipated to occur during the construction phase of the project are construction related traffic and noise and dust pollution.

Two technology alternative for the BESS have been proposed. There is no difference in the impacts from a traffic perspective between the alternatives.

Table 7-200: SPH5: Traffic Impacts – Construction Phase

		TRAFFIC IMPACT		
PROJECT PHASE	Constructi			
DIRECT IMPACT		ngestion due to an increase in traffic o	caused by the trans	portation ofequipment,
DIRECT IMPACT		ınd staff to site		
INDIRECT IMPACT		ion traffic on roads might generate dus	st and noise.	
CUMULATIVE IMPACT	Traffic del	ays on the surrounding road network.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION	I	
DURATION	2	The duration of the activity		
201		associated with the impact will		
		last 6-18 months and as such is		_
		rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as		
		Local as it affects the development		
		area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated		
		as Moderate negative as the		
		affected environment is altered but		
		natural, cultural and social		
		functions and processes continue		
		albeit in a modified way; and	Slightly Detrimental	
		valued, important, sensitive or		- ···
		vulnerable systems or communities		Definite
		·		
		are negatively affected		
IMPACT ON		No irreplaceable resources will		
IRREPLACEBLE		beimpacted.		
RESOURCES		•		
SIGNIFICANCE	-30	low negative POSED MITIGATION MEASURES		
Stagger component delivery t		POSED WITTIGATION WEASONES		
Reduce the construction perio		وا:		
		e), I roads and the access road to the site)	during the constru	ction phase acreauired
		internal roads and the access road i		
	ivei rodus (internal rodas and the access roda i	to the site) by the	Contractor during the
construction phase.	ants and au	arries in close proximity to the site (if a	wailahla and faasih	la), and
Staff and general trips should			ivaliable and Jeasibi	e); unu
Stajj una general trips snoula	occur outsi	POST-MITIGATION		
	2	The duration of the activity		
DURATION		associated with the impact will		
		last 6-18 months and as such is		
	_	ratedas Short term	5	1
EXTENT	3	The extent of the impact is rated as		
		Local as it affects the		
		development area and adjacent		
		properties		
CEVEDITY	-1	The severity of the impact is rated		
SEVERITY		as Low negative as the impact		
		affects the environment in such a		
		way that natural, cultural and	Negligible	Unlikely
		socialfunctions and processes are		
		minimally affected		

IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will beimpacted.			
SIGNIFICANCE	-15	very low negative			
CONFIDENCE LEVEL					
Medium					

(I) Landscape and Visual Impact

Four visual impacts were identified for SPH5 during the construction, operational phase and decommissioning phase

- Landscape change
- Impact on Protected Areas
- Impact on local roads
- Impact on homesteads
- Light pollution

These impacts would all occur during the construction, operation and decommissioning phase. Impacts would peak once the facility is constructed, remain relatively constant during the operational phase and then decrease during the decommissioning phase.

The type of battery technology used in the BESS would not impact on the assessment of visual impacts and so the tables below cover both technology options.

Table 7-201: SPH5 Landscape change

		LANDSCAPE CHANGE		
		n, Operational & Decommissioning Pho of construction, be relatively constant		
PROJECT PHASE	peak levels	during decommissioning.		
DIRECT IMPACT	Change of c	haracter due to industrialisation of a No	atural Landscape	
INDIRECT IMPACT				
CUMULATIVE IMPACT	Extension of	f landscape industrialisation due to othe	er electrical infrastructur	e projects
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
	_	PROPOSED MITIGATION MEASURES	S	

Plan to maintain the height of structures as low as possible relative to existing ground levels;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

Monitor areas for vegetation cover post-decommissioning and implement remedial actions.

	POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			

CONFIDENCE LEVEL

High

NOTES

- 7. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 8. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-202: SPH5 Industrialization of the landscape as seen from Nielsview NR

SPH5 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM NIELSVIEW NR					
		Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on			
	completion	of construction, be relatively constant of	during operation and dec	crease again from peak	
PROJECT PHASE	levels during	g decommissioning.			
DIRECT IMPACT	Industrialisa	ation of the view from Nielsview NR due	e to this project.		
INDIRECT IMPACT					
	Extension o	f industrialisation of views from Pro	tected Areas due to thi	is and other electrical	
CUMULATIVE IMPACT	infrastructu	re projects			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
		The duration of the activity			
DURATION	4	associated with the impact will last			
DONATION	4	more than 5 years and as such is			
		rated as Long Term	0	3	
		The extent of the impact is rated as			
EXTENT	3	Local as it affects the development			
		area and adjacent properties			
SEVERITY	0	Negligible			
IMPACT ON		No impolence his recovered will be			
IRREPLACEBLE	0	No irreplaceable resources will be	Negligible	Definite	
RESOURCES		impacted.			
SIGNIFICANCE	0	very low negative			
		PROPOSED MITIGATION MEASU	RES		

Plan to maintain the height of structures as low as possible relative to existing ground levels;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	0	very low negative		

CONFIDENCE LEVEL

High

NOTES

- 7. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 8. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-203: Industrialization of the landscape as seen from local roads, SPH5

INI	DUSTRIALISA [*]	TION OF THE LANDSCAPE AS SEEN FROM	LOCAL ROADS, SPH5		
PROJECT PHASE	Constructio	n, Operational & Decommissioning Phases	S		
DIRECT IMPACT	Industrialis	ndustrialisation of the view from local roads due to this project.			
INDIRECT IMPACT					
		of industrialisation of views from local	l roads due to this d	and other electrical	
CUMULATIVE IMPACT	infrastructu			1	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental		
SIGNIFICANCE	-21	low negative			
		PROPOSED MITIGATION MEASURES			
Plan site levels to minimis	e earthworks	to ensure that levels are not elevated;			
Plan to maintain the heigi	ht of structure	es as low as possible;			

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development; Construct and/or plant a 2m high screen along the southern edge of the array cluster Plan to protect existing natural site features such as drainage pans; Reinstate any areas of vegetation that have been disturbed during construction; Remove all temporary works; Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions; Remove infrastructure not required for the post-decommissioning use of the site; POST-MITIGATION duration of the activity associated with the impact will last **DURATION** 4 more than 5 years and as such is rated as Longt term n 3 The extent of the impact is rated as **EXTENT** 3 Local as it affects the development area and adjacent properties **SEVERITY** O Negligible ON **IMPACT** No irreplaceable resources will be Definite Negligible IRREPLACEBLE 0 impacted. **RESOURCES** SIGNIFICANCE 0 very low negative **CONFIDENCE LEVEL**

High

NOTES

- 9. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 10. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-204 SPH5: Industrialization of the landscape as seen from local homesteads

SPH5 I	SPH5 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM LOCAL HOMESTEADS			
Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on				
	completion	of construction, be relatively constant du	ring operation and decre	ase again from peak
PROJECT PHASE	levels during	g decommissioning.		
DIRECT IMPACT	Industrialisa	ation of the view from local homesteads a	lue to this project.	
INDIRECT IMPACT				
		f industrialisation of views from local h	omesteads due to this	and other electrical
CUMULATIVE IMPACT	infrastructu	re projects		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	æ
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURES	<u> </u>	

Plan to maintain the height of structures as low as possible;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Construct / grow 2m high screen along SW and E edges of solar cluster closest to affected homesteads;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

	POST-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-18	very low negative		

CONFIDENCE LEVEL

High

NOTES

- 7. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 8. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-205 SPH5 Light pollution

		SPH4 LIGHT POLLUTION			
		Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on completion of construction, be relatively constant during operation and decrease again from peak			
PROJECT PHASE	levels during	g decommissioning.			
DIRECT IMPACT	Light polluti	on from the project spoiling the night tim	ne environment and nuis	ance to neighbors.	
INDIRECT IMPACT					
CUMULATIVE IMPACT	Extension of	f light pollution due to this and other elec	trical infrastructure proj	ects	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as	-14	3	
EXTENT	3	Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite	

IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	-42	moderate - negative				
		PROPOSED MITIGATION MEASURES				
Use low key lighting arour	nd buildings a	nd operational areas that is triggered only	when people are prese	nt;		
Utilise infra-red security sy	stems or mot	ion sensor triggered security lighting;				
Ensure that lighting is focu	ised on the de	evelopment with no light spillage outside t	the site;			
No tall mast lighting shoul	ld be used;					
		POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur				
SEVERITY	0	Negligible				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite		
SIGNIFICANCE 0 very low negative						
CONFIDENCE LEVEL						
High						
		NOTES				

^{7.} The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.

7.6.4 Operational Phase

(a) Agricultural Impact

During the operational phase, areas that where vegetation will remain cleared such as access routes, will remain at risk of soil loss through erosion. During the operation phase, staff and maintenance personnel will access the development area to maintain the infrastructure and make repairs, where required. Biodegradable detergents and water will be used to clean the panels, however this is not expected to result in impacts from an agricultural perspective. The assessment of these impacts are summarised in **Table 7-44** and **Table 7-45**.

Table 7-206: SPH5 Impact significance of soil loss through erosion during the operation phase

SOIL LOSS THROUGH EROSION					
PROJECT PHASE	Operation	n Phase			
DIRECT IMPACT		Areas where soil surfaces will remain bare such as access routes and between PV arrays, will remain at risk of soil erosion.			
INDIRECT IMPACT	Eroded a	Eroded areas can expand into nearby areas and result in land degradation.			
CUMULATIVE IMPACT	Increase i	Increase in areas at risk of soil erosion.			
DIMENSION	RATING	NG MOTIVATION CONSEQUENCE LIKELIHO			
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3	

^{8.} The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

EXTENT	2	The extent of the impact is rated as site as it will affect only the development area				
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite		
IMPACT ON						
IRREPLACEBLE	1	Irreplaceable resources will be impacted.				
RESOURCES						
SIGNIFICANCE	-42	moderate - negative				
	PROPOSED MITIGATION MEASURES					
regularly be monitored to	detect earl	ternal access routes, as well as areas bor y signs of soil erosion on-set.		opment area, must		
If soil erosion is detected,	the area m	ust be stabilised using geo-textiles and facili	tated re-vegetation.			
		POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		
IMPACT ON						
IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-18	very low negative	-			
CONFIDENCE LEVEL						

Table 7-207: SPH5 Impact significance of soil pollution during the operation phase

SOIL POLLUTION						
PROJECT PHASE	Operation	Operational phase				
DIRECT IMPACT	· ·	oil pollution caused by oil and fuel spills or maintenance materials and domestic waste left on				
		replacement of electrolyte of the redox flow		•		
INDIRECT IMPACT		risk of pollutant uptake by vegetation with ental and human health	in the development	area that can affect		
CUMULATIVE IMPACT	Increase i	n areas at risk of soil pollution				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	14	4		
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-14	1		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and	Moderately Detrimental	Unlikely		

High

IMPACT	ON		processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	
IRREPLACEBLE		1	Irreplaceable resources will be impacted.	
RESOURCES				
SIGNIFICANCE		-14	very low negative	

PROPOSED MITIGATION MEASURES

Maintenance must be undertaken regularly on all vehicles and maintenance machinery to prevent hydrocarbon spills.

No domestic and other waste must be left at the site and must be transported with the maintenance vehicles to an authorised waste dumping area.

Regularly monitor the BESS area for any signs of oil, grease and fuel spillage or the presence of waste.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	4
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-6	very low negative		
CONFIDENCE LEVEL				
High	•			

(b) Aquatic Impact

During the operation phase, the solar arrays will operate largely unattended and with low maintenance required for more than 20 years. The hard surfaces created by the development may lead to increased runoff. This may lead to increased erosion and sedimentation of the downslope areas. A localised long-term impact (more than 20 years) of low intensity (depending on the distance between the solar arrays and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified aquatic ecosystems in the area.

The only potentially toxic or hazardous materials which would be present in relatively small amounts would be of lubricating oils and hydraulic and insulating fluids. Therefore, contamination of surface or groundwater or soils is highly unlikely.

Significance of impacts after mitigation: The overall significance of the impact on the aquatic ecosystems is expected to be very low. The impacts are rated the same for the battery technology alternatives for the BESS.

Table 7-208: SPH5 Operational phase aquatic ecosystem impacts

PROJECT PHASE O							
FROJECTFTIASE	peration)	Operational phase					
DIRECT IMPACT D	isturband	ce of aquatic habitat; water quality impacts					
INDIRECT IMPACT N	/odificati	on of flow and alien vegetation invasion in aquatic	features				
CUMULATIVE IMPACT	egradati	on of the ecological condition of aquatic ecosyster	ms				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION		The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term	-12	2			
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area					
SEVERITY		The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Likely			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental				
SIGNIFICANCE	-24	very low negative					

PROPOSED MITIGATION MEASURES

Any disturbance during the operation phase should be limited to the approved development footprints and should avoid disturbance of the soil and natural vegetation cover.

Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areasdo not become infested with invasive alien plants.

Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwaterleaving developed areas.

Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider. In a scenario where services are installed, these systems need to be adequately installed and maintained to prevent any potential contamination of the water resources on site.

		POST-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term The extent of the impact is rated as site as it	-6	2	
		will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Likely	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-	12 very low negative			
CONFIDENCE LEVEL					
Medium					

(c) Avifaunal Impact

(i) Bird fatality at PV facility

Bird fatalities could occur at the site through a number of mechanisms, including collision with PV panels, entanglement in perimeter fence (less likely since developer has chosen to use mesh panel fencing which has a tight weave and birds are less likely to become entangled),

electrocution in substations/electrical compounds and others. The battery technology options for the BESS are rated the same and are both covered in the same table.

Table 7-209: SPH5 bird fatality during operational phase

		BIRD FATALITY AT PV FACILITY		
PROJECT PHASE	Operational phase			
DIRECT IMPACT	Birds killed	through various interaction with facility infrastr	ucture	
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	More projec	cts will result in overall higher fatality rates in th	ne area	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		
		PROPOSED MITIGATION MEASURES		

None required at this stage. Once operational, if facility staff identify any fatalities this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. Operational phase bird monitoring should be conducted for at least one year as per the best practice guidelines – see Section 8.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	o	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		
CONFIDENCE LEVEL				
Medium	•			

(ii) Nesting & other use of facility infrastructure by birds

Certain species, in particular doves, pigeons, weavers and crows, are likely to use some of the facility infrastructure for nesting, perching and roosting. At face value this is a positive impact for birds and has been rated as VERY LOW POSITIVE significance both pre and post mitigation. However, where nesting interferes with the operation of the facility this could cause conflict and require management. Nesting on infrastructure also increases the likelihood of bird fatalities occurring through the various mechanism, particularly of young inexperienced birds.

No mitigation is required for the impact of the facility on birds through nesting. For the impact of the birds nesting on the facility, the specialist recommends nest management on a case by case basis under the supervision of an avifaunal specialist, and in conformance with all relevant national and provincial legislation. The impact is rated the same for the both battery technology alternatives for the BESS.

Table 7-210: SPH4 impact of bird nesting and other use of facility infrastructure by birds

	BIRD N	IESTING, PERCHING & ROOSTING AT PV FACILITY	1	
PROJECT PHASE	Operationa	l phase		
DIRECT IMPACT				
INDIRECT IMPACT	Birds use in	frastructure to perch, roost or nest on		
	More proje	cts in the area will probably diminish the likel	ihood of this happ	pening as perch
CUMULATIVE IMPACT	availability	will increase		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Beneficial	
SIGNIFICANCE	7	very low positive		
		PROPOSED MITIGATION MEASURES		

None required at this stage. Once operational, if facility staff identify any nesting which interferes with operations this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. All nest management measures should only be undertaken in compliance with national and provincial environmental legislation in this regard.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	4
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	,	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	7	very low positive		
CONFIDENCE LEVEL				
Medium	•		•	

(d) Bats Impact

Day to day operation and maintenance of the facility may result in disturbance and displacement of bats. The impact is rated the same for both battery technology options for the BESS.

Table 7-211: SPH5 disturbance and displacement effects for bats

	IMPACT OF	N POSSIBLE DISTURBANCE & DISPLACEMENT EFF	ECTS	
PROJECT PHASE	Operationa			
DIRECT IMPACT	'	e of bats during operational activities		
INDIRECT IMPACT	Displaceme			
CUMULATIVE IMPACT	Unavailabili	ty of suitable foraging resources in the broader en	vironment for displa	ced individuals
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		suchis rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it		
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes	Cliabtly	
		are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON			Detrimental	
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES				
SIGNIFICANCE	-7	very low negative		
		PROPOSED MITIGATION MEASURES		
Limit operational and main	tenance activ	ities to daylight hours, as far as possible, and mini	imise lighting at nig	ht.
All lighting should preferab	ly use low pre	ssure sodium and warm white LED lights.		
Operational and maintenar	nce activities s	hould be limited to the immediate project footpr	int only.	
Site access should be strictl	y controlled,	to avoid unnecessary disturbance.		
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		suchis rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it		
EXICIVI	2	will affect only the development area		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes	Slightly	Unlikely
		are minimally affected	detrimental	Offlikely
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES				
SIGNIFICANCE	-7	very low negative		
		CONFIDENCE LEVEL		
Medium				

Table 7-212: SPH5 bat roost disturbance

		MPACT ON POSSIBLE ROOST DISTURBANCE		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Disturbance	of roosting bats during operational activities		
INDIRECT IMPACT	Roost aban			
	Unavailabili	ity of suitable roosting resources in the brod	ader environment	for abandoned
CUMULATIVE IMPACT	individuals	, ,		•
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION	,	I.
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
	-	such is rated as Long Term	-7	1
	_	The extent of the impact is rated as site as it	·	_
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
		albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems or	Slightly	Unlikely
		communities are negatively affected	Detrimental	,
IIMPACT ON		5 , 33		
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES		,		
SIGNIFICANCE	-7	Low negative		
	PROPOSED	MITIGATION MEASURES TO BE INCLUDED IN THI	E EMPr	
All lighting should preferable	ly use low pre	ssure sodium and warm white LED lights.		
During operational and ma	intenance act	ivities, avoid all movement and noise around med	lium sensitivity ared	is.
Operational and maintenar	ice activities s	hould be limited to the immediate project area.		
Site access should be strictly	, controlled, t	o avoid unnecessary disturbance.		
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		such is rated as Long Term	-7	1
EV/TENIT	2	The extent of the impactis rated as site as it		
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes are	Slightly	Unlikalı
		minimally affected	detrimental	Unlikely
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES				
SIGNIFICANCE	-7	very low negative	-	
		CONFIDENCE LEVEL		
Medium				
-				

(e) Botanical Impacts

Maintenance activities will require management of vegetation which may result in loss of natural vegetation. The impact is rated the same for both battery technology options for the BESS.

Table 7-213: SPH5 loss of Western Free State Grassland during operational phase

		LOSS OF VEGETATION		
PROJECT PHASE	Operationa			
DIRECT IMPACT	Direct impa	ct		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION	· · · · ·	
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-5	1
EXTENT	1	The extent of the impact is the footprint as it only affects the area in which the proposed activity will occur.	,5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
		aring should be undertaken during the dry seasor	1.	
Only clear vegetation where				
		will be decided and approved by the Project M	anager and appoin	ted ECO before
construction commences or	site and shou	uld not be located within drainage lines.		
	ı	POST-MITIGATION		
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	-2	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-2	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-2	very low negative		
		CONFIDENCE LEVEL		
Medium				

(f) Groundwater Impact

Similar to the construction phase, the operational phase of the SPH5 will require approximately 1,000 m^3/a (0.03 L/s). This does not exceed the regionally mapped yield of the underling aquifer (0.5 – 2.0 L/s). It is not currently planned to use groundwater for the operational phase of this project however if this changes a water use licence will need to be applied for and the potential impacts and mitigation measures are presented in **Table 7-214**.

The principal risks for groundwater contamination that have been identified are the use of cleaning agents for cleaning of PV panels and for dust suppression of internal roads. If required, it is encouraged that water alone is used to conduct these tasks. Alternatively, the PV cleaning agents and dust suppression mixes must be environmentally friendly and should breakdown naturally without causing ingression of harmful chemicals into the environment. The risks and status of groundwater contamination occurring during the operational phase of SPH4 is presented in **Table 7-125**.

The proposed development will require a BESS. Currently two different technologies are being considered, i.e. either Solid State Lithium Batteries (SSLB) or Vanadium Redox Flow Battery Energy Storage Systems (VRFB). Both of these two BESS systems require an electrolyte. The SSLB contain an ethylene carbonate or di-ethyl carbonate electrolyte and the VRFB system will require that an estimate of 3 000 m³ of sulfuric acid solution with vanadium ions electrolyte is stored on site for each Springhaas Facility. The BESS systems will also require cooling systems and these systems could potentially either be water based or it may be refrigerant based systems which used chemicals such as ethylene glycol- based coolants.

The containers that the BESS systems are held in are equipped with a "Clean agent" which is a fires suppression systems that can release a powder/gas into the container to snuff fires. These systems usually leave a residue on the equipment that will need to be cleaned off. With any chemical storage there is always a risk of chemical fires that will need to be put out with water or foam and the waste water from these activities could contain contaminants that should not be let to run off into the environment.

The fire safety systems, refrigerants, electrolyte solutions and the waste products produced from these systems could contaminate the soil and groundwater and all measures should be taken to prevent leaks or spills on the ground. The risks and mitigations for the BESS are presented in **Table 7-126**.

The impact on groundwater levels is rated the same for both battery technology alternatives for the BESS.

Table 7-214 SPH5: Impact of lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place)

Potential impact on groundwater level due to over abstraction					
PROJECT PHASE	Operational	Phase			
DIRECT IMPACT	Lowering of	groundwater level due to over abstraction			
INDIRECT IMPACT	Drying of sp	rings in the area			
CUMULATIVE IMPACT	Permanent (damage to the aquifer system in the area			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
	PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-16	2	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected	Moderately	Likely	

IMPACT ON IRREPLACEBLE RESOURCES	1	environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected Irreplaceable resources will be impacted.	Detrimental	
SIGNIFICANCE	-32	low – negative		
		PROPOSED MITIGATION MEASURES		
		rectly yield tested according to the National Sta This includes a Step Test, Constant Discharge Te		
Adhere to the boreho	le's safe yield	and to monitor water levels and flow.		
Groundwater abstrac	tion volumes	must be monitored.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	2	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	0	1
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
Medium				

Table 7-215: SPH5 Impact of contamination of groundwater as a result of cleaning agents used for cleaning the solar panels

Potential impact on groundwater as a result of cleaning agents used for cleaning the solar panels.						
PROJECT PHASE	Operationa	Operational Phase				
DIRECT IMPACT	Contaminat	ion of groundwater				
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area				
CUMULATIVE IMPACT	Long-term r	educed groundwater quality				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with				
		the impact will last more than 5 years and				
		as				
		such is rated as Long Term	-16	2		
EXTENT	3	The extent of the impact is rated as Local as	10	2		
		it affects the development area and				
		adjacent				
		properties				
SEVERITY	-2	The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural, cultural				
		and social functions and processes continue				
		albeit in a modified way; and valued,				
		important, sensitive or vulnerable systems	Moderately	Likely		
		or	Detrimental	LIKETY		
		communities are negatively affected				
IMPACT ON	1	Irreplaceable resources will be impacted.				
IRREPLACEBLE	_					
RESOURCES						
SIGNIFICANCE	-32	low - negative				
PROPOSED MITIGATION MEASURES						
Use environmentall that will not cause o		g agents that breakdown naturally (biodegrads. s.	dable detergents/g	reen soaps) and		

	POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur				
SEVERITY	0	Negligible	Negligible	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	0	very low negative				
CONFIDENCE LEVEL						
Medium						

Redox flow batteries contain electrolyte solution which needs to be replaced approximately every 15 to 20 years. During replacement of electrolyte there is a risk of leaks or spills. This impact is only applicable to the redox flow batteries as lithium-ion batteries are solid state batteries.

Table 7-216: SPH5 Impact table for contamination of groundwater quality as a result of leaking or spills from the electrolyte solution from the battery energy storage system (BESS)

Potential impact on gr	oundwater qualit	ty as a result of leaking or spills from t	he electrolyte soluti	on from the
	•	tery energy storage system (BESS)	,	
PROJECT PHASE	Operational Pho	ase		
DIRECT IMPACT	Contamination	of groundwater		
INDIRECT IMPACT		vegetation or ecosystem it the area		
CUMULATIVE IMPACT	Long-term redu	ced groundwater quality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or Communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		
	PRO	OPOSED MITIGATION MEASURES		

Ensure that all electrolyte or chemicals stored or used on site have secondary containments systems in place with reliable leak detection, annunciation in place. Ensure that all chemicals are handled on concrete bunded surfaces and not on bare soil.

Any waste products produced form the BESS systems should be removed and disposed of appropriately.

Waste water produced by fire hydrants should not be allowed to runoff into the environment.				
POST-MITIGATION POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	Ü	1
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
CONFIDENCE LEVEL				
Medium				

(g) Heritage Impact

(i) Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts during operation of SPH5 relate only to the presence of the facility in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the facility. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a degree of change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. The impacts are the same for both technology options for the batteries for the BESS.

Table 7-217: SPH5: Assessment of operation phase impacts to the cultural landscape

CULTURAL LANDSCAPE IMPACTS					
PROJECT PHASE	PROJECT PHASE Operation Phase				
DIRECT IMPACT	Alteration (Alteration of the rural landscape character through the presence of a solar energy facility			
INDIRECT IMPACT	None				
CUMULATIVE IMPACT	Impacts wi	ll be greater with multiple facilities being preser	nt		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-7	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental		
SIGNIFICANCE	-21	low - negative			
	PROPOSED MITIGATION MEASURES				
Keep all maintenance wor	k within the	authorised footprint.			

Minimise night-time light	pollution in a	the area (visual recommendations to be followed	to achieve this).	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	_
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-7	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

(h) Socio-Economic Impact

(i) Stimulation of the Local Economy during operations

The operational period of SPH5 is a minimum of 20 years. Of the money spent annually during the operations period, a significant portion will likely comprise of salaries and wages of the Springhaas employees. The operations of the facility will make some contribution towards the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

No differentiate can be made between the and battery technology alternatives for the BESS. The technology alternatives are considered in **Table 7-56** and **Table 7-57**.

Table 7-218: SPH5: Assessment of Economic stimulation during operations

STIMULATION OF THE LOCA	L ECONOMY	DURING OPERATIONS			
PROJECT PHASE	Operation	Operational Phase			
DIRECT IMPACT	Long-tern	n increase in production and GDP in the local eco	поту		
INDIRECT IMPACT	Improved	household income and increased business sales i	n the local econom	у	
CUMULATIVE IMPACT	Increase i	n production and GDP in the regional economy			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	- 8	3	
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite	

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
PROPOSED MITIGATION MEA	SURES			
Where feasible, procure goods	s and servi	ces required for the operation of the plant from th	e local economy	
POST-MITIGATION				
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	16	3
		The extent of the impact is rated as Regional	10	3
EXTENT	4	as the effects of the impact extends beyond		
		municipal boundaries		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or	Moderately Beneficial	Definite
		communities are positively affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be impacted.		
RESOURCES		cp.accasic resources will be impacted.		
SIGNIFICANCE	48	moderate positive		
CONFIDENCE LEVEL				
High				_

(ii) Creation of Employment and increased household income during operations

The operation of SPH5 will require functional and maintenance employees. It is envisaged that about eight direct jobs per facility will be created during the operations phase, which will occur for a duration of 20 years. About 70% of these jobs are to be filled by people from the local communities as they will be low-skilled employment opportunities. Employment of the eight individuals for the entire operational period will increase their household income, improve their standard of living and benefit their families.

SPH5 will create the same number of employment opportunities, regardless of its location on the site; thus, layout alternatives are equally preferred. The type of battery used in the BESS will also not significantly affect employment alternatives, thus both technology alternatives are equally preferred.

Table 7-219: SPH5 Assessment of employment during operations

CREATION OF EMPLOYMENT AND INCREASED HOUSEHOLD INCOME DURING OPERATIONS					
PROJECT PHASE	Operation	al Phase			
DIRECT IMPACT	Creation o	f permanent employment opportunities in the	local and regional	economy	
INDIRECT IMPACT	Improved	Improved income of households whose members are employed on the project			
CUMULATIVE IMPACT	Creation o	Creation of permanent employment opportunities in the region			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
PRE-MITIGATION	PRE-MITIGATION PRE-MITIGATION				
		The duration of the activity associated with			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and	8	3	

EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
PROPOSED MITIGATION MEAS	SURES			
Where feasible, aim to fill all t	he positions	by labour from the local community		
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	8	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		3
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		•
CONFIDENCE LEVEL				
High				

(iii) Improved municipal service delivery

SPH5 will have a capacity of up to 150MWac and will be connected to the national grid through Eskom substation and generated electricity will be sold nationwide. The proposed project, albeit relatively small, will contribute towards improving National electricity availability; thus, improving the government service delivery, and could potentially also aid in growing the local economy by increasing the overall supply of electricity in the local economy. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas.

The layout alternatives and BESS technology alternatives will not affect the capacity of the solar facility; thus all alternatives are equally preferred.

Table 7-220: SPH5: Assessment of service delivery improvement

IMPROVED MUNICIPAL SERVICE DELIVERY				
PROJECT PHASE	Operational phase			
DIRECT IMPACT	It will likely Improve the local electricity supply if fed to the grid			
INDIRECT IMPACT	Improved standard of living within the region			
CUMULATIVE IMPACT	Improved electricity availability			

DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION	_			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	48	moderate positive	<u> </u>	
PROPOSED MITIGATION	MEASURES			
No mitigations proposed				

(iv) Reduction of Land Area available for productive farming

The proposed site of SPH5 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH5 as being of low to very low agricultural potential with one small isolated patch of low — moderate potential land. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH5 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH5.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The different battery technology alternatives will not affect the impact ratings.

Table 7-221: SPH5: Assessment of Impact on agricultural production

Reduction of Land Area available for Productive Farming					
PROJECT PHASE	Operation				
DIRECT IMPACT	Loss of ag	gricultural production within the footprint a	lue to land sterilisatio	on	
INDIRECT IMPACT	Negligibi	e to no indirect impact			
CUMULATIVE IMPACT	Negligible	e to no cumulative effects			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
		The duration of the activity associated			
DURATION	4	with the impact will last more than 5			
		years and as such is rated as Long Term	6	3	
		The extent of the impact is rated as	b	3	
EXTENT	1	footprint as it only affects the area in			
		which the proposed activity will occur			
		The severity of the impact is rated as			
		Low negative as the impact affects the			
SEVERITY	-1	environment in such a way that natural,		Definite	
		cultural and social functions and			
		processes are minimally affected	Negligible		
IMPACT ON		Irreplaceable resources will be			
IRREPLACEABLE	1	impacted.			
RESOURCES		mpactea.			
SIGNIFICANCE	-18	very low negative			
		PROPOSED MITIGATION MEASURES			
		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming	
after the closure of the pro	ject.	POST-MITIGATION			
		The duration of the activity associated			
DURATION	4	with the impact will last more than 5			
Bollytholy	-	years and as such is rated as Long Term			
		The extent of the impact is rated as	6	3	
EXTENT	1	footprint as it only affects the area in			
27.1.2.11	_	which the proposed activity will occur			
		The severity of the impact is rated as			
		Low negative as the impact affects the			
SEVERITY	-1	environment in such a way that natural,			
	_	cultural and social functions and		_	
		processes are minimally affected	Negligible	Definite	
IMPACT ON					
IRREPLACEABLE	1	Irreplaceable resources will be			
RESOURCES		impacted.			
SIGNIFICANCE	-18	very low negative			
		CONFIDENCE LEVEL			
High					

(i) Terrestrial Biodiversity and Animal Species

(i) Direct Impacts – Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death.

Regarding the technology alternative for the type of battery used in the BESS for SPH5, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the

surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-222: SPH5 Injury or death to fauna

		ALL FACILITIES		
PROJECT PHASE	Operation			
DIRECT IMPACT		death to fauna		
INDIRECT IMPACT				
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
Bildicitation	IXATING	PRE-MITIGATION	CONSEQUENCE	LIKELITIOOD
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
BOWTION	-	years and as such is rated as Long Term		
		The extent of the impact is rated as	-16	2
EXTENT	3	Local as it affects the development		
EXTENT		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
		cultural and social functions and		
SEVERITY	-2	processes continue albeit in a modified		
		way; and valued, important, sensitive	Moderately	Likely
		or vulnerable systems or communities	detrimental	Likely
		are negatively affected		
IMPACT ON IRREPLACEABLE		Irreplaceable resources will be		
RESOURCES	1	impacted		
SIGNIFICANCE	-32	low negative		
SIGINITEARCE	-32	PROPOSED MITIGATION MEASURES		
No wild animal may under any	circumstan	ce be handled, removed or be interfered w	ith hy maintenance s	taff
		, drivers of maintenance vehicles must rem		
		t should be adhered to (recommended 40		ssibility of utilitials
	_	prevent attraction of faunal species to hun		ra scavangar proof
		osed of in the most appropriate way to pre		
becoming habituated to human		osed of in the most appropriate way to pre	verit juuriur species ru	namy the bins and
		ures must be in place. A fire emergency mo	anaaement nlan must	he in place
		ed on a regular basis to minimise the risk o		. De III place
All electrical equipment must be	emamame	POST-MITIGATION	y jire	
DURATION	4	The duration of the activity associated with the impact will last more than 5		
DOMATION	-	years and as such is rated as Long Term		
		The extent of the impact is rated as	-6	1
EVTENT	1	footprint as it only affects the area in		
EXTENT	1	, , , , , , , , , , , , , , , , , , , ,		
		which the proposed activity will occur		
		The severity of the impact is rated as Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that		
SEVENITI	-1	natural, cultural and social functions	Negligible	Unlikely
		and processes are minimally affected	Negligible	Offlikely
IMPACT ON IRREPLACEABLE				
RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-6	very low negative		
JIGHII ICANCL	U	CONFIDENCE LEVEL		
Liah		CONFIDENCE LEVEL		
High				

(ii) Indirect Impacts – Pollution and contamination of natural areas

During operations, release of grey water into the environment can cause contamination by detergents. Grey water from cleaning of the solar panels has the potential to contaminate soils and ground water and be washed into the nearby natural pans during high rainfall events. This includes biodegradable detergents used for cleaning the panels, which can accumulate in the soil and be washed into the nearby pans before they break down. Biodegradable detergents can alter the balance of freshwater ecosystems as they promote bacterial growth and lower oxygen levels. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-223: SPH5 Pollution and contamination of natural areas including pans and wetland

POLLUTION ANI	D CONTAM	INATION OF NATURAL AREAS INCLUDING	PANS AND WETLA	NDS
PROJECT PHASE	Operation			
DIRECT IMPACT	,			
INDIRECT IMPACT	Pollution	and contamination of natural areas – incl	uding nearby pans (or wetlands
CUMULATIVE IMPACT	Habitat a	legradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	21	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-21	3
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-63	high negative		

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-12	2

High				
CONFIDENCE LEVEL				
SIGNIFICANCE	-24	very low negative		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Likely

(iii) Indirect Impacts - Disturbance and displacement of fauna

Security lights for SPH4 during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland and rocky outcrops adjacent to the facility, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-224: SPH5 Disturbance and displacement of fauna – natural grassland and rocky outcrops

DISTURBANCE AND DISPLACEMENT OF FAUNA – NATURAL GRASSLAND				
PROJECT PHASE	Operation	nal Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland and rock	y outctops
CUMULATIVE IMPACT	Displacer	nent of fauna		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	1	PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-48	low negative		
	ı	PROPOSED MITIGATION MEASURES		

Operations during the night must be avoided to minimise the need for artificial lighting and to reduce the impact of light and noise on nocturnal animals

Lighting during operations should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-7	very low negative	<u> </u>		
		CONFIDENCE LEVEL			
High					

(j) Traffic Impact

During the operational phase there will be approximately 8 full time employees on site. Vehicles would access the site for daily operations and maintenance as and when required. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-225 SPH5: Traffic impacts during operation phase

		TRAFFIC IMPACTS			
PROJECT PHASE	Operational Phase				
DIRECT IMPACT		Traffic congestion due to the trips generated by the operation of the facility			
INDIRECT IMPACT	The associ	ated noise and dust pollution			
CUMULATIVE IMPACT		ays on the surrounding road network			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	1	PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will lastmore than 5 years and as such is rated as Long Term	0	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the developmentarea and adjacent properties	-	-	
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite	
SIGNIFICANCE	0	very low negative			
		PROPOSED MITIGATION MEASURES			
Staff and maintenance trips	s should occu	ır outside of peak traffic periods; and			
Client/Facility Manager is t	o ensure tha	t regular maintenance of gravel roads (locate	ed within the site boun	dary,including the	
access road to the site) occ	urs during op	peration phase to minimise/mitigate dust pol	lution.		
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will lastmore than 5 years and as such is rated as Long Term	0	3	
EXTENT	2	The extent of the impact is rated assite as it will affect only the development area			
SEVERITY	0	Negligible	Negligible	Definite	

IMPACT ON	0	No irreplaceable resources will be	
IRREPLACEBLE		impacted.	
RESOURCES			
SIGNIFICANCE	0	very low negative	
	-	CONFIDENCE LEVEL	

7.6.5 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered **Section 7.7**.

7.6.6 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities and is covered in **Section 7.8.**

7.6.7 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The cumulative impact assessment is available in **Section 7.9.**

Table 7-226: SPH5 impact summary

Impact	Nature	Rating pre-mitigation	Rating post mitigation			
Design/Planning/Pre-Construction Phase						
No impacts identified						
Construction Phase						
Agricultural impacts						
Land use change from livestock farming to energy generation	Negative	Moderate	Low			
Soil loss through erosion	Negative	Moderate	Very low			
Impaired soil functionality caused by compaction	Negative	Moderate	Very low			
Impaired soil health as a result of soil pollution	Negative	High	Very low			
Aquatic impacts						
Disturbance and water quality impacts	Negative	Very low	Very low			
Avifaunal impacts						
Destruction of bird habitat during construction	Negative	Low	Low			
Disturbance of birds during construction	Negative	Very low	Very low			
Bat impacts	,					

Bat habitat modification	Negative	Very low	Very low
Disturbance and displacement of bats	Negative	Very low	Very low
Possible roost disturbance	Negative	Low	Very low
Bat roost destruction	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Medium	Low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place)	Negative	Low	Very low
Contamination of groundwater as a result of accidental oil spillages or fuel leakages	Negative	Very low	Very low
Heritage impacts			
Impact on archaeological sites	Negative	Very low	Very low
Impact on graves	Negative	Low	Very low
Impact on cultural landscape	Negative	Low	Low
Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-economic impacts			
Stimulation of the economy during construction	Positive	Low	Low
Employment opportunities	Positive	Low	Low
Reduction in land available for productive farming	Negative	Very low	Very low
Loss of property	Negative	Low	Very low
Terrestrial biodiversity and animal species (faunal) impacts			
Destruction of faunal habitat	Negative	High	Low
Injury or death to fauna	Negative	Moderate	Very low
Disturbance and displacement of fauna	Negative	Low	Very low
Pollution and contamination of natural areas	Negative	Moderate	Very low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Traffic impacts			
Traffic congestion	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads	Negative	Low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
Operational Phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Soil pollution			
A more than the contract of	Negative	Very low	Very low
Aquatic impacts	Negative	Very low	Very low
Increased run-off, pollution	Negative Negative	Very low	Very low

Disturbance of aquatic habitat; water quality impacts	Negative	Very low	Very low
Avifauna impacts		10.7.0	10.7.011
Bird fatality through interaction with infrastructure	Negative	Very low	Very low
Nesting and use of other infrastructure by birds	Positive	Very low	Very low
Bat impacts		very low	very low
Disturbance and displacement	Negative	Very low	Very low
Roost disturbance	Negative	Low	Very low
Botanical impacts		LOW	very low
Loss of vegetation	Negative	Very low	Vorylow
Groundwater impacts	Hogains	very low	Very low
Lowering of the groundwater level due to over abstraction for	Negative		
operational phase (only applicable if abstraction takes place).	Negative	Low	Very low
Contamination of groundwater from use of cleaning agents	Negative	Low	Very low
Contamination of groundwater from leaks or spills from BESS	Negative	Low	Very low
Heritage impacts			
Impact on cultural landscape	Negative	Low	Low
Socio-economic impacts			
Economic stimulation during operations	Positive	Low	Moderate
Employment opportunities	Positive	Low	Low
Improved service delivery	Positive	Moderate	Moderate
Reduction in land available for productive farming	Negative	Very low	Very low
Terrestrial biodiversity and animal species			
Injury or death of fauna	Negative	Low	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Very low
Disturbance and displacement of fauna –natural grassland and rocky outcrops	Negative	Moderate	Very low
Traffic impact			
Traffic congestion	Negative	Very low	Very low
Palaeontological impacts			
Destruction of fossils	NA	NA	NA
Decommissioning phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Impaired soil health as a result of soil pollution	Negative	High	Very low
Aquatic impacts			
Disturbance of aquatic habitat, water quality impacts	Negative	Very low	Very low
Avifaunal impacts			
Disturbance of birds	Negative	Very low	Very low
Bat impacts			
Disturbance and displacements	Negative	Very low	Very low
Botanical impacts	1		
Loss of vegetation	Negative	Low	Low
	<u> </u>		

Negative	Very low	Very low
Negative	Low	Very low
Nogative/		Very low
Positive	Very low (negative)	(positive)
Positive	Very low	Very low
Positive	Very low	Very low
1 331413	,	10.7.0
1		<u> </u>
Negative	Moderate	Very low
Negative	Moderate	Very low
Negative	High	Very low
Negative	Low	Very Low
Negative	Moderate	Very low
Negative	Very low	Low positive
Negative	Very low	Very low
Negative	Moderate	Low
Negative	Very low	Very low
Negative	Very low	Very low
Negative	Very low	Very low
Negative	Moderate	Very low
Negative	Moderate	Very low
Negative	Very low	Very low
Negative	-	Very low- negligible
Negative	Very low	Very low
Negative	Very low	Very low
Negative	Low	Low
Negative	Very low	Very low
Negative Negative	Very low Very Low	Very low Very Low
	Very low Very Low Low negative	Very low Very Low Very low positive
	Negative/Positive Positive Positive Positive Negative Negative/Positive Positive Positive Very low (negative) Positive Very low Very low Negative Very low Negative	

 $^{^{6}}$ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

	6	T	I
	forgone +		
	impacts		
Destruction of fossils	NA	NA	NA
Landscape and Visual	Negligible	No impact/NA	No
		No inipact/NA	impact/NA
Groundwater Impacts	Negligible	NA	NA
Cumulative impacts			
Agricultural	Negative	Very low	Very low
Aquatic	Negative	Low	Low
Avi-fauna	Negative	Moderate	Moderate
Bats	Negative	Low	Low
Botanical	Negative	Very low	Very low
Heritage	Negative	Moderate	Low
Socio-economic - Impact on the economy- construction	Positive	-	Moderate
Socio-economic -Creation of employment during construction	Positive	-	Moderate
Socio-economic -Reduction in land available for productive farming	Negative	-	Low
Socio-economic -Stimulation of the economy – operations	Positive	-	Moderate
Socio-economic -Employment - operations	Positive	-	Moderate
Socio-economic -Improved municipal service delivery	Positive	-	Moderate
Socio-economic -Loss of property	Negative	-	Low
Socio-economic - Stimulation of economy - decommissioning	Positive	-	Very low
Terrestrial biodiversity	Negative	High	Moderate
Transport	Negative	Low	Very Low
Landscape and visual	Negative	-	Low
Destruction of fossils	NA	NA	NA
Groundwater: Aquifer system and water quality	Negative	Low- Very Low	Low – Very Low

7.7 Springhaas 6 Detailed Impact Assessment

7.7.1 Alternatives Considered

(a) Technology Alternatives

Two technology alternatives namely lithium-ion and redox flow batteries were considered for the BESS.

(b) No-Go Alternative

The no-go alternative was considered for all seven of the proposed facilities. The impact of the no-go alternative was rated as the same for all seven facilities. The no-go alternative is assessed in **Section 7.8**.

7.7.2 Pre-construction phase

No significant impacts for the pre-construction phase have been identified by any specialist studies or by the EAP for SPH6.

7.7.3 Construction Phase

(a) Agricultural Impact

The most significant agricultural impacts associated with the development of SPH6 will occur during the construction phase when the site is fenced off, vegetation is removed and the soil surface is prepared for the installation of infrastructure.

The footprint of SPH6 is fully located in low sensitivity agricultural land.

SPH6 was also classified in terms of agricultural potential. The entire site is classified as a mix of low to very low potential and low to moderate potential land.

Tables 7-173 – 7-176 cover the two technology options for the BESS. There was no difference in the alternatives proposed from an agricultural perspective.

Table 7-227: SPH6: Impact of land use change from livestock farming to renewable energy generation

LANI	LAND USE CHANGE FROM LIVESTOCK FARMING TO ENERGY GENERATION				
PROJECT PHASE	Construction Phase				
DIDECT IMPACT	Construction of boundary fence and PV infrastructure will change land use from livestock				
DIRECT IMPACT	farming to r	enewable energy generation			
	Intensificati	on of agriculture in other areas or otherv	vise reduction of live	stock produced in	
INDIRECT IMPACT	the area				
CUMULATIVE IMPACT	Increase in a	areas where agriculture is converted into o	other land uses		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
		The duration of the activity associated			
DURATION	4	with the impact will last more than 5			
DURATION	4	years and as such is rated as Long			
		Term	-14	3	
		The extent of the impact is rated as			
EXTENT	2	site as it will affect only the			
		development area			
		The severity of the impact is rated as			
		Moderate negative as the affected			
		environment is altered but natural,			
SEVERITY	-2	cultural and social functions and			
SEVERITI		processes continue albeit in a			
		modified way; and valued, important,	Moderately	Definite	
		sensitive or vulnerable systems or	Detrimental	Dejiiite	
		communities are negatively affected			
IMPACT ON		Irreplaceable resources will be			
IRREPLACEBLE	1	impacted.			
RESOURCES		mpacca.			
SIGNIFICANCE	-42	moderate - negative			

PROPOSED MITIGATION MEASURES

Springhaas Solar Facility 3 (Pty) Ltd must provide market-related compensation that will allow the current land users to have the same or better ability to sustain their livelihood.

Ensure that the final infrastructure layout remains within the fenced off area of the development footprint.

Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area.

The use of main access routes by construction vehicles and equipment must do so with consideration of nearby agricultural land users who use the same access routes for farming activities.

All left-over construction material must be removed from site once construction on a land portion is completed.

No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.

No boundary fence must be opened without the landowners' permission.

No open fires made by the construction teams are allowable during the construction phase.

	POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	low - negative			
		CONFIDENCE LEVEL			
High					

Table 7-228: SPH6: Impact significance of soil loss through erosion during the construction phase

		SOIL LOSS THROUGH EROSION			
PROJECT PHASE	Constructio	n Phase			
DIRECT IMPACT	-	Loss of soil particles from areas where construction activities result in the removal of vegetation from the surface.			
INDIRECT IMPACT	Sparse to no	o vegetation growth in eroded area	S.		
CUMULATIVE IMPACT	Increase in	areas exposed to soil erosion			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily	Moderately Detrimental	Definite	

		or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.
SIGNIFICANCE	-54	moderate - negative

PROPOSED MITIGATION MEASURES

Limit vegetation removal from the soil surface to the areas of infrastructure development such as access routes as well as around the foundations of the PV arrays and buildings.

Vegetation clearance must only be undertaken immediately prior to construction activities and only within the development footprint

Once construction of an area has been completed, level any remaining soil removed from excavation pits (where the PV arrays will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface where it is exposed to rain and wind. This is applicable to all construction areas, except where topsoil stockpiles must remain for site rehabilitation of specific areas.

Stormwater channels on site must be designed to minimise the soil erosion risk that results from surface water runoff.

Where possible, conduct the construction activities outside of the rainy season.

	POST-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	E	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
High				

Table 7-229: SPH6: Impact significance of impaired soil functionality caused by compaction

IMPAIRED SOIL FUNCTIONALITY				
PROJECT PHASE	Construct	ion Phase		
DIRECT IMPACT	The weig	ht and movement of vehicles and equipme on.	ent over the surfac	e will result in soil
INDIRECT IMPACT		ed soil have reduced pore space and water in the rate of surface water runoff, especially af	•	pacted soil surfaces
CUMULATIVE IMPACT	Increase i	in areas affected by soil compaction.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will	Moderately Detrimental	Definite

			temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	
IMPACT	ON			
IRREPLACEBLE		1	Irreplaceable resources will be impacted.	
RESOURCES				
SIGNIFICANCE		-54	moderate - negative	
			PROPOSED MITIGATION MEASURES	

Only allow vehicles and equipment to travel on designated access routes and not anywhere else within the development

Use existing main access routes and internal farm roads where possible and avoid using other areas in the site as temporary access routes.

Vehicles and equipment must park in designated parking areas.

Materials must be off-loaded and stored in designated laydown area.

Where possible, conduct the construction activities outside of the rainy season as wet soil compacts easily as opposed to dry soil.

ury son.					
	POST-MITIGATION POST-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-	2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-15	very low negative			
CONFIDENCE LEVEL					
High				•	

Table 7-230: SPH6: Impact significance of impaired soil health as a result of soil pollution

IMPAIRED SOIL HEALTH					
PROJECT PHASE	Construction I	Construction Phase			
DIRECT IMPACT	and material spillage of cor state containe	Soil pollution can be caused by oil and fuel spills from vehicles and equipment as well as domestic and material waste on site. Should the vanadium redox flow batteries be used for the BESS, spillage of corrosive and environmentally toxic electrolyte is possible. In the case that lithium solid state containerised batteries are used, there is a possibility of thermal runaway that will result in the release of toxic and flammable gasses.			
INDIRECT IMPACT		Increased risk of pollutant uptake by vegetation within the development area that can affect environmental and human health.			
CUMULATIVE IMPACT	Increase in ar	Increase in areas at risk of soil pollution.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	24	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-21	3	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and	Highly detrimental	Definite	

		valued, important, sensitive or vulnerable systems or communities are substantially affected.		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-63	high negative		
		PROPOSED MITIGATION MEASURES		
Maintenance must be u	ndertaken regu	larly on all vehicles and construction equipme	ent to prevent hydr	ocarbon spills.
Any waste generated d construction teams.	uring construct	ion must be stored into designated containe	ers and removed fr	om the site by the
Any left-over construction	on materials mu	ust be removed from the development area.		
oil spills and waste dum	ping. The ECO r	red by the Environmental Control Officer (ECC nust also report any spills from batteries. on is undertaken by accredited staff and contr	•	ly signs of fuel and
		or the safe handling of battery cells during tra		tion
complic (and dancie to	, a procedure je	POST-MITIGATION	nsport and mstand	tion.
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		

(b) Aquatic Impact

SIGNIFICANCE

High

Construction phase activities would result in disturbance of soil and clearing of vegetation. Water quality impacts may occur from batching of concrete on site, hydrocarbon spills and other construction activities.

CONFIDENCE LEVEL

There is no difference in impacts between the two battery technology options for BESS, the impact assessment table covers both alternatives.

Table 7-231: SPH6: Impact of aquatic ecosystems during the construction phase

very low negative

AQUATIC ECOSYSTEM IMPACTS					
PROJECT PHASE	Construction	Phase			
DIRECT IMPACT	Disturbance	of aquatic habitat; water quality impacts			
INDIRECT IMPACT	Modification	of flow and alien vegetation invasion in aquatic fe	eatures		
CUMULATIVE IMPACT	Degradation	Degradation of the ecological condition of aquatic ecosystems			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	-	PRE-MITIGATION			
	4	The duration of the activity associated with the			
DURATION		impact will last more than 5 years and as such	-14	3	
		is rated as Long term			

			PROPOSED MITIGATION MEASURES		
SIGNIFICANCE		-42	Moderate negative		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SEVERITY		-2	The severity of the impact is rated as Moderate as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.	Moderately Detrimental	Definite
EXTENT		3	affects only the development area and adjacent properties		
			The extent of the impact is rated as Local as it		

A buffer of at least 250 m between the significant aquatic ecosystems (larger pans) and all the proposed project activities should be maintained (noting that this is already honoured in the proposed layout for all facilities).

Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers, while retaining the topography and cover vegetation within the wider drainage areas through the site is preferred to reduce the potential modification to the way in which water drains through these areas.

The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.

During the construction phase, site management must be undertaken at the laydown and construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities such as hydrocarbon spills. The solar panels will be washed with water and a biodegradable/ greendetergent.

Any stormwater that does arise within the construction sites must be handled appropriately to trap sediments and reduce flow velocities where necessary.

Development within the drainage areas, where located within a proposed facility, will however need to consider stormwater management measures and should avoid impacting on the movement of water through the more seasonally wet areas. Minimal disturbance to the topography and cover vegetation in these areas is recommended.

		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last 0-6 months and as such is rated asTemporary	-12	2	
EXTENT	2	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur			
SEVERITY	-2	The severity of the impact is rated as Moderate as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.	Slightly Detrimental	Likely	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE -24 low negative					
		CONFIDENCE LEVEL			
High					

(c) Avifaunal Impact

(i) Habitat destruction associated with the construction of the facility

Habitat destruction and alteration will occur during the construction phase of SPH6. The majority of the development footprint would be transformed from its current state to a

renewable energy facility. SPH6 will transform approximately 428ha of habitat. Most of this is in a fairly natural state currently, or in the case of arable lands is still accessible and useable for birds foraging.

Table 7-232: SPH6: Formal rating of destruction of bird habitat during construction

	DESTRU	CTION OF BIRD HABITAT DURING CONSTRUCTION	ON	
PROJECT PHASE	Construction	n phase		
DIRECT IMPACT	Transforma	tion of natural habitat into PV facility		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Yes - Larger	area transformed from natural habitat		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	10	,
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural and social functions and processes are altered to the extent that natural processes will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are significantly affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	moderate – negative		
There is no specific mitiaat	ion reauired.	PROPOSED MITIGATION MEASURES Impact avoidance has already been implemente	ed in the desian pho	ase through the
adherence to no-go buffers			, , ,	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	12	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-12	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-36	low - negative		
		CONFIDENCE LEVEL		

(ii) Disturbance of birds & displacement effects

Disturbance of avifauna during the construction (and thereafter during maintenance and operational and decommissioning) of the facility and all development alternatives and associated infrastructure is likely to occur. Disturbance of breeding birds is typically of

greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. It is noted that no breeding sites have been identified on site at this stage.

There is no difference between the location and technology options in terms of disturbance and displacement of birds.

Table 7-233: SPH6: Formal rating of disturbance of birds during construction

PROJECT PHASE	Constructio	n phase & operations phase to lesser extent		
DIRECT IMPACT		bed from their normal activities through the inc with construction	creased noise and	activity levels
INDIRECT IMPACT				
CUMULATIVE IMPACT	More projec	cts will result in overall higher disturbance levels		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with the		
DURATION	2	impact will last 6-18 months and as such is rated as Short term	-	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Nogliziblo	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	- Negligible	Omikely
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
	•	d as there are no particularly sensitive features id	•	
_	•	should be implemented during construction in te	rms of control of	vehicles, staff,
minimising the impact on	the receiving	environment as much as possible.		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-3	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	3 3	
SIGNIFICANCE	-5	very low negative		
		CONFIDENCE LEVEL		
Medium				

(d) Bats Impact

The facility boundary for SPH6 overlaps one medium sensitivity areas from a bat perspective. During the construction of SPH6 habitat modification would occur, disturbance and displacement of bats may occur and bat roosts may be disturbed or destroyed.

Two technology options are under consideration for the BESS. For bat impacts the type of technology used for the BESS is not considered relevant. Both technology options are considered equally acceptable.

Table 7-234: SPH6: Bat habitat modification

	Į!	MPACT ON POSSIBLE HABITAT MODIFICATION				
PROJECT PHASE	Constructio	Construction phase				
DIRECT IMPACT	Modificatio	n of habitat through the removal of vegetation cove	er and water source	?5		
INDIRECT IMPACT	Displaceme	nt				
CUMULATIVE IMPACT	Loss of fora	ging resources for local bat population				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	2		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	2		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Norticible	Librahi		
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.	Negligible	Likely		
SIGNIFICANCE	-8	very low negative				

This impact may be reduced by limiting the removal of vegetation and available water sources, as far as possible.

Avoid all high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should any changes or expansion take place to the boundary of the facility a bat specialist must provide input to confirm that these changes are acceptable in terms of the avoidance of high sensitivity areas.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction, rehabilitation of all disturbed areas, inclusive of that beyond permanent infrastructure footprints, (e.g. temporary access tracks and laydown areas) must be undertaken.

(e.g.teperary access tra	cho arra rayaro	DOST BALTICATION		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
Medium	•			

Table 7-235: SPH6: Disturbance and displacement effects for bats

INADACT ON DO	CCIDI E DICTUDO	ANCE & DICDLA	CEMENT EFFECTS
IIVIPACI ON PO	3310FE DI310KD	ANCE & DISPLA	CIVICINI EFFECTS

5.55555555	Construction	n phase		
DIRECT IMPACT	Disturbance	of bats during construction activities		
INDIRECT IMPACT	Displaceme	nt		
CUMULATIVE IMPACT	Unavailabili	ity of suitable foraging resources in the broader environ	ment for displaced	individuals
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Northile	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.	Negligible	
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
Limit construction activiti	es to daylight	hours only and minimise lighting at night, as far as pos	sihle	
expansion take place to the of avoidance of high sens.	ne boundaries itivity areas.	. With the layouts currently assessed, this has been of a bat specialist must provide input to confirm that thes	achieved. Should d	
expansion take place to the of avoidance of high sens.	ne boundaries itivity areas.	. With the layouts currently assessed, this has been on a bat specialist must provide input to confirm that thes ited to the assessed project footprint only.	achieved. Should d	
expansion take place to the of avoidance of high sens.	ne boundaries itivity areas.	. With the layouts currently assessed, this has been on a bat specialist must provide input to confirm that thes sited to the assessed project footprint only. POST-MITIGATION	achieved. Should d	
expansion take place to the of avoidance of high sens.	ne boundaries itivity areas.	. With the layouts currently assessed, this has been on a bat specialist must provide input to confirm that thes ited to the assessed project footprint only.	achieved. Should d	
expansion take place to the of avoidance of high sense. All construction activities	ne boundaries, itivity areas. should be lim	. With the layouts currently assessed, this has been a a bat specialist must provide input to confirm that thes ited to the assessed project footprint only. POST-MITIGATION The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated	achieved. Should c e changes are acce	ptable in terms
expansion take place to the of avoidance of high sense. All construction activities DURATION	ne boundaries, itivity areas. should be lim 2	. With the layouts currently assessed, this has been a a bat specialist must provide input to confirm that thes ited to the assessed project footprint only. POST-MITIGATION The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term The extent of the impact israted as site as it will	achieved. Should c e changes are acce	ptable in terms
expansion take place to the of avoidance of high sense. All construction activities DURATION EXTENT	ne boundaries, itivity areas. should be lim	. With the layouts currently assessed, this has been a pat specialist must provide input to confirm that thes ited to the assessed project footprint only. POST-MITIGATION The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and	achieved. Should a e changes are acce -5	ptable in terms
expansion take place to the of avoidance of high sense. All construction activities. DURATION EXTENT SEVERITY IMPACT ON IRREPLACEBLE	ne boundaries, itivity areas. should be lim.	. With the layouts currently assessed, this has been a part specialist must provide input to confirm that thes ited to the assessed project footprint only. POST-MITIGATION The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	achieved. Should a e changes are acce -5	ptable in terms
expansion take place to the of avoidance of high sense. All construction activities. DURATION EXTENT SEVERITY IMPACT ON IRREPLACEBLE RESOURCES	ne boundaries, itivity areas. should be lim	. With the layouts currently assessed, this has been a a bat specialist must provide input to confirm that thes ited to the assessed project footprint only. POST-MITIGATION The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term The extent of the impact israted as site as it will affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Irreplaceable resources will beimpacted.	achieved. Should a e changes are acce -5	ptable in terms

Table 7-236: SPH6: Bat roost disturbance

IMPACT ON POSSIBLE ROOST DISTURBANCE						
PROJECT PHASE	Construction	Construction phase				
DIRECT IMPACT	Disturbance	of roosting bats during construction activities				
INDIRECT IMPACT	Roost aban	donment				
CUMULATIVE IMPACT	Unavailabil	ity of suitable roosting resources in the broader environi	ment for abandonedir	ndividuals		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1		
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.	Negligible	Unlikely		

SIGNIFICANCE		-5	low negative
RESOURCES			
IRREPLACEBLE		1	Irreplaceable resources will be impacted.
IMPACT	ON		

PROPOSED MITIGATION MEASURES

All construction activities should be limited to the assessed project footprint only.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough toidentify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
		CONFIDENCE LEVEL		
Medium				

Table 7-237: SPH4: Bat Roost destruction

		IMPACT OF POSSIBLE ROOST DESTRUCTION				
PROJECT PHASE	Construction	onstruction phase				
DIRECT IMPACT	Destruction	of potential bat roosting features				
INDIRECT IMPACT	Reduction o	f available roosting sites and/or Mortality				
CUMULATIVE IMPACT	Insufficient	roosting resources to support the local population and μ	ootential increased	batmortality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1		
EXTENT	2	The extent of the impact is rated as site as it will affect only thedevelopment area				
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.				
SIGNIFICANCE	-5	Low negative				

PROPOSED MITIGATION MEASURES TO BE INCLUDED IN THE EMPT

Avoid the destruction or removal of existing farmsteads and trees, as far as possible.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

All construction activities should be limited to the assessed project footprint only.

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposedactivity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Lownegative as the impactaffects the environment in such away that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE	-8	very low negative		
		CONFIDENCE LEVEL		
Medium				

(e) Botanical Impacts

The development of SPH6 would result in extensive but localized loss of relatively undisturbed (unploughed but grazed) Western Free State Clay Grasslands.

The shade effect of the panels on the grassland vegetation is not known and it not easily predicted. There will be space under the panels for grass and other plants to grow. However, the microclimate is likely to be different to that of open grassland, so a different suite of plant species is likely to colonize the space under the solar panels.

Two technology options are proposed for the BESS. The technology alternatives will make no difference on the botanical impact assessment and as such these alternatives are covered in the **Table 7-19**.

Table 7-238: SPH6: Impact of loss of Western Free State Clay Grassland

		LOSS OF VEGETATION				
PROJECT PHASE	Construction	onstruction Phase				
DIRECT IMPACT	Removal of	emoval of natural vegetation: Western Free State Clay Grasslands				
INDIRECT IMPACT	None deterr	mined				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term.	-15	3		
EXTENT	3	The impacts will be localized to the designated target areas.				
SEVERITY	-2	The severity of the potential impact will be moderate negative.				
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Moderately Detrimental	Definite		
SIGNIFICANCE	-45	medium - negative				
PROPOSED MITIGATION	MEASURES					

The first mitigation measures necessary would be the relocation of **Ammocharis coranica** bulbs if they cannot be avoided. Ideally the bulb should be lifted when they area dormant (winter) but that would mean traversing the entire area of the SPH sites in the preceding summer and marking every occurrence of these plants. A more practical approach would be to unearth the bulbs during the construction phase and relocating and planting them soon after removal.

Secondly, all areas that are disturbed during construction and that are not needed during the operational phase should be rehabilitated, using natural grasses that occur in the area. It would be possible for some grasses and forbs to survive under the panels, but it is difficult to predict the extent of such growth, nor which plant species would grow effectively under the panels.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

(f) Groundwater Impact

The water required during the construction phase of SPH6 is approximately $18,000\text{m}^3$ per year. The water requirement lies well within the yield potential of the underlying fractured rock aquifer (i.e. 0.5-2.0 L/s). It must be noted that at present the use of groundwater is not proposed however if this changes the potential impacts of groundwater abstraction are shown in **Table 7-185.**

Earthmoving plant and/or construction vehicles will be used on site during the construction phase. Use of vehicles presents a risk of groundwater contamination by fuel and oil leakage.

Two technology options (lithium-ion vs redox flow batteries) were considered for SPH6. The alternatives considered are equally preferred.

Table 7-239: SPH6: Impact table for the lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place).

Potential impact on groundwater level due to over abstraction					
PROJECT PHASE	Construction F	Phase			
DIRECT IMPACT	Lowering of g	roundwater level due to over abstraction	า		
INDIRECT IMPACT	Drying of spring	ngs in the area			
CUMULATIVE IMPACT	Permanent da	mage to the aquifer system in the area			
DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD					
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-14	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development			

		area		
		and adjacent properties		
SEVERITY IMPACT ON	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected Irreplaceable resources will be	Moderately Detrimental	Likely
IRREPLACEBLE RESOURCES		impacted.		
SIGNIFICANCE	-28	low - negative		
		PROPOSED MITIGATION MEASURES		
Groundwater abstraction v	olumes must be	POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	U	1
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
Medium				

The main risk associated with the construction phase is groundwater contamination from the use of construction vehicles and heavy machinery on-site.

Table 7-240: SPH6: Impact of contamination of groundwater as a result of accidental oil spillages or fuel leakages during the construction and decommissioning phases.

Potential impact on	Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages					
PROJECT PHASE	Construction	Construction and Decommissioning Phase				
DIRECT IMPACT	Groundwate	er contamination				
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area				
CUMULATIVE IMPACT	Long term r	educed groundwater quality				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	PRE-MITIGATION					
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term		2		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	5			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the	Negligible	Likely		

		environment in such a way that natural, cultural and social functions and processes are minimally affected	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	
SIGNIFICANCE	-10	very low negative	

PROPOSED MITIGATION MEASURES

Vehicles must be maintained regularly and kept in a good working order.

Dirty water should be captured, to be re-used where possible. No dirty water is allowed to be discharged into the surrounding environment.

No heavy equipment or vehicles to be left in excavation area when not in use. Drip trays to be used under stationary vehicles and machinery where possible.

	POST-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	_	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
Medium				·

(g) Heritage Impact

(i) Impacts to archaeological resources

Impacts to archaeological resources at SHP4 are limited to the possible destruction of isolated background scatter artefacts which have very low to no cultural significance. Impacts will be direct and permanent but because of the low cultural significance the severity is very low negative.

Two technology alternatives were considered for the battery technology for the BESS. Both technology options are equally preferred.

Table 7-241: SPH6: Assessment of construction phase impacts to archaeological sites.

Archaeological impacts						
PROJECT PHASE	Construction	on Phase				
DIRECT IMPACT	Destruction	n of isolated artefacts				
INDIRECT IMPACT	None					
CUMULATIVE IMPACT	None					
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
	PRE-MITIGATION					
		The duration of the activity associated with the				
DURATION	4	impact will last more than 5 years and as such is	-6	3		
		rated as Long Term				

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	No official o	D. Carte
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	-18	very low negative		
		PROPOSED MITIGATION MEASURES		
None required as the ruin recorded.	n is in poor	condition and does not have any special architecture	al qualities that ne	ed to be further
No materials to be remov	ved from ai	ny other ruins in the wider project area.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.	-3 3	
SIGNIFICANCE	-18	very low negative		•
		CONFIDENCE LEVEL		
High				

(ii) Impacts to graves

Impacts to graves for SPH6 are not expected because all identified graves have been avoided by the facility layout. There is still the chance of an unmarked grave being present, or even a marked grave that was not found during the survey. The chances are considered low, however. The impact on graves applies equally to both technology alternatives.

Table 7-242: SPH6: Assessment of construction phase impacts to graves

IMPACTS TO GRAVES					
PROJECT PHASE	Construction	on Phase			
DIRECT IMPACT	Destruction	Destruction of graves, including their coverings and possibly human remains			
INDIRECT IMPACT	None	None			
CUMULATIVE IMPACT	Destruction	Destruction of graves, including their coverings and possibly human remains			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	10	2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-18	2	

DRODOSED MITIGATION MEASURES					
SIGNIFICANCE		-36	low – negative		
RESOURCES					
IRREPLACEABLE		1	Irreplaceable resources will be impacted.		
IMPACT	ON				
SEVERITY		-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Likely

Farm-style wire fences should be erected around all known and unfenced graves (i.e. waypoints 362 & 404) within the farm portion affected by construction. Pedestrian access gates must be provided and the fences must be located a minimum of

5 m away from all graves.

All graves to be treated as no-go areas with temporary signage as required.

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-18	1	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Unlikely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE -18 very low negative					
		CONFIDENCE LEVEL			

(iii) Impacts to the cultural landscape SPH6

No landscape features such as hills and pans will be impacted by SPH6. The impact on cultural landscape is due to the construction activities (construction vehicles and equipment) on site which is a rural landscape.

Table 7-243: SPH6 Assessment of construction phase impacts to the cultural landscape

CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	Constructio	n Phase		
DIRECT IMPACT	Alteration of the rural landscape character through the introduction of construction equipment and vehicles and all the associated activities on site			
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	Impacts wil	ll be greater with multiple facilities being (constructed at once	
DIMENSION	DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
PRE-MITIGATION				

		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-10	3
		The extent of the impact is rated as		
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as Moderate negative as the affected		
		environment is altered but natural,		
	_	cultural and social functions and		
SEVERITY	-2	processes continue albeit in a modified		
		way; and valued, important, sensitive	Slightly	- <i>c</i>
		or vulnerable systems or communities	Detrimental	Definite
		are negatively affected		
IMPACT ON		No irreplaceable resources will be		
IRREPLACEABLE	0	impacted.		
RESOURCES		Impacted.		
SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
Keep construction period				
Rehabilitate any areas no	t needed duri	ing operation as soon as possible.		
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-10	3
		The extent of the impact is rated as		
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected environment is altered but natural,		
		cultural and social functions and		
SEVERITY	-2	processes continue albeit in a modified		
		way; and valued, important, sensitive	Slightly	Definite
		or vulnerable systems or communities	Detrimental	Dejiiite
		are negatively affected		
IMPACT ON				
IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted.		
SIGNIFICANCE	-30	low – negative		
CONFIDENCE LEVEL				
High				

(h) Palaeontological Impact

Palaeontological impacts would be the destruction of fossils from construction activities. The site as a whole is considered as low sensitivity in terms of palaeontology.

Table 7-244: SPH6: Assessment of the potential impacts to possible paleontological resources considers the criteria below

	PALAEONTOLOGY IMPACTS			
PROJECT PHASE	Constructi	on, Operational and de commissioning Phases		
DIRECT IMPACT	Destruction	Destruction of fossils in the footprint		
INDIRECT IMPACT				
CUMULATIVE	Loss of fos	sil heritage and scientific knowledge		
IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				

DURATION		1	The duration of the activity associated with the		
			impact will last 0-6 months and as such is rated		
			as Temporary	2	2
EXTENT		1	The extent of the impact is rated as footprint as it		3
			only affects the area in which the proposed		
			activity will occur		
SEVERITY		-1	The severity of the impact is rated as Low		
			negative as the impact affects the environment in		
			such a way that natural, cultural and social		
			functions and processes are minimally affected	Nogligible	Dofinito
IMPACT	ON	0	No irreplaceable resources will be impacted.	Negligible	Definite
IRREPLACEBA	LE				
RESOURCES					
SIGNIFICANCE		-6	Very Low Negative		
DDODOCED N	UTICATIO	SAL BAEACI	IDEC		

PROPOSED MITIGATION MEASURES

If fossils are found once excavations for foundations and amenities have commenced then they should be photographed, removed and put in a safe place. Photographs should be sent to a palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university

If no fossils are found, no action will be required

ij no jossiis are joana,	no action	wiii be required		
POST-MITIGATION				
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary		3
EXTENT 1		The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	2	
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	6	Very Low Positive		
CONFIDENCE LEVEL		·		
High				

(i) Socio-Economic Impact

(i) Stimulation of the Economy during construction

The size of the Tokologo LM's economy was estimated at R2,170 million at current prices (2022) and primarily comprises of the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. That being said, it is likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the development of SPH6 through local procurement.

The stimulation of the economy will not be dependent on the technology options of the SPH6; thus, the battery technology alternatives are equally preferred.

Table 7-245: SPH6: Impact of Economic Stimulation during construction

		IMPACT ON ECONOMY		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	Tempora	ry increase in production and GDP in the local o	есопоту	
INDIRECT IMPACT		household income and increased business sale		ту
CUMULATIVE IMPACT		ry increase in production and GDP in the region		•
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION	·	
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
applied where possible: Procure construction mater				
Employ local contractors w Note: The proposed mitigat	here possib tion measui	, and products from local and domestic supplie le res will possibly increase the positive impact on		however, this will
Employ local contractors w	here possib tion measui	le res will possibly increase the positive impact on		however, this will
Employ local contractors w Note: The proposed mitigat	here possib tion measui	le	the local economy;	
Employ local contractors w Note: The proposed mitigat not affect the weighting th	here possib tion measur ereof.	POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as		however, this will
Employ local contractors w Note: The proposed mitigat not affect the weighting th DURATION	here possib tion measur ereof.	POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development area and	the local economy;	
Employ local contractors w Note: The proposed mitigat not affect the weighting th DURATION EXTENT IMPACT ON IRREPLACEABLE RESOURCES	here possibition measurereof.	POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected No irreplaceable resources will be impacted.	the local economy; 10 Slightly	3
Employ local contractors w Note: The proposed mitigat not affect the weighting th DURATION EXTENT IMPACT ON IRREPLACEABLE	here possibicion measurereof.	POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected No irreplaceable resources will be	the local economy; 10 Slightly	3

(ii) Creation of Employment during construction

The construction of SPH6 will require temporary employment of construction workers, foremen, and engineers On-site. Construction is expected to last twelve months where at the peak of construction about 300 people will be working on-site.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

SPH4 will create the same number of employment opportunities, regardless of its layout on the site; thus, layout alternatives are equally preferred.

Table 7-246: SPH6: Assessment of Employment during construction

		IMPACT ON EMPLOYMENT				
PROJECT PHASE	Constructi	on Phase				
DIRECT IMPACT	Creation o	Creation of temporary employment opportunities On-site				
INDIRECT IMPACT	Improved	Improved income of households whose members are employed on the project				
CUMULATIVE IMPACT	Creation o	f temporary employment opportunities i	n the area			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	30	low positive				
		PROPOSED MITIGATION MEASURE	S			
The following is recommend	ded to incred	ase the employment opportunities created	d in the local commun	ities, where feasible:		
Employ labour intensive me	ethods in co	nstruction, where feasible				
Employ local residents and	communitie	es, where possible				
Utilise local suppliers, when	e possible					
		POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	- 10	3		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and	Slightly Beneficial	Definite		

			processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected		
IMPACT IRREPLACEABLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		30	low positive		
CONFIDENCE LEVEL					
High					

(iii) Reduction of Land Area available for productive farming

The proposed site of SPH6 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH6 comprised of low – very low and low - moderate potential land. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH6 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH6.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-247: SPH6: Assessment of Impact on agricultural production

Reduction of Land Area available for Productive Farming						
PROJECT PHASE	Construction and Operational Phase					
DIRECT IMPACT	Loss of ag	gricultural production within the footprint a	lue to land sterilisatio	on		
INDIRECT IMPACT	Negligibl	e to no indirect impact				
CUMULATIVE IMPACT	Negligible	e to no cumulative effects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	D	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,	Negligible	Definite		

1	I		Ī	İ	
		cultural and social functions and processes are minimally affected			
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-18	very low negative			
		PROPOSED MITIGATION MEASURES			
Rehabilitation of land shou after the closure of the pro	•	ce at the end of the project's life to allow for	r the land to be used j	for livestock farming	
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	6	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-18	very low negative			
CONFIDENCE LEVEL					
High					

(iv) Loss of Property

An influx of job seekers to the area during the construction phase may result in stock theft and burglaries. The number of workers and duration of construction will not be affected by the technology alternatives; thus, all alternatives are equally preferred.

Table 7-248: SPH6: Assessment of loss of property

IMPACT ON CRIME LEVELS							
PROJECT PHASE	Construct	ion Phase					
DIRECT IMPACT	Temporar	emporary increase in crime associated with the influx of people					
INDIRECT IMPACT	Reduced I	evel of security in and around the proposed	l facility				
CUMULATIVE IMPACT	No to neg	ligible cumulative impact					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.					

SIGNIFICANCE	-30	low - negative				
PROPOSED MITIGATION MEASURES						
The following mitigations of	are advised	to be instituted to minimise and possible e	liminate the impact o	altogether:		
Ensure proper fencing and	monitoring	of the fencing is in place				
Maximise job creation and	allocation	to locals as far as practically possible. Recr	uitment of workers s	hould be planned in		
advance and should not ta	ke place on-	site. This will reduce the probability of work	seekers loitering in t	he area surrounding		
the project sites						
Hire additional security pe	rsonnel dur	ing the construction period				
		POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	_	2		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE -15 very low negative						
CONFIDENCE LEVEL						
High						

(j) Terrestrial Biodiversity & Faunal Impact

(i) Direct Impact - Destruction of faunal habitat

Clearing or disturbance to natural vegetation for the construction of SPH6 will remove up to 428ha of natural grassland habitat. This includes the burrows of many fossorial species as well as termite mounds which provide a source of food for species such as aardvark and mongoose.

Two technology alternatives for the battery to be used in the BESS have been proposed. As the type of battery used will not alter the footprint of the BESS the alternatives are rated as equal for the impact of clearance of natural habitat.

Table 7-249: SPH6: Destruction of faunal habitat

DESTRUCTION OF FAUNAL HABITAT				
PROJECT PHASE	Construction phase			
DIRECT IMPACT	Destructi	on of faunal habitat		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of ho	abitat and habitat connectivity		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	24	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-21	3
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or	Highly detrimental	Definite

		social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-63	high negative		
PROPOSED MITIGATION MEASURES				

Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays. Only indigenous grasses found in the area must be used for rehabilitation

Undertake vegetation clearing during the dry season, and outside of the breeding season of burrowing fauna

If possible, the movement of animals through the sites must be permitted during operations. The use of fencing that will allow the movement of small to medium fauna through would help mitigate the effect of fences acting as barriers. This can be achieved by constructing a fence that has places for animals to crawl through and is not difficult for fleeing animals and birds to see. For example, black mesh panel fencing can be used where gaps of approximately 30 cm high and 50 cm wide and spaced at regular intervals are cut/installed. The tops of these gaps must be smoothed off to limit the chance of wildlife being injured when passing through. The use of barbed wire must be avoided

The proposed activities must remain within the project footprint

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	10	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-30	low negative		
		CONFIDENCE LEVEL		
Medium				

(ii) Direct Impact - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death. The clearing of ground for the foundations of the PV arrays will destroy burrows, potentially causing injury or death to burrowing animals. Furthermore, the presence of the construction site and personnel may result in negative interactions with fauna, such as hunting or killing animals perceived to be pests.

Regarding the technology alternative for the type of battery used in the BESS for all facilities, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread

into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-250: SPH6: Injury or death to fauna

	INJURY OR DEATH TO FAUNA				
PROJECT PHASE	Construct	tion Phase			
DIRECT IMPACT		death to fauna			
INDIRECT IMPACT					
CUMULATIVE IMPACT					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-54	moderate negative			

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

No wild animal may under any circumstance be handled, removed or be interfered with by construction workers

To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

Ideally construction should not continue at night so as to avoid potential collisions with nocturnal fauna

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely

IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be		
RESOURCES	1	impacted		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
High				

(iii) Indirect Impacts - Disturbance and displacement of fauna

Construction activities have the potential to cause disturbance to fauna inhabiting the natural grassland through noise, vibrations, and light (if construction continues after dark). Security lights for the solar facilities during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-251: SPH6: Disturbance and displacement of fauna

	DISTUR	RBANCE AND DISPLACEMENT OF FAUNA	ı	
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland	
CUMULATIVE IMPACT	Displacen	nent of fauna		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-36	low negative		

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

Ideally construction activities should cease at night to minimise the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals

Lighting during construction should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-10	very low negative		
CONFIDENCE LEVEL				
Medium				·

(iv) Indirect Impacts – Pollution and contamination of natural areas

During construction, dust from exposed areas and roads, and litter from construction workers have the potential to pollute the surrounding natural vegetation. The use of dust suppressants, as well as hydrocarbons from vehicles and machinery, have the potential to contaminate soils and ground water, and be washed into the nearby natural pans during high rainfall events. The battery technology alternatives are rated the same and hence are covered in the same table.

Table 7-252: SPH6: Pollution and contamination of natural areas

	POLLUTION	AND CONTAMINATION OF NATURAL AR	EAS	
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Pollution a	nd contamination of natural areas		
CUMULATIVE IMPACT	Habitat de	gradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-15	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-15	,
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-45	moderate negative		
PROPOSED MITIGATION MEASURES				
		cer (ECO) must be appointed to oversee all	construction activit	ies
		for leaks and serviced on a regular basis		
		in the most appropriate manner		
No washing of vehicles must ta	•			
During construction, dust on co	nstruction ro	oads must be suppressed using a water tar	nker	

Dumping of solid waste in natu	ral areas, inc	luding cigarette butts and litter by constru	uction workers must	be prohibited
Appropriate solid waste dispose	al facilities m	ust be provided for workers during constr	uction	
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
High				

(v) Indirect Impacts – Increased potential of invasion by alien vegetation

During construction, the removal of natural vegetation and disturbance to the soil will increase the likelihood of invasion by alien plant species. Alien species establish easily and quickly on bare soil by colonisation or from seeds existing in the seed bank of the soil. Infestation by alien and invasive species will lead to degradation of the surrounding natural habitat and will increase the potential of spread into the greater landscape. In addition, the vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds. This impact is relevant to all the proposed arrays equally and has therefore been assessed in one table for the construction phase.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-253: SPH6: Increased potential of invasion by alien vegetation

IN	INCREASED POTENTIAL OF INVASION BY ALIEN VEGETATION					
PROJECT PHASE	Construct	tion Phase				
DIRECT IMPACT						
INDIRECT IMPACT	Increased	l potential of invasion by alien vegetation				
CUMULATIVE IMPACT	Habitat d	legradation				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	3		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite		

IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be	
RESOURCES	O	impacted	
SIGNIFICANCE	-42	moderate - negative	

PROPOSED MITIGATION MEASURES

An independent Environmental Control Officer (ECO) must be appointed to oversee all construction activities monthly All areas cleared of natural vegetation must be rehabilitated. Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays and other cleared areas. Only indigenous grasses found in the area must be used for rehabilitation. This must be advised by the hotanist

An invasive alien plant species management and monitoring plan must be implemented during the construction phase. Monitoring should continue into the operational phase and through and for a period after decommissioning. This should be advised by the botanist

All alien seedlings and saplings must be removed as they become evident for the duration of construction and during the operational phase. Manual / mechanical removal is preferred to chemical control

All construction vehicles and eq	uipment i	nust be free of plant material before enter	ing the site	
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
Hiah				

(k) Transport Impact

Traffic impacts anticipated to occur during the construction phase of the project are construction related traffic and noise and dust pollution.

Two technology alternative for the BESS have been proposed. There is no difference in the impacts from a traffic perspective between the alternatives.

Table 7-254: SPH6: Traffic Impacts - Construction Phase

TRAFFIC IMPACT					
PROJECT PHASE	Constructi	ion phase			
DIRECT IMPACT	Traffic congestion due to an increase in traffic caused by the transportation ofequipment, material and staff to site				
INDIRECT IMPACT	Construction traffic on roads might generate dust and noise.				
CUMULATIVE IMPACT	Traffic delays on the surrounding road network.				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3	

EXTENT	3	The extent of the impact is rated as		
		Local as it affects the development		
		area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated		
		as Moderate negative as the		
		affected environment is altered but		
		natural, cultural and social		
		functions and processes continue		
		albeit in a modified way; and		
		valued, important, sensitive or	Slightly	Definite
		vulnerable systems or communities	Detrimental	Definite
		are negatively affected		
IMPACT		ure negatively affected		
IMPACT ON		No irreplaceable resources will		
IRREPLACEBLE RESOURCES		beimpacted.		
SIGNIFICANCE	-30	low negative		
SIGITI ICATOE		POSED MITIGATION MEASURES		
Stagger component delivery				
Reduce the construction period		(e);		
Dust suppression of gravel ro	ads (interna	I roads and the access road to the site)	during the construc	ction phase, asrequired.
		internal roads and the access road		
construction phase.			, ,	· ·
The use of mobile batching p	ants and qu	arries in close proximity to the site (if a	vailable and feasibl	le); and
Staff and general trips should				
		POST-MITIGATION		
DUDATION	2	The duration of the activity		
DURATION		associated with the impact will		
		last 6-18 months and as such is		
		ratedas Short term	5	1
EXTENT	3	The extent of the impact is rated as	5	1
		Local as it affects the		
		development area and adjacent		
		properties		
	-1	The severity of the impact is rated		
SEVERITY	_	as Low negative as the impact		
		affects the environment in such a		
		way that natural, cultural and		
		socialfunctions and processes are	Nanlinible	l lalilada.
		minimally affected	Negligible	Unlikely
IMPACT ON	0	No irreplaceable resources will		
IRREPLACEBLE		beimpacted.		
RESOURCES		20		

(I) Landscape and Visual Impact

SIGNIFICANCE

Four visual impacts were identified for SPH6 during the construction, operational phase and decommissioning phase

CONFIDENCE LEVEL

very low negative

Medium

- Landscape change
- Impact on Protected Areas
- Impact on local roads
- Impact on homesteads
- Light pollution

These impacts would all occur during the construction, operation and decommissioning phase. Impacts would peak once the facility is constructed, remain relatively constant during the operational phase and then decrease during the decommissioning phase.

The type of battery technology used in the BESS would not impact on the assessment of visual impacts and so the tables below cover both technology options.

Table 7-255: SPH6 Landscape change

		LANDSCAPE CHANGE		
PROJECT PHASE	completion	n, Operational & Decommissioning Pho of construction, be relatively constant during decommissioning.		
DIRECT IMPACT		haracter due to industrialisation of a No	atural Landscape	
INDIRECT IMPACT	on any of the	· · · · · · · · · · · · · · · · · · ·		
CUMULATIVE IMPACT	Extension o	f landscape industrialisation due to othe	er electrical infrastructur	e proiects
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURE	-	
		s as low as possible relative to existing <code>g</code>		
Plan to protect existing na planning, however ongoing	tural site feat g monitoring	g landscape and maintain existing vege tures such as drainage pans. it is noted and restriction of access to these areas	that this has largely been is necessary;	
Reinstate any areas of veg	etation that h	nave been disturbed during construction);	
Remove all temporary wor				
		ion cover post-construction and implem		
-		the post-decommissioning use of the sit		
Monitor areas for vegetati	on cover post	-decommissioning and implement reme	edial actions.	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite

IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		-21	low - negative		
CONFIDENCE LEVEL					
High					
NOTES					

- 9. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 10. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-256: SPH6 Industrialization of the landscape as seen from Nielsview NR

SP	H6 INDUSTRI	ALISATION OF THE LANDSCAPE AS SEI	EN FROM NIELSVIEW NE	R		
	completion	n, Operational & Decommissioning Professional Construction, be relatively constant of	•	,		
PROJECT PHASE		levels during decommissioning.				
DIRECT IMPACT	Industrialisa	Industrialisation of the view from Nielsview NR due to this project.				
INDIRECT IMPACT						
CUMULATIVE IMPACT	Extension of infrastructu	f industrialisation of views from Pro re projects	tected Areas due to th	is and other electrical		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	. 27			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	-42	moderate low negative				
		PROPOSED MITIGATION MEASU	RES			
Plan to maintain the hei	ght of structu	res as low as possible relative to existin	ng ground levels;			
		ing landscape and maintain existing ve		elopment;		
Plan to protect existing i	natural site fe	atures such as drainage pans. it is note g and restriction of access to these are	ed that this has largely b	•		
Remove all temporary w		t have been disturbed during construct	юп,			
· · · · ·		ation cover nost construction and impli	amont ramadial actions			
	, ,	ation cover post-construction and imple r the post-decommissioning use of the				
nemove injrustructure n	ot required Jo	POST-MITIGATION	SILE,			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3		

			CONFIDENCE LEVEL	5	_
SIGNIFICANCE		-21	low negative		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.	Sligjhtly detrimental	Definite
SEVERITY		-1	Negligible		
EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

CONFIDENCE LEVEL

High

NOTES

- 9. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 10. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-257: Industrialization of the landscape as seen from local roads, SPH6

INE	OUSTRIALISAT	TION OF THE LANDSCAPE AS SEEN FROM	LOCAL ROADS, SPH6			
PROJECT PHASE	Construction	n, Operational & Decommissioning Phase	S			
DIRECT IMPACT	Industrialisa	Industrialisation of the view from local roads due to this project.				
INDIRECT IMPACT						
CUMULATIVE IMPACT		Extension of industrialisation of views from local roads due to this and other electrical infrastructure projects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties				
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	-21	low negative				
		PROPOSED MITIGATION MEASURES	5			
Plan site levels to minimis	e earthworks	to ensure that levels are not elevated;				
Plan to maintain the heigl	nt of structure	es as low as possible;				
Minimise disturbance of t	he surroundin	g landscape and maintain existing vegeto	ation around the develor	oment;		
Construct and/ or plant a 2m high screen along the southern edge of the array cluster						
Plan to protect existing no	ntural site fea	tures such as drainage pans;				
Reinstate any areas of veg	Reinstate any areas of vegetation that have been disturbed during construction;					
Remove all temporary works;						
Monitor rehabilitated area	Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;					
Remove infrastructure not required for the post-decommissioning use of the site;						
POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Longt term	-14	3		

			CONFIDENCE LEVEL		
SIGNIFICANCE		0	very low negative		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SEVERITY		-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Moderatelt detrimental	Definite
EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

High

NOTES

- 11. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 12. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-258 SPH6: Industrialization of the landscape as seen from local homesteads

SPH6	INDUSTRIALIS	SATION OF THE LANDSCAPE AS SEEN FRO	M LOCAL HOMESTEAD	S	
		Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on completion of construction, be relatively constant during operation and decrease again from peak			
PROJECT PHASE	levels durin	g decommissioning.			
DIRECT IMPACT	Industrialisa	ation of the view from local homesteads o	lue to this project.		
INDIRECT IMPACT					
CUMULATIVE IMPACT	Extension of infrastructu	f industrialisation of views from local h re projects	omesteads due to this	and other electrical	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	•	PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as	-14	3	
EXICINI	3	Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-42	moderate - negative			
		PROPOSED MITIGATION MEASURES	•		

PROPOSED MITIGATION MEASURES

Plan to maintain the height of structures as low as possible;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Construct / grow 2m high screen along SW and E edges of solar cluster closest to affected homesteads;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
		CONFIDENCE LEVEL		

NOTES

- 9. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- $10. \ The \ No-Go\ alternative\ could\ result\ in\ a\ limited\ number\ of\ additional\ agricultural\ buildings\ being\ developed.\ However,\ this$ is likely to result in negligible landscape change or visual impact.

Table 7-259 SPH6 Light pollution

Construction, Operational & Decommissioning Phases. Impacts will increal completion of construction, be relatively constant during operation and decrepted levels during decommissioning. DIRECT IMPACT Light pollution from the project spoiling the night time environment and nuise INDIRECT IMPACT CUMULATIVE IMPACT Extension of light pollution due to this and other electrical infrastructure proposed in the project spoiling the night time environment and nuise INDIRECT IMPACT Extension of light pollution due to this and other electrical infrastructure proposed in the project spoiling the night time environment and nuise INDIRECT IMPACT Extension of light pollution due to this and other electrical infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed in the project infrastructure proposed infrastructure proposed in the project infrastructure proposed infrastructure project infrastructure p	
completion of construction, be relatively constant during operation and decree levels during decommissioning. DIRECT IMPACT Light pollution from the project spoiling the night time environment and nuise INDIRECT IMPACT CUMULATIVE IMPACT Extension of light pollution due to this and other electrical infrastructure properties PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term 1 The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as The severity of the impact is rated as	
PROJECT PHASE DIRECT IMPACT Light pollution from the project spoiling the night time environment and nuise in the project spoiling time environment and n	•
DIRECT IMPACT INDIRECT IMPACT CUMULATIVE IMPACT DIMENSION RATING WOTIVATION PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term EXTENT 3 Local as it affects the development area and adjacent properties The severity of the impact is rated as The severity of the impact is rated as The severity of the impact is rated as	ase again from peak
INDIRECT IMPACT CUMULATIVE IMPACT Extension of light pollution due to this and other electrical infrastructure properties PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term EXTENT 3 Local as it affects the development area and adjacent properties The severity of the impact is rated as The severity of the impact is rated as	
CUMULATIVE IMPACT DIMENSION RATING MOTIVATION CONSEQUENCE	sance to neighbors.
DIMENSION RATING PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as The severity of the impact is rated as	
DURATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as	jects
DURATION 4 The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as	LIKELIHOOD
DURATION 4	
EXTENT 3 Local as it affects the development area and adjacent properties The severity of the impact is rated as	3
SEVERITY -2 environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE O No irreplaceable resources will be impacted.	
SIGNIFICANCE -42 moderate - negative	
PROPOSED MITIGATION MEASURES	
Use low key lighting around buildings and operational areas that is triggered only when people are pres	ent;
Utilise infra-red security systems or motion sensor triggered security lighting;	

Ensure that lighting is focused on the development with no light spillage outside the site;

No tall mast lighting should be used;				
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	0	very low negative		
CONFIDENCE LEVEL				
High				
NOTES				

^{9.} The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.

7.7.4 Operational Phase

(a) Agricultural Impact

During the operational phase, areas that where vegetation will remain cleared such as access routes, will remain at risk of soil loss through erosion. During the operation phase, staff and maintenance personnel will access the development area to maintain the infrastructure and make repairs, where required. Biodegradable detergents and water will be used to clean the panels, however this is not expected to result in impacts from an agricultural perspective.

Table 7-260: SPH6 Impact significance of soil loss through erosion during the operation phase

	SOIL LOSS THROUGH EROSION				
PROJECT PHASE	Operation	Operation Phase			
DIRECT IMPACT		Areas where soil surfaces will remain bare such as access routes and between PV arrays, will remain at risk of soil erosion.			
INDIRECT IMPACT	Eroded a	reas can expand into nearby areas and resul	t in land degradation	1.	
CUMULATIVE IMPACT	Increase	in areas at risk of soil erosion.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as site as it will affect only the development area	-14	3	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite	

^{10.} The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

IMPACT (IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-42	moderate - negative		
			PROPOSED MITIGATION MEASURES		
regularly be monitore	d to	detect earl	ternal access routes, as well as areas bor y signs of soil erosion on-set.		opment area, must
If soil erosion is detect	ted, t	the area mu	ust be stabilised using geo-textiles and facili	tated re-vegetation.	
			POST-MITIGATION		
DURATION		4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3
EXTENT		1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	3
SEVERITY		-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-18	very low negative		
			CONFIDENCE LEVEL		

Table 7-261: SPH6 Impact significance of soil pollution during the operation phase

High

SOIL POLLUTION				
PROJECT PHASE	Operational phase			
DIRECT IMPACT	Soil pollution caused by oil and fuel spills or maintenance materials and domestic waste left on site. The replacement of electrolyte of the redox flow batteries, also pose soil pollution risk.			
INDIRECT IMPACT	Increased risk of pollutant uptake by vegetation within the development area that can affect environmental and human health			
CUMULATIVE IMPACT	Increase in areas at risk of soil pollution			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-14	very low negative		
PROPOSED MITIGATION MEASURES				
Maintenance must be und	ertaken reg	gularly on all vehicles and maintenance mac	hinery to prevent hyd	rocarbon spills.

No domestic and other wathorised waste dumping		be left at the site and must be transporte	ed with the mainten	ance vehicles to an	
		any signs of oil, grease and fuel spillage or th	ne presence of waste		
		POST-MITIGATION	, ,		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE -6 very low negative					
CONFIDENCE LEVEL					
High					

(b) Aquatic Impact

During the operation phase, the solar arrays will operate largely unattended and with low maintenance required for more than 20 years. The hard surfaces created by the development may lead to increased runoff. This may lead to increased erosion and sedimentation of the downslope areas. A localised long-term impact (more than 20 years) of low intensity (depending on the distance between the solar arrays and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified aquatic ecosystems in the area.

The only potentially toxic or hazardous materials which would be present in relatively small amounts would be of lubricating oils and hydraulic and insulating fluids. Therefore, contamination of surface or groundwater or soils is highly unlikely.

Significance of impacts after mitigation: The overall significance of the impact on the aquatic ecosystems is expected to be very low. The impacts are rated the same for the battery technology alternatives for the BESS.

Table 7-262: SPH6 Operational phase aquatic ecosystem impacts

		AQUATIC ECOSYSTEM IMPACTS				
PROJECT PHASE	Operation	al phase				
DIRECT IMPACT	Disturban	ce of aquatic habitat; water quality impacts				
INDIRECT IMPACT	Modificati	ion of flow and alien vegetation invasion in aquati	c features			
CUMULATIVE	Dogradati	ion of the ecological condition of aquatic ecosyste				
IMPACT	Degradati	Degradation of the ecological condition of aquatic ecosystems				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with				
		the impact will last more than 5 years and as				
		such israted as Long Term	-5	1		
EXTENT	1	The extent of the impact is rated as footprint				
		as it will affects the area in which the proposed				

SIGNIFICANCE	-5	very low negative		
RESOURCES				
IRREPLACEBLE				
IMPACT ON	0	No irreplaceable resources will be impacted.		
		functions and processes are minimally affected	Negligible	Likely
		in such a waythat natural, cultural and social		
		negative as the impact affects the environment		
SEVERITY	-1	The severity of the impact is rated as Low		
		activity will occur		

PROPOSED MITIGATION MEASURES

Any disturbance during the operation phase should be limited to the approved development footprints and should avoid disturbance of the soil and natural vegetation cover.

Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areasdo not become infested with invasive alien plants.

Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwaterleaving developed areas.

Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider. In a scenario where services are installed, these systems need to be adequately installed and maintained to prevent any potential contamination of the water resources on site.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term	r	4
EXTENT	1	The extent of the impact is rated as footprint as it will affects the area in which the proposed activity will occur	-5	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	_	
SIGNIFICANCE		-5 very low negative		
		CONFIDENCE LEVEL		
Medium				

(c) Avifaunal Impact

(i) Bird fatality at PV facility

Bird fatalities could occur at the site through a number of mechanisms, including collision with PV panels, entanglement in perimeter fence (less likely since developer has chosen to use mesh panel fencing which has a tight weave and birds are less likely to become entangled), electrocution in substations/electrical compounds and others. The battery technology options for the BESS are rated the same and are both covered in the same table.

Table 7-263: SPH6 bird fatality during operational phase

BIRD FATALITY AT PV FACILITY						
PROJECT PHASE	Operational	phase				
DIRECT IMPACT	Birds killed t	Birds killed through various interaction with facility infrastructure				
INDIRECT IMPACT						
CUMULATIVE IMPACT	More projec	More projects will result in overall higher fatality rates in the area				
DIMENSION	RATING					

PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-8	very low negative			
	PROPOSED MITIGATION MEASURES				

None required at this stage. Once operational, if facility staff identify any fatalities this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. Operational phase bird monitoring should be conducted for at least one year as per the best practice quidelines – see Section 8.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		
CONFIDENCE LEVEL				
Medium			_	

(ii) Nesting & other use of facility infrastructure by birds

Certain species, in particular doves, pigeons, weavers and crows, are likely to use some of the facility infrastructure for nesting, perching and roosting. At face value this is a positive impact for birds and has been rated as VERY LOW POSITIVE significance both pre and post mitigation. However, where nesting interferes with the operation of the facility this could cause conflict and require management. Nesting on infrastructure also increases the likelihood of bird fatalities occurring through the various mechanism, particularly of young inexperienced birds. No mitigation is required for the impact of the facility on birds through nesting. For the impact of the birds nesting on the facility, the specialist recommends nest management on a case by case basis under the supervision of an avifaunal specialist, and in conformance with all relevant national and provincial legislation. The impact is rated the same for the both battery technology alternatives for the BESS.

Table 7-264: SPH6 impact of bird nesting and other use of facility infrastructure by birds

PROJECT PHASE	Operational	l phase		
DIRECT IMPACT				
INDIRECT IMPACT	Birds use inj	frastructure to perch, roost or nest on		
	More proje	cts in the area will probably diminish the likel	ihood of this happ	ening as perch
CUMULATIVE IMPACT	availability	will increase		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	7	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Beneficial .	
SIGNIFICANCE	7	very low positive		

None required at this stage. Once operational, if facility staff identify any nesting which interferes with operations this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. All nest management measures should only be undertaken in compliance with national and provincial environmental legislation in this regard.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	,	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	7	very low positive		
CONFIDENCE LEVEL				
Medium				

(d) Bats Impact

Day to day operation and maintenance of the facility may result in disturbance and displacement of bats. The impact is rated the same for both battery technology options for the BESS.

Table 7-265: SPH6 disturbance and displacement effects for bats

IMPACT ON POSSIBLE DISTURBANCE & DISPLACEMENT EFFECTS					
PROJECT PHASE	Operational phase				
DIRECT IMPACT	Disturbance of bats during operational activities				
INDIRECT IMPACT	Displacement				
CUMULATIVE IMPACT	Unavailability of suitable foraging resources in the broader environment for displaced individuals				

DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1	
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.			
SIGNIFICANCE	-7	very low negative			
		PROPOSED MITIGATION MEASURES			
Limit operational and main	tenance activi	ties to daylight hours, as far as possible, and mini	imise lighting at nig	ht.	
All lighting should preferable	y use low pre	ssure sodium and warm white LED lights.			
•		hould be limited to the immediate project footpr	int only.		
Site access should be strictly	y controlled, 1	o avoid unnecessary disturbance.			
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1	
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly detrimental	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.			
SIGNIFICANCE	-7	very low negative			
		CONFIDENCE LEVEL			
Medium	Medium				

Table 7-266: SPH6 bat roost disturbance

		MPACT ON POSSIBLE ROOST DISTURBANCE		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Disturbance	of roosting bats during operational activities		
INDIRECT IMPACT	Roost aban	donment		
	Unavailabili	ity of suitable roosting resources in the brod	ader environment	for abandoned
CUMULATIVE IMPACT	individuals	, ,		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	-7	1
EVTENT	2	The extent of the impact is rated as site as it		
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
		albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems or	Slightly	Unlikely
		communities are negatively affected	Detrimental	,
IIMPACT ON		3 , ,,		
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES	_			
SIGNIFICANCE	-7	Low negative		
	PROPOSED	MITIGATION MEASURES TO BE INCLUDED IN THI	E EMPr	
All lighting should preferable	ly use low pre	ssure sodium and warm white LED lights.		
		ivities, avoid all movement and noise around med	dium sensitivity area	ıs.
		hould be limited to the immediate project area.	,	
•		o avoid unnecessary disturbance.		
	, , , , , , , , , , , , , , , , , , , ,	POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		such is rated as Long Term	-7	1
		The extent of the impactis rated as site as it		
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
0212	_	cultural and social functions and processes are	Slightly	
		minimally affected	detrimental	Unlikely
IMPACT ON		, ,,	1	
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES		,		
SIGNIFICANCE	-7	very low negative	L	
		CONFIDENCE LEVEL		
Medium				

(e) Botanical Impacts

Maintenance activities will require management of vegetation which may result in loss of natural vegetation. The impact is rated the same for both battery technology options for the BESS.

Table 7-267: SPH6 loss of Western Free State Grassland during operational phase

		LOSS OF VEGETATION		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Direct impa	ct		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
Bonathon		such is rated as Long Term		
		The extent of the impact is the footprint as it	-5	1
EXTENT	1	only affects the area in which the proposed		
EXTENT	_	activity will occur.		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,	Negligible	
		cultural and social functions and processes are		
		minimally affected		Unlikely
IMPACT ON		, , , , , , , , , , , , , , , , , , , ,		· · · · · · · · · · · · · · · · · · ·
IRREPLACEBLE	О	No irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
When and where possible, v	vegetation cle	earing should be undertaken during the dry season	ı.	
Only clear vegetation where	_			
, ,		will be decided and approved by the Project M	anaaer and appoin	ted ECO before
	-	uld not be located within drainage lines.		,
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	1	the impact will last 0-6 months and as such is		
		rated as Temporary	2	4
		The extent of the impact is rated as footprint	-2	1
EXTENT	1	as it only affects the area in which the		
		proposed activity will occur		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes are	Nanlinible	Halibala
		minimally affected	Negligible	Unlikely
IMPACT ON				
IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-2	very low negative	-	
		CONFIDENCE LEVEL		
Medium				

(f) Groundwater Impact

Similar to the construction phase, the operational phase of the SPH6 will require approximately $2,000 \text{ m}^3/\text{a}$ (0.03 L/s). This does not exceed the regionally mapped yield of the underling aquifer (0.5-2.0 L/s). It is not currently planned to use groundwater for the operational phase of this project however if this changes a water use licence will need to be applied for and the potential impacts and mitigation measures are presented in **Table 7-268**.

The principal risks for groundwater contamination that have been identified are the use of cleaning agents for cleaning of PV panels and for dust suppression of internal roads. If required, it is encouraged that water alone is used to conduct these tasks. Alternatively, the PV cleaning agents and dust suppression mixes must be environmentally friendly and should breakdown naturally without causing ingression of harmful chemicals into the environment. The risks and status of groundwater contamination occurring during the operational phase of SPH4 is presented in **Table 7-269**.

The proposed development will require a BESS. Currently two different technologies are being considered, i.e. either Solid State Lithium Batteries (SSLB) or Vanadium Redox Flow Battery Energy Storage Systems (VRFB). Both of these two BESS systems require an electrolyte. The SSLB contain an ethylene carbonate or di-ethyl carbonate electrolyte and the VRFB system will require that an estimate of 3 000 m³ of sulfuric acid solution with vanadium ions electrolyte is stored on site for each Springhaas Facility. The BESS systems will also require cooling systems and these systems could potentially either be water based or it may be refrigerant based systems which used chemicals such as ethylene glycol- based coolants.

The containers that the BESS systems are held in are equipped with a "Clean agent" which is a fires suppression systems that can release a powder/gas into the container to snuff fires. These systems usually leave a residue on the equipment that will need to be cleaned off. With any chemical storage there is always a risk of chemical fires that will need to be put out with water or foam and the waste water from these activities could contain contaminants that should not be let to run off into the environment.

The fire safety systems, refrigerants, electrolyte solutions and the waste products produced from these systems could contaminate the soil and groundwater and all measures should be taken to prevent leaks or spills on the ground. The risks and mitigations for the BESS are presented in **Table 7-270**.

The impact on groundwater levels is rated the same for both battery technology alternatives for the BESS.

Table 7-268 SPH6: Impact of lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place)

Potential impact on groundwater level due to over abstraction					
PROJECT PHASE	Operational	Phase			
DIRECT IMPACT	Lowering of	groundwater level due to over abstraction			
INDIRECT IMPACT	Drying of sp	rings in the area			
CUMULATIVE IMPACT	Permanent o	damage to the aquifer system in the area			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
	PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as			
		such is rated as Long Term	-16	2	
EXTENT	3	The extent of the impact is rated as Local as	-10	2	
		it affects the development area and			
		adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected	ivioaerateiv	Likely	

		environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-32	low – negative			
		PROPOSED MITIGATION MEASURES			
If boreholes are used it must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 — Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring. Adhere to the borehole's safe yield and to monitor water levels and flow.					
Groundwater abstrac	tion volumes	must be monitored.			
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	•		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	0	1	
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely	
SIGNIFICANCE	0	very low negative			
		CONFIDENCE LEVEL			
Medium					

Table 7-269: SPH6 Impact of contamination of groundwater as a result of cleaning agents used for cleaning the solar panels

Potential impact on groundwater as a result of cleaning agents used for cleaning the solar panels.					
PROJECT PHASE	Operational	Operational Phase			
DIRECT IMPACT	Contaminat	ion of groundwater			
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area			
CUMULATIVE IMPACT	Long-term r	educed groundwater quality			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-16	2	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-32	low - negative			
PROPOSED MITIGATION MEASURES					
· ·	Use environmentally safe cleaning agents that breakdown naturally (biodegradable detergents/green soaps) and that will not cause adverse effects.				

	POST-MITIGATION				
DURATION	4	The duration of the activity associated with	0	1	
		the impact will			
		last more than 5 years and as such is rated			
		as Long Term			
EXTENT	1	The extent of the impact is rated as			
		footprint as it only affects the area in			
		which the			
		proposed activity will occur			
SEVERITY	0	Negligible	Negligible	Unlikely	
IMPACT ON	1	Irreplaceable resources will be			
IRREPLACEBLE	-	impacted.			
RESOURCES					
SIGNIFICANCE	0	very low negative			
	CONFIDENCE LEVEL				
Medium			•	•	

Redox flow batteries contain electrolyte solution which needs to be replaced approximately every 15 to 20 years. During replacement of electrolyte there is a risk of leaks or spills. This impact is only applicable to the redox flow batteries as lithium-ion batteries are solid state batteries.

Table 7-270: SPH6 Impact table for contamination of groundwater quality as a result of leaking or spills from the electrolyte solution from the battery energy storage system (BESS)

Potential impact on gr	•	ty as a result of leaking or spills from t	he electrolyte soluti	on from the
DDOLECT DUACE		tery energy storage system (BESS)		
PROJECT PHASE	Operational Pho			
DIRECT IMPACT		of groundwater		
INDIRECT IMPACT		vegetation or ecosystem it the area		
CUMULATIVE IMPACT		ced groundwater quality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or Communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-32	low - negative		
	PRO	OPOSED MITIGATION MEASURES		

Ensure that all electrolyte or chemicals stored or used on site have secondary containments systems in place with reliable leak detection, annunciation in place. Ensure that all chemicals are handled on concrete bunded surfaces and not on bare soil.

Any waste products produced form the BESS systems should be removed and disposed of appropriately.

Waste water produced by fire hydrants should not be allowed to runoff into the environment.				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	0	1
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely
SIGNIFICANCE	0	very low negative		
CONFIDENCE LEVEL				
Medium				

(g) Heritage Impact

(i) Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts during operation of SPH6 relate only to the presence of the facility in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the facility. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a degree of change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. The impacts are the same for both technology options for the batteries for the BESS.

Table 7-271: SPH6: Assessment of operation phase impacts to the cultural landscape

	CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	Operation I	Operation Phase			
DIRECT IMPACT	Alteration (Alteration of the rural landscape character through the presence of a solar energy facility			
INDIRECT IMPACT	None				
CUMULATIVE IMPACT	Impacts wi	ll be greater with multiple facilities being preser	nt		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-7	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental	, 	
SIGNIFICANCE	-21	low - negative			
		PROPOSED MITIGATION MEASURES			
Keep all maintenance wor	k within the	authorised footprint.		·	

Minimise night-time light	pollution in t	he area (visual recommendations to be followed	to achieve this).	
	POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-/	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High	•			

(h) Socio-Economic Impact

(i) Stimulation of the Local Economy during operations

The operational period of SPH6 is a minimum of 20 years. Of the money spent annually during the operations period, a significant portion will likely comprise of salaries and wages of the Springhaas employees. The operations of the facility will make some contribution towards the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

No differentiate can be made between battery technology alternatives for the BESS. The technology alternatives are considered in **Table 7-218** and **Table 7-219**.

Table 7-272: SPH6: Assessment of Economic stimulation during operations

STIMULATION OF THE LOCA	L ECONOMY	DURING OPERATIONS			
PROJECT PHASE	Operation	Operational Phase			
DIRECT IMPACT	Long-term	n increase in production and GDP in the local ecor	поту		
INDIRECT IMPACT	Improved	household income and increased business sales i	n the local econom	у	
CUMULATIVE IMPACT	Increase i	n production and GDP in the regional economy			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	- 8	3	
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite	

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
PROPOSED MITIGATION MEA	SURES			
Where feasible, procure goods	s and servi	ces required for the operation of the plant from th	e local economy	
POST-MITIGATION				
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	16	3
		The extent of the impact is rated as Regional	10	3
EXTENT	4	as the effects of the impact extends beyond		
		municipal boundaries		
		The severity of the impact is rated as		
		Moderate positive as the affected		
		environment is altered but natural, cultural		
SEVERITY	2	and social functions and processes continue	Madayatak	
		albeit in a modified way; and valued,	Moderately Beneficial	Definite
		important, sensitive or vulnerable systems or	Бепелски	
		communities are positively affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be impacted.		
RESOURCES	U	No irreplaceable resources will be impacted.		
SIGNIFICANCE	48	moderate positive		
CONFIDENCE LEVEL				
High				

(ii) Creation of Employment and increased household income during operations

The operation of SPH6 will require functional and maintenance employees. It is envisaged that about 16 direct jobs per facility will be created during the operations phase, which will occur for a duration of 20 years. About 70% of these jobs are to be filled by people from the local communities as they will be low-skilled employment opportunities. Employment of the eight individuals for the entire operational period will increase their household income, improve their standard of living and benefit their families.

SPH6 will create the same number of employment opportunities, regardless of its location on the site; thus, layout alternatives are equally preferred. The type of battery used in the BESS will also not significantly affect employment alternatives, thus both technology alternatives are equally preferred.

Table 7-273: SPH6 Assessment of employment during operations

CREATION OF EMPLOYMENT AND INCREASED HOUSEHOLD INCOME DURING OPERATIONS						
PROJECT PHASE	Operation	al Phase				
DIRECT IMPACT	Creation o	f permanent employment opportunities in the	local and regional	есопоту		
INDIRECT IMPACT	Improved	Improved income of households whose members are employed on the project				
CUMULATIVE IMPACT	Creation o	Creation of permanent employment opportunities in the region				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
PRE-MITIGATION						
		The duration of the activity associated with				
DURATION	4	the impact will last more than 5 years and	8	3		
		as such is rated as Long Term				

EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
PROPOSED MITIGATION MEAS	SURES			
Where feasible, aim to fill all t	he positions	by labour from the local community		
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	8	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		3
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		•
CONFIDENCE LEVEL				
High				

(iii) Improved municipal service delivery

SPH6 will have a capacity of up to 250MWac and will be connected to the national grid through Eskom substation and generated electricity will be sold nationwide. The proposed project, albeit relatively small, will contribute towards improving National electricity availability; thus, improving the government service delivery, and could potentially also aid in growing the local economy by increasing the overall supply of electricity in the local economy. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas.

The layout alternatives and BESS technology alternatives will not affect the capacity of the solar facility; thus all alternatives are equally preferred.

Table 7-274: SPH6: Assessment of service delivery improvement

IMPROVED MUNICIPAL SERVICE DELIVERY				
PROJECT PHASE	Operational phase			
DIRECT IMPACT	It will likely Improve the local electricity supply if fed to the grid			
INDIRECT IMPACT	Improved standard of living within the region			
CUMULATIVE IMPACT	Improved electricity availability			

DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as	16	3
EXTENT	4	Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite
IMPACT O IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	48	moderate positive	1	
PROPOSED MITIGATION	MEASURES			
No mitigations proposed				

(iv) Reduction of Land Area available for productive farming

The proposed site of SPH6 and surrounding land is currently used for small-scale livestock. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH6 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH6.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The different battery technology alternatives will not affect the impact ratings.

Table 7-275: SPH6: Assessment of Impact on agricultural production

	Reduction of Land Area available for Productive Farming					
PROJECT PHASE	Operation	nal Phase				
DIRECT IMPACT	Loss of ag	gricultural production within the footprint o	lue to land sterilisatio	on		
INDIRECT IMPACT	Negligibi	e to no indirect impact				
CUMULATIVE IMPACT	Negligible	Negligible to no cumulative effects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	Ü	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-18	very low negative				
		PROPOSED MITIGATION MEASURES				
Rehabilitation of land shou after the closure of the pro		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming		
.,	,	POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	U	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-18	very low negative				
		CONFIDENCE LEVEL				
High						

(i) Terrestrial Biodiversity and Animal Species

(i) Direct Impacts – Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death.

Regarding the technology alternative for the type of battery used in the BESS for SPH6, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-276: SPH6 Injury or death to fauna

		ALL FACILITIES		
PROJECT PHASE	Operation	nal Phase		
DIRECT IMPACT		death to fauna		
INDIRECT IMPACT		acath to Juana		
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
DIMENSION	KATING	PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
DONATION	7	years and as such is rated as Long Term		
		The extent of the impact is rated as	-16	2
EXTENT	3	Local as it affects the development		
EXTENT		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
		cultural and social functions and		
SEVERITY	-2	processes continue albeit in a modified		
		way; and valued, important, sensitive	Moderately	Likely
		or vulnerable systems or communities	detrimental	
		are negatively affected		
IMPACT ON IRREPLACEABLE		Irreplaceable resources will be		
RESOURCES	1	impacted		
SIGNIFICANCE	-32	low negative		
		PROPOSED MITIGATION MEASURES		
No wild animal may under any	circumstan	ce be handled, removed or be interfered w	vith by maintenance s	taff
		, drivers of maintenance vehicles must rem		
		t should be adhered to (recommended 40		, . ,
	_	prevent attraction of faunal species to hun		re scavenaer proof
		osed of in the most appropriate way to pre		
becoming habituated to humar		, , , , , , , , , , , , , , , , , , , ,	, ,	3
		ures must be in place. A fire emergency mo	anagement plan must	be in place
		ed on a regular basis to minimise the risk o		,
		POST-MITIGATION	, ,	
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	_	
		The extent of the impact is rated as	-6	1
EXTENT	1	footprint as it only affects the area in		
		which the proposed activity will occur		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that		
		natural, cultural and social functions	Negligible	Unlikely
		and processes are minimally affected		
IMPACT ON IRREPLACEABLE		Irreplaceable resources will be		
RESOURCES	1	impacted		
SIGNIFICANCE	-6	very low negative		
		CONFIDENCE LEVEL		
High				

(ii) Indirect Impacts – Pollution and contamination of natural areas

During operations, release of grey water into the environment can cause contamination by detergents. Grey water from cleaning of the solar panels has the potential to contaminate soils and ground water and be washed into the nearby natural pans during high rainfall events. This

includes biodegradable detergents used for cleaning the panels, which can accumulate in the soil and be washed into the nearby pans before they break down. Biodegradable detergents can alter the balance of freshwater ecosystems as they promote bacterial growth and lower oxygen levels. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-277: SPH6 Pollution and contamination of natural areas including pans and wetland

POLLUTION AND CONTAMINATION OF NATURAL AREAS INCLUDING PANS AND WETLANDS				
PROJECT PHASE	Operational Phase			
DIRECT IMPACT				
INDIRECT IMPACT	Pollution	and contamination of natural areas – incl	uding nearby pans	or wetlands
CUMULATIVE IMPACT	Habitat d	legradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	21	3
		The extent of the impact is rated as		3
EXTENT	3	Local as it affects the development		İ
		area and adjacent properties		
		The severity of the impact is rated as		
		High negative as the natural, cultural		
		or social functions and processes are		
		altered to the extent that the natural		
SEVERITY	-3	process will temporarily or		
		permanently cease; and valued,	Highly	Definite
		important, sensitive or vulnerable	detrimental	Dejiiite
		systems or communities are		
		substantially affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted		
SIGNIFICANCE	-63	high negative		
PROPOSED MITIGATION MEASURES				

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-12	2
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive	Slightly Detrimental	Likely

		or vulnerable systems or communities are negatively affected	
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be	
RESOURCES	0	impacted	
SIGNIFICANCE	-24	Low negative	
CONFIDENCE LEVEL			
High			

(iii) Indirect Impacts – Disturbance and displacement of fauna

Security lights for SPH6 during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland adjacent to the facility, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-278: SPH6 Disturbance and displacement of fauna – natural grassland and rocky outcrops

DISTUR	BANCE ANI	D DISPLACEMENT OF FAUNA – NATURAI	L GRASSLAND	
PROJECT PHASE	Operational Phase			
DIRECT IMPACT				
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland and rock	y outctops
CUMULATIVE IMPACT	Displacen	nent of fauna		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-48	Moderate negative		
	F	PROPOSED MITIGATION MEASURES	_	_

Operations during the night must be avoided to minimise the need for artificial lighting and to reduce the impact of light and noise on nocturnal animals

Lighting during operations should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1

EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-7	very low negative		
		CONFIDENCE LEVEL		
High				

(j) Traffic Impact

During the operational phase there will be approximately 8 full time employees on site. Vehicles would access the site for daily operations and maintenance as and when required. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-279 SPH6: Traffic impacts during operation phase

		TRAFFIC IMPACTS				
PROJECT PHASE	Operation	al Phase				
DIRECT IMPACT	Traffic con	gestion due to the trips generated by the operati	ion of the facility			
INDIRECT IMPACT		ated noise and dust pollution				
CUMULATIVE IMPACT		rys on the surrounding road network				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	PRE-MITIGATION					
DURATION	4	The duration of the activity associated				
DONATION		with the impact will lastmore than 5 years				
		and as such is				
		rated as Long Term	0	3		
EXTENT	3	The extent of the impact is rated asLocal as				
		it affects the development area and				
		adjacent properties				
SEVERITY	0	Negligible				
IMPACT ON	0	No irreplaceable resources will be				
IRREPLACEBLE		impacted.	Negligible	Definite		
RESOURCES		mpactea.				
SIGNIFICANCE	0	very low negative				
		PROPOSED MITIGATION MEASURES				
		r outside of peak traffic periods; and				
		t regular maintenance of gravel roads (located w		lary,including the		
access road to the site) occ	urs during op	eration phase to minimise/mitigate dust pollution	on.			
		POST-MITIGATION	ı			
DURATION	4	The duration of the activity associated				
BOILTION		with the impact will lastmore than 5 years	_	_		
		and as such is rated as Long Term	0	3		
EXTENT	2	The extent of the impact is rated assite as it				
		will affect only the development area				
SEVERITY	0	Negligible				
IMPACT ON	0	No irreplaceable resources will be	Negligible	Definite		
IRREPLACEBLE		impacted.	, regugible	Dejiiite		
RESOURCES						
SIGNIFICANCE	0	very low negative				
		CONFIDENCE LEVEL				
High	<u> </u>					

7.7.5 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered **Section 7.7**.

7.7.6 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities and is covered in **Section 7.8.**

7.7.7 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The cumulative impact assessment is available in **Section 7.9.**

Table 7-280: SPH6 impact summary

Impact	Nature	Rating pre-mitigation	Rating post mitigation				
Design/Planning/Pre-Construction Phase							
No impacts identified							
Construction Phase							
Agricultural impacts							
Land use change from livestock farming to energy generation	Negative	Moderate	Low				
Soil loss through erosion	Negative	Moderate	Very low				
Impaired soil functionality caused by compaction	Negative	Moderate	Very low				
Impaired soil health as a result of soil pollution	Negative	High	Very low				
Aquatic impacts							
Disturbance and water quality impacts	Negative	Moderate	Low				
Avifaunal impacts							
Destruction of bird habitat during construction	Negative	Moderate	Low				
Disturbance of birds during construction	Negative	Very low	Very low				
Bat impacts							
Bat habitat modification	Negative	Very low	Very low				
Disturbance and displacement of bats	Negative	Very low	Very low				
Possible roost disturbance	Negative	Low	Very low				
Bat roost destruction	Negative	Low	Very low				
Botanical impacts							
Loss of vegetation	Negative	Medium	Low				

Groundwater impacts			
Lowering of the groundwater level due to over abstraction for	Negative	Low	Very low
construction phase (only applicable if abstraction takes place)	Nanativa	LOW	very low
Contamination of groundwater as a result of accidental oil spillages or fuel leakages	Negative	Very low	Very low
Heritage impacts			
Impact on archaeological sites	Negative	Very low	Very low
Impact on graves	Negative	Low	Very low
Impact on cultural landscape	Negative	Low	Low
Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-economic impacts			
Stimulation of the economy during construction	Positive	Low	Low
Employment opportunities	Positive	Low	Low
Reduction in land available for productive farming	Negative	Very low	Very low
Loss of property	Negative	Low	Very low
Terrestrial biodiversity and animal species (faunal) impacts			
Destruction of faunal habitat	Negative	High	Low
Injury or death to fauna	Negative	Moderate	Very low
Disturbance and displacement of fauna	Negative	Low	Very low
Pollution and contamination of natural areas	Negative	Moderate	Very low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Traffic impacts			
Traffic congestion	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Moderate	Low
Industrialisation of the landscape as seen from local roads	Negative	Low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
Operational Phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Soil pollution	Negative	Very low	Very low
Aquatic impacts			
Increased run-off, pollution	Negative	Very low	Very low
Aquatic			
Disturbance of aquatic habitat; water quality impacts	Negative	Very low	Very low
Avifauna impacts			
Bird fatality through interaction with infrastructure	Negative	Very low	Very low
Nesting and use of other infrastructure by birds	Positive	Very low	Very low
Bat impacts			
Disturbance and displacement	Negative	Very low	Very low
	1		

Roost disturbance	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Very low	Very low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place).	Negative	Low	Very low
Contamination of groundwater from use of cleaning agents	Negative	Low	Very low
Contamination of groundwater from leaks or spills from BESS	Negative	Low	Very low
Heritage impacts			
Impact on cultural landscape	Negative	Low	Low
Socio-economic impacts			
Economic stimulation during operations	Positive	Low	Moderate
Employment opportunities	Positive	Low	Low
Improved service delivery	Positive	Moderate	Moderate
Reduction in land available for productive farming	Negative	Very low	Very low
Terrestrial biodiversity and animal species			
Injury or death of fauna	Negative	Low	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Low
Disturbance and displacement of fauna –natural grassland and rocky outcrops	Negative	Moderate	Very low
Traffic impact			
Traffic congestion	Negative	Very low	Very low
Palaeontological impacts			
Destruction of fossils	NA	NA	NA
			INA
Decommissioning phase			INA INA
Decommissioning phase Agricultural impacts		-	IVA
	Negative	Moderate	Very low
Agricultural impacts	Negative Negative		
Agricultural impacts Soil loss through erosion	_	Moderate	Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction	Negative	Moderate Moderate	Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution	Negative	Moderate Moderate	Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts	Negative Negative	Moderate Moderate High	Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts	Negative Negative	Moderate Moderate High	Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts	Negative Negative Negative	Moderate Moderate High Very low	Very low Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds	Negative Negative Negative	Moderate Moderate High Very low	Very low Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts	Negative Negative Negative Negative	Moderate Moderate High Very low	Very low Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements	Negative Negative Negative Negative	Moderate Moderate High Very low	Very low Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts	Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low	Very low Very low Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation	Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low	Very low Very low Very low Very low Very low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation Groundwater	Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low Low	Very low Very low Very low Very low Very low Low
Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation Groundwater Contamination from construction activities	Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low Low	Very low Very low Very low Very low Very low Low

Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-Economic impacts			
Impact on the economy	Positive	Very low	Very low
Creation of temporary employment opportunities in the local and regional economy	Positive	Very low	Very low
Terrestrial biodiversity and animal species			
Destruction of novel ⁷ faunal habitat (i.e. grassed areas under the	Negative	Moderate	Very low
panels where fauna may recolonise after construction) Injury or death to animals (due to collisions with construction			,
vehicles or destruction of burrows that have established under the panels)	Negative	Moderate	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Very low
Disturbance to and displacement to fauna and edge effects – natural grassland	Negative	Low	Very Low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Reestablishment of movement corridors through the landscape due to removal of fences and return to open grassland	Negative	Very low	Low positive
Traffic impacts			
Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
No-Go Alternative			
Agricultural	Negative	Very low	Very low
Aquatic	Negative		Very low-
Avifauna	Negative	Very low	negligible Very low
Bats	Negative	Very low	Very low
Botanical	Negative	Low	,
Heritage	Negative	Very low	Low Very low
Transport- Traffic congestion	Negative	Very low	Very Low
Terrestrial biodiversity and animal species	Negative/		Very low
	positive	Low negative	positive
Socio-economic Socio-economic	NA- no impact, forgone + impacts	NA	NA
Destruction of fossils	NA	NA	NA
Landscape and Visual	Negligible	No impact/NA	No impact/NA
Groundwater Impacts	Negligible	NA	NA
Cumulative impacts			

 $^{^{7}}$ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

Agricultural	Negative	Very low	Very low
Aquatic	Negative	Low	Low
Avi-fauna	Negative	Moderate	Moderate
Bats	Negative	Low	Low
Botanical	Negative	Very low	Very low
Heritage	Negative	Moderate	Low
Socio-economic - Impact on the economy- construction	Positive	-	Moderate
Socio-economic -Creation of employment during construction	Positive	-	Moderate
Socio-economic -Reduction in land available for productive farming	Negative	-	Low
Socio-economic -Stimulation of the economy – operations	Positive	-	Moderate
Socio-economic -Employment - operations	Positive	-	Moderate
Socio-economic -Improved municipal service delivery	Positive	-	Moderate
Socio-economic -Loss of property	Negative	-	Low
Socio-economic - Stimulation of economy - decommissioning	Positive	-	Very low
Terrestrial biodiversity	Negative	High	Moderate
Transport	Negative	Low	Very Low
Landscape and visual	Negative	-	Low
Destruction of fossils	NA	NA	NA
Groundwater: Aquifer system and water quality	Negative	Low- Very Low	Low – Very Low

7.8 Springhaas 8 Detailed Impact Assessment

7.8.1 Alternatives Considered

(a) Technology Alternatives

Two technology alternatives namely lithium-ion and redox flow batteries were considered for the BESS.

(b) No-Go Alternative

The no-go alternative was considered for all seven of the proposed facilities. The impact of the no-go alternative was rated as the same for all seven facilities. The no-go alternative is assessed in **Section 7.8**.

7.8.2 Pre-construction phase

No significant impacts for the pre-construction phase have been identified by any specialist studies or by the EAP for SPH8.

7.8.3 Construction Phase

(a) Agricultural Impact

The most significant agricultural impacts associated with the development of SPH8 will occur during the construction phase when the site is fenced off, vegetation is removed and the soil surface is prepared for the installation of infrastructure.

The majority of the footprint of SPH8 is classified as low sensitivity from an agricultural perspective. There is one small patch of medium sensitivity land on the eastern edge of the site.

SPH8 was also classified in terms of agricultural potential. The majority of the site is classified as low to very low potential. There are two patches of low- moderate potential land and one sections of moderate potential land. As these patches of low- moderate and moderate potential agricultural land are isolated from larger patches of moderate sensitivity land they are not viable from a production perspective.

Tables 7-173 – 7-176 cover the two technology options for the BESS. There was no difference in the alternatives proposed from an agricultural perspective.

Table 7-281: SPH8: Impact of land use change from livestock farming to renewable energy generation

LAN	LAND USE CHANGE FROM LIVESTOCK FARMING TO ENERGY GENERATION					
PROJECT PHASE	Construction	Construction Phase				
DIRECT IMPACT	Construction of boundary fence and PV infrastructure will change land use from livestock					
DIRECT IIVIPACT	farming to r	enewable energy generation				
	Intensificati	on of agriculture in other areas or other	wise reduction of live	estock produced in		
INDIRECT IMPACT	the area					
CUMULATIVE IMPACT	Increase in a	areas where agriculture is converted into	other land uses			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3		
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area				
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-42	moderate - negative				
PROPOSED MITIGATION MEASURES						

Springhaas Solar Facility 3 (Pty) Ltd must provide market-related compensation that will allow the current land users to have the same or better ability to sustain their livelihood.

Ensure that the final infrastructure layout remains within the fenced off area of the development footprint.

Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area.

The use of main access routes by construction vehicles and equipment must do so with consideration of nearby agricultural land users who use the same access routes for farming activities.

All left-over construction material must be removed from site once construction on a land portion is completed.

No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.

No boundary fence must be opened without the landowners' permission.

No open fires made by the construction teams are allowable during the construction phase.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
	CONFIDENCE LEVEL			
High				

Table 7-282: SPH8: Impact significance of soil loss through erosion during the construction phase

		SOIL LOSS THROUGH EROSION			
PROJECT PHASE	Constructio	Construction Phase			
DIRECT IMPACT	1	particles from areas where consti from the surface.	ruction activities result in	the removal of	
INDIRECT IMPACT	Sparse to no	o vegetation growth in eroded areas	S.		
CUMULATIVE IMPACT	Increase in	areas exposed to soil erosion			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as site as it will affect only the development area	-18	3	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or	Moderately Detrimental	Definite	

		communities are substantially affected.
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be
RESOURCES	1	impacted.
SIGNIFICANCE	-54	moderate - negative

PROPOSED MITIGATION MEASURES

Limit vegetation removal from the soil surface to the areas of infrastructure development such as access routes as well as around the foundations of the PV arrays and buildings.

Vegetation clearance must only be undertaken immediately prior to construction activities and only within the development footprint

Once construction of an area has been completed, level any remaining soil removed from excavation pits (where the PV arrays will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface where it is exposed to rain and wind. This is applicable to all construction areas, except where topsoil stockpiles must remain for site rehabilitation of specific areas.

Stormwater channels on site must be designed to minimise the soil erosion risk that results from surface water runoff.

Where possible, conduct the construction activities outside of the rainy season.

POST-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	_	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
High				

Table 7-283: SPH8: Impact significance of impaired soil functionality caused by compaction

IMPAIRED SOIL FUNCTIONALITY				
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	The weig compacti	tht and movement of vehicles and equipment on.	ent over the surfac	ce will result in soil
INDIRECT IMPACT	increase i	ed soil have reduced pore space and water ir the rate of surface water runoff, especially af	•	pacted soil surfaces
CUMULATIVE IMPACT		in areas affected by soil compaction.	1	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable	Moderately Detrimental	Definite

	PROPOSED MITIGATION MEASURES				
SIGNIFICANCE		-54	moderate - negative		
RESOURCES					
IRREPLACEBLE		1	Irreplaceable resources will be impacted.		
IMPACT	ON				
			systems or communities are substantially affected.		

Only allow vehicles and equipment to travel on designated access routes and not anywhere else within the development

Use existing main access routes and internal farm roads where possible and avoid using other areas in the site as temporary access routes.

Vehicles and equipment must park in designated parking areas.

Materials must be off-loaded and stored in designated laydown area.

Where possible, conduct the construction activities outside of the rainy season as wet soil compacts easily as opposed to dry soil.

ury son.				
		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	,,	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
High				_

Table 7-284: SPH8: Impact significance of impaired soil health as a result of soil pollution

IMPAIRED SOIL HEALTH						
PROJECT PHASE	Construction I	onstruction Phase				
DIRECT IMPACT	and material spillage of cor state containe the release of	Soil pollution can be caused by oil and fuel spills from vehicles and equipment as well as domestic and material waste on site. Should the vanadium redox flow batteries be used for the BESS, spillage of corrosive and environmentally toxic electrolyte is possible. In the case that lithium solid state containerised batteries are used, there is a possibility of thermal runaway that will result in the release of toxic and flammable gasses.				
INIDIDECT IMPACT		Increased risk of pollutant uptake by vegetation within the development area that can affect				
INDIRECT IMPACT CUMULATIVE IMPACT	environmental and human health. Increase in areas at risk of soil pollution.					
DIMENSION		RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
PRE-MITIGATION						
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as Local as it affects the development area and	-21	3		
SEVERITY	-3	adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable	Highly detrimental	Definite		

		systems or communities are substantially affected.		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-63	high negative		
		PROPOSED MITIGATION MEASURES		
Maintenance must be u	ndertaken regu	larly on all vehicles and construction equipme	ent to prevent hydr	ocarbon spills.
Any waste generated d construction teams.	uring construct	ion must be stored into designated containe	rs and removed fr	om the site by the
Any left-over construction	on materials mu	ust be removed from the development area.		
The development area r	nust be monitor	red by the Environmental Control Officer (ECC)) to detect any ear	ly signs of fuel and
oil spills and waste dum	ping. The ECO r	must also report any spills from batteries.		
Ensure battery transpor	t and installatio	on is undertaken by accredited staff and conti	actors.	
Compile (and adhere to,	a procedure fo	or the safe handling of battery cells during tra	nsport and installa	tion.
		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	_	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
		CONFIDENCE LEVEL		

(b) Aquatic Impact

High

Construction phase activities would result in disturbance of soil and clearing of vegetation. Water quality impacts may occur from batching of concrete on site, hydrocarbon spills and other construction activities.

There is no difference in impacts between the two battery technology options for BESS, the impact assessment table covers both alternatives.

Table 7-285: SPH8: Impact of aquatic ecosystems during the construction phase

		AQUATIC ECOSYSTEM IMPACTS		
PROJECT PHASE	Construction	Phase		
DIRECT IMPACT	Disturbance	of aquatic habitat; water quality impacts		
INDIRECT IMPACT	Modification	of flow and alien vegetation invasion in aquatic fea	itures	
CUMULATIVE IMPACT	Degradation	of the ecological condition of aquatic ecosystems		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
	4	The duration of the activity associated with the		
DURATION		impact will last more than 5 years and as such is		
		rated as Long term	4.4	2
	2	The extent of the impact is rated as Local as it	-14	3
EXTENT	3	affects only the development area and adjacent		
LATEINI		properties		

			PROPOSED MITIGATION MEASURES		
SIGNIFICANCE		-42	Moderate negative		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SEVERITY		-2	The severity of the impact is rated as Moderate as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.	Moderately Detrimental	Definite

A buffer of at least 250 m between the significant aquatic ecosystems (larger pans) and all the proposed project activities should be maintained (noting that this is already honoured in the proposed layout for all facilities).

Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers, while retaining the topography and cover vegetation within the wider drainage areas through the site is preferred to reduce the potential modification to the way in which water drains through these areas.

The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.

During the construction phase, site management must be undertaken at the laydown and construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities such as hydrocarbon spills. The solar panels will be washed with water and a biodegradable/ greendetergent.

Any stormwater that does arise within the construction sites must be handled appropriately to trap sediments and reduce flow velocities where necessary.

Development within the drainage areas, where located within a proposed facility, will however need to consider stormwater management measures and should avoid impacting on the movement of water through the more seasonally wet areas. Minimal disturbance to the topography and cover vegetation in these areas is recommended.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last 0-6 months and as such is rated asTemporary	-12	2
EXTENT	2	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur		
SEVERITY	-2	The severity of the impact is rated as Moderate as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.	Slightly Detrimental	Likely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-24	low negative		
		CONFIDENCE LEVEL		
High				

(c) Avifaunal Impact

(i) Habitat destruction associated with the construction of the facility

Habitat destruction and alteration will occur during the construction phase of SPH8. The majority of the development footprint would be transformed from its current state to a renewable energy facility. SPH8 will transform approximately 253ha of habitat. Most of this

is in a fairly natural state currently, or in the case of arable lands is still accessible and useable for birds foraging.

Table 7-286: SPH8: Formal rating of destruction of bird habitat during construction

	DESTRU	ICTION OF BIRD HABITAT DURING CONSTRUCTION	ON	
PROJECT PHASE	Construction			
DIRECT IMPACT		tion of natural habitat into PV facility		
INDIRECT IMPACT	Transjorma	tion of material medical into 1 v judinity		
CUMULATIVE IMPACT	Vac Largar	area transformed from natural habitat		
			CONCEOUENCE	HIVELIHOOD
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	ı	PRE-MITIGATION		
-		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	-12	3
I		The extent of the impact is rated as footprint		3
EXTENT	1	as it only affects the area in which the		
		proposed activity will occur		
		The severity of the impact is rated as		
		Moderate as the affected environment is		
		altered but natural, cultural and social		
SEVERITY	-2	functions and processes continue albeit in a		
		modified way; and valued, important,	61: 1.1	
		sensitive or vulnerable systems or	Slightly	Definite
		communities are negatively affected.	Detrimental	-
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES		, ,		
SIGNIFICANCE	-36	moderate – negative		
		PROPOSED MITIGATION MEASURES		
There is no specific mitigat	tion required.	Impact avoidance has already been implemente	ed in the design ph	ase through the
adherence to no-go buffers			a m the design pm	use imough inc
auncience to no go zujjeto	arearra pario	POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term		
		The extent of the impact is rated as footprint	-12	3
EXTENT	1	as it only affects the area in which the		
2,11,2,11	_	proposed activity will occur		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
SEVERITI	-2		Slightly	
		albeit in a modified way; and valued, important, sensitive or vulnerable systems or	Detrimental Detrimental	Definite
		communities are negatively affected	Detrimental	
IMPACT ON		communities are negatively affected		
	1	Irraniacoable recourses will be impressed		
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES SIGNIFICANCE	-36	low - negative		
SIGNIFICANCE	-30	-		
re t		CONFIDENCE LEVEL		
High				

(ii) Disturbance of birds & displacement effects

Disturbance of avifauna during the construction (and thereafter during maintenance and operational and decommissioning) of the facility and all development alternatives and associated infrastructure is likely to occur. Disturbance of breeding birds is typically of

greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. It is noted that no breeding sites have been identified on site at this stage.

There is no difference between the location and technology options in terms of disturbance and displacement of birds.

Table 7-287: SPH8: Formal rating of disturbance of birds during construction

PROJECT PHASE	Construction	n phase & operations phase to lesser extent		
DIRECT IMPACT		bed from their normal activities through the inc	creased noise and	activity levels
INDIRECT IMPACT				
CUMULATIVE IMPACT	More projec	cts will result in overall higher disturbance levels		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with the		
DURATION	2	impact will last 6-18 months and as such is rated as Short term	-	4
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Manifela	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Omikely
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
		d as there are no particularly sensitive features id		
_	•	should be implemented during construction in te	rms of control of	vehicles, staff,
minimising the impact on	the receiving	environment as much as possible.		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	?	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	3 3	,
SIGNIFICANCE	-5	very low negative		
		CONFIDENCE LEVEL		
Medium				

(d) Bats Impact

The facility boundary for SPH8 overlaps one medium sensitivity areas from a bat perspective. During the construction of SPH8 habitat modification would occur, disturbance and displacement of bats may occur and bat roosts may be disturbed or destroyed.

Two technology options are under consideration for the BESS. For bat impacts the type of technology used for the BESS is not considered relevant. Both technology options are considered equally acceptable.

Table 7-288: SPH8: Bat habitat modification

	Į.	MPACT ON POSSIBLE HABITAT MODIFICATION				
PROJECT PHASE	Constructio	onstruction phase				
DIRECT IMPACT	Modificatio	n of habitat through the removal of vegetation cove	er and water source	?5		
INDIRECT IMPACT	Displaceme	nt				
CUMULATIVE IMPACT	Loss of fora	ging resources for local bat population				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	2		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	2		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Noglinible	Likohu		
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.	Negligible	Likely		
SIGNIFICANCE	-8	very low negative				

This impact may be reduced by limiting the removal of vegetation and available water sources, as far as possible.

Avoid all high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should any changes or expansion take place to the boundary of the facility a bat specialist must provide input to confirm that these changes are acceptable in terms of the avoidance of high sensitivity areas.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction, rehabilitation of all disturbed areas, inclusive of that beyond permanent infrastructure footprints, (e.g. temporary access tracks and laydown areas) must be undertaken.

(c.g.compensor) access to		DOST BALTICATION		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		_
Medium	•			

Table 7-289: SPH8: Disturbance and displacement effects for bats

IMPACT ON	POSSIBLE	DISTURBANCE 8	& DISPLACE	MENT EFFECTS

PROJECT PHASE	Construction	n phase			
DIRECT IMPACT	Disturbance of bats during construction activities				
INDIRECT IMPACT	Displacement				
CUMULATIVE IMPACT	Unavailability of suitable foraging resources in the broader environment for displaced individuals				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5 Negligible	1 Unlikely	
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.			
SIGNIFICANCE	-5	very low negative			
		PROPOSED MITIGATION MEASURES	<u> </u>		
Limit construction activiti	es to davliaht	hours only and minimise lighting at night, as far as pos	sible.		
expansion take place to the of avoidance of high sens.	ie boundaries, itivity areas.	. With the layouts currently assessed, this has been a , a bat specialist must provide input to confirm that thes ited to the assessed project footprint only.			
7 III CONSTRUCTION ACTIVITIES	onoura de min	POST-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term The extent of the impact israted as site as it will	-5	1	
SEVERITY	-1	affectonly the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.			
SIGNIFICANCE	-5	very low negative			
		CONFIDENCE LEVEL			
Medium					

Table 7-290: SPH8: Bat roost disturbance

IMPACT ON POSSIBLE ROOST DISTURBANCE					
PROJECT PHASE	Construction phase				
DIRECT IMPACT	Disturbance of roosting bats during construction activities				
INDIRECT IMPACT	Roost abandonment				
CUMULATIVE IMPACT	Unavailability of suitable roosting resources in the broader environment for abandonedindividuals				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1	
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area	1		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.	Negligible	Unlikely	

SIGNIFICANCE		-5	low negative
RESOURCES			
IRREPLACEBLE		1	Irreplaceable resources will be impacted.
IMPACT	ON		

PROPOSED MITIGATION MEASURES

All construction activities should be limited to the assessed project footprint only.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough toidentify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1	
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area			
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-5	very low negative			
CONFIDENCE LEVEL					
Medium				_	

Table 7-291: SPH8: Bat Roost destruction

IMPACT OF POSSIBLE ROOST DESTRUCTION					
PROJECT PHASE	Construction phase				
DIRECT IMPACT	Destruction of potential bat roosting features				
INDIRECT IMPACT	Reduction of available roosting sites and/or Mortality				
CUMULATIVE IMPACT	Insufficient roosting resources to support the local population and potential increased batmortality				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1	
EXTENT	2	The extent of the impact is rated as site as it will affect only thedevelopment area			
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.			
SIGNIFICANCE	-5	Low negative			

PROPOSED MITIGATION MEASURES TO BE INCLUDED IN THE EMPR

Avoid the destruction or removal of existing farmsteads and trees, as far as possible.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

All construction activities should be limited to the assessed project footprint only.

	POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	4	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposedactivity will occur	-4		
SEVERITY	-1	The severity of the impact is rated as Lownegative as the impactaffects the environment in such away that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.			
SIGNIFICANCE	-8	very low negative			
CONFIDENCE LEVEL					
Medium					

(e) Botanical Impacts

The development of SPH8 would result in extensive but localized loss of relatively undisturbed (unploughed but grazed) Western Free State Clay Grasslands.

The shade effect of the panels on the grassland vegetation is not known and it not easily predicted. There will be space under the panels for grass and other plants to grow. However, the microclimate is likely to be different to that of open grassland, so a different suite of plant species is likely to colonize the space under the solar panels.

Two technology options are proposed for the BESS. The technology alternatives will make no difference on the botanical impact assessment and as such these alternatives are covered in the **Table 7-19**.

Table 7-292: SPH8: Impact of loss of Western Free State Clay Grassland

LOSS OF VEGETATION					
PROJECT PHASE	Construction	Construction Phase			
DIRECT IMPACT	Removal of	natural vegetation: Western Free State Clay Gras.	slands		
INDIRECT IMPACT	None deterr	mined			
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term.	-15	3	
EXTENT	3	The impacts will be localized to the designated target areas.			
SEVERITY	-2	The severity of the potential impact will be moderate negative.			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Moderately Detrimental	Definite	
SIGNIFICANCE	-45	medium - negative			
PROPOSED MITIGATION	MEASURES				

The first mitigation measures necessary would be the relocation of **Ammocharis coranica** bulbs if they cannot be avoided. Ideally the bulb should be lifted when they area dormant (winter) but that would mean traversing the entire area of the SPH sites in the preceding summer and marking every occurrence of these plants. A more practical approach would be to unearth the bulbs during the construction phase and relocating and planting them soon after removal.

Secondly, all areas that are disturbed during construction and that are not needed during the operational phase should be rehabilitated, using natural grasses that occur in the area. It would be possible for some grasses and forbs to survive under the panels, but it is difficult to predict the extent of such growth, nor which plant species would grow effectively under the panels.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

(f) Groundwater Impact

The water required during the construction phase of SPH8 is approximately $18,000\text{m}^3$ per year. The water requirement lies well within the yield potential of the underlying fractured rock aquifer (i.e. 0.5-2.0 L/s). It must be noted that at present the use of groundwater is not proposed however if this changes the potential impacts of groundwater abstraction are shown in **Table 7-185.**

Earthmoving plant and/or construction vehicles will be used on site during the construction phase. Use of vehicles presents a risk of groundwater contamination by fuel and oil leakage.

Two technology options (lithium-ion vs redox flow batteries) were considered for SPH8. The alternatives considered are equally preferred.

Table 7-293: SPH8: Impact table for the lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place).

Potential impact on groundwater level due to over abstraction						
PROJECT PHASE	Construction I	Phase				
DIRECT IMPACT	Lowering of g	roundwater level due to over abstraction	n			
INDIRECT IMPACT	Drying of sprii	ngs in the area				
CUMULATIVE IMPACT	Permanent da	mage to the aquifer system in the area				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
	PRE-MITIGATION					
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-14	2		
EXTENT	3	The extent of the impact is rated as Local as it affects the development				

		area		
		and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
		cultural and social functions and		
		processes continue albeit in a		
		modified way; and valued,	Moderately	Likely
		important, sensitive or vulnerable	Detrimental	LIKETY
		systems or communities are		
		negatively affected		
IMPACT ON	1	Irreplaceable resources will be		
IRREPLACEBLE RESOURCES		impacted.		
SIGNIFICANCE	-28	low - negative		
		PROPOSED MITIGATION MEASURES		
Groundwater abstraction v	olumes must be	monitored. POST-MITIGATION		
DURATION	3	The duration of the activity		
		associated with the impact will last		
		18 months-5 years and as such is		
		rated as Medium		
		term	0	1
EXTENT	1	The extent of the impact is rated		
		as footprint as it only affects the		
		area in		
SEVERITY	0	which the proposed activity will occur Negliaible		
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be	Negligible	Unlikely
RESOURCES	_	impacted.	reging.a.c	Cimiciy
SIGNIFICANCE	0	very low negative		ı
		CONFIDENCE LEVEL		
Medium				

The main risk associated with the construction phase is groundwater contamination from the use of construction vehicles and heavy machinery on-site.

Table 7-294: SPH8: Impact of contamination of groundwater as a result of accidental oil spillages or fuel leakages during the construction and decommissioning phases.

Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages					
PROJECT PHASE	Construction	Construction and Decommissioning Phase			
DIRECT IMPACT	Groundwate	er contamination			
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area			
CUMULATIVE IMPACT	Long term re	educed groundwater quality			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term		2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	5		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the	Negligible	Likely	

1	cultural and social functions and processes are minimally affected Irreplaceable resources will be impacted.		
-10	very low negative		
	1 - 10	1 Irreplaceable resources will be impacted.	1 Irreplaceable resources will be impacted10 very low negative

FROFOSED WITHOUT INLASO

Vehicles must be maintained regularly and kept in a good working order.

Dirty water should be captured, to be re-used where possible. No dirty water is allowed to be discharged into the surrounding environment.

No heavy equipment or vehicles to be left in excavation area when not in use. Drip trays to be used under stationary vehicles and machinery where possible.

POST-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
Medium	·		·	·

(g) Heritage Impact

(i) Impacts to archaeological resources

Impacts to archaeological resources at SHP4 are limited to the possible destruction of isolated background scatter artefacts which have very low to no cultural significance. Impacts will be direct and permanent but because of the low cultural significance the severity is very low negative.

Two technology alternatives were considered for the battery technology for the BESS. Both technology options are equally preferred.

Table 7-295: SPH8: Assessment of construction phase impacts to archaeological sites.

		Archaeological impacts			
PROJECT PHASE	Construction	on Phase			
DIRECT IMPACT	Destruction	n of isolated artefacts			
INDIRECT IMPACT	None				
CUMULATIVE IMPACT	None	None			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
	PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3	

EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Nantinikla	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	-18	very low negative		
		PROPOSED MITIGATION MEASURES		
None required as the ruin recorded.	n is in poor	condition and does not have any special architecture	al qualities that ne	eed to be further
No materials to be remov	ved from ai	ny other ruins in the wider project area.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.	- J J - J	
SIGNIFICANCE	-18	very low negative		•
		CONFIDENCE LEVEL		
High				

(ii) Impacts to graves

Impacts to graves for SPH8 are not expected because all identified graves have been avoided by the facility layout. There is still the chance of an unmarked grave being present, or even a marked grave that was not found during the survey. The chances are considered low, however. The impact on graves applies equally to both technology alternatives.

Table 7-296: SPH8: Assessment of construction phase impacts to graves

IMPACTS TO GRAVES					
PROJECT PHASE	Construction	on Phase			
DIRECT IMPACT	Destruction	Destruction of graves, including their coverings and possibly human remains			
INDIRECT IMPACT	None	None			
CUMULATIVE IMPACT	Destruction of graves, including their coverings and possibly human remains				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	10	2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	18	2	

SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Likely		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-36	low – negative				
	PROPOSED MITIGATION MEASURES					

Farm-style wire fences should be erected around all known and unfenced graves (i.e. waypoints 362 & 404) within the farm portion affected by construction. Pedestrian access gates must be provided and the fences must be located a minimum of 5 m away from all graves.

All graves to be treated as no-go areas with temporary signage as required. **POST-MITIGATION** The duration of the activity associated **DURATION** with the impact will last more than 5 years and as such is rated as Long Term -18 The extent of the impact is rated as **EXTENT** 1 footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural **SEVERITY** -3 process will temporarily or permanently Moderately cease; and valued, important, sensitive Unlikely Detrimental or vulnerable systems or communities are substantially affected. IMPACT ON IRREPLACEABLE Irreplaceable resources will be impacted. 1 **RESOURCES** SIGNIFICANCE -18 very low negative CONFIDENCE LEVEL High

(iii) Impacts to the cultural landscape SPH8

No landscape features such as hills and pans will be impacted by SPH8. The impact on cultural landscape is due to the construction activities (construction vehicles and equipment) on site which is a rural landscape.

Table 7-297: SPH8 Assessment of construction phase impacts to the cultural landscape

CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	Constructio	n Phase		
DIRECT IMPACT	Alteration of the rural landscape character through the introduction of construction equipment and vehicles and all the associated activities on site			
INDIRECT IMPACT	None	None		
CUMULATIVE IMPACT	Impacts wil	Impacts will be greater with multiple facilities being constructed at once		
DIMENSION	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
	PRE-MITIGATION			

		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-10	3
		The extent of the impact is rated as		
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as Moderate negative as the affected		
		environment is altered but natural,		
		cultural and social functions and		
SEVERITY	-2	processes continue albeit in a modified		
		way; and valued, important, sensitive	Slightly	- <i>c</i>
		or vulnerable systems or communities	Detrimental	Definite
		are negatively affected		
IMPACT ON		No irreplaceable resources will be		
IRREPLACEABLE	0	impacted.		
RESOURCES		•		
SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
Keep construction period				
Rehabilitate any areas no	t needed duri	ing operation as soon as possible.		
	ī	POST-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development		
EXTEINI	3	area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
	_	cultural and social functions and		
SEVERITY	-2	processes continue albeit in a modified		
		way; and valued, important, sensitive	Slightly	Definite
		or vulnerable systems or communities	Detrimental	,
		are negatively affected		
IMPACT ON		No irranlacaable recourses will be		
IRREPLACEABLE	0	No irreplaceable resources will be impacted.		
RESOURCES		Impactea.		
SIGNIFICANCE	-30	low – negative		
CONFIDENCE LEVEL				
CONTIDENCE LEVEL				

(h) Palaeontological Impact

Palaeontological impacts would be the destruction of fossils from construction activities. The site as a whole is considered as low sensitivity in terms of palaeontology.

Table 7-298: SPH8: Assessment of the potential impacts to possible paleontological resources considers the criteria below

PALAEONTOLOGY IMPACTS				
PROJECT PHASE	Constructi	on, Operational and de commissioning Phases		
DIRECT IMPACT	Destruction	Destruction of fossils in the footprint		
INDIRECT IMPACT				
CUMULATIVE	Loss of fos	sil heritage and scientific knowledge		
IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				

DURATION		1	The duration of the activity associated with the		
			impact will last 0-6 months and as such is rated		
			as Temporary	-2	2
EXTENT		1	The extent of the impact is rated as footprint as it	-2	3
			only affects the area in which the proposed		
			activity will occur		
SEVERITY		-1	The severity of the impact is rated as Low		
			negative as the impact affects the environment in		
			such a way that natural, cultural and social		
			functions and processes are minimally affected	A. 1	5 6
IMPACT	ON	0	No irreplaceable resources will be impacted.	Negligible	Definite
IRREPLACEBALE					
RESOURCES					
SIGNIFICANCE		-6	Very Low Negative		

PROPOSED MITIGATION MEASURES

If fossils are found once excavations for foundations and amenities have commenced then they should be photographed, removed and put in a safe place. Photographs should be sent to a palaeontologist to assess their scientific value. If the fossils are important the palaeontologist must obtain a permit from SAHRA, visit the site and remove the fossils for curation and storage in a recognised facility such as a museum or palaeontology department in a university

If no fossils are found, no action will be required

POST-MITIGATION				
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	2	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	2	3
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	6	Very Low Positive		
CONFIDENCE LEVEL				
High				

(i) Socio-Economic Impact

(i) Stimulation of the Economy during construction

The size of the Tokologo LM's economy was estimated at R2,170 million at current prices (2022) and primarily comprises of the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. That being said, it is likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the development of SPH8 through local procurement.

The stimulation of the economy will not be dependent on the technology options of the SPH8; thus, the battery technology alternatives are equally preferred.

Table 7-299: SPH8: Impact of Economic Stimulation during construction

		IMPACT ON ECONOMY		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	Temporal	ry increase in production and GDP in the local	есопоту	
INDIRECT IMPACT	Improved	household income and increased business sal	es in the local econd	рту
CUMULATIVE IMPACT	Temporal	ry increase in production and GDP in the region	nal economy	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term		_
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
To optimise the stimulatio	on of the lo	PROPOSED MITIGATION MEASURES cal economy through direct, indirect and indi	uced effects, the fol	lowing should be
applied where possible: Procure construction mater Employ local contractors w Note: The proposed mitigat	rials, goods, here possib tion measur	cal economy through direct, indirect and indu	ers if feasible	
applied where possible: Procure construction mater Employ local contractors w	rials, goods, here possib tion measur	cal economy through direct, indirect and inde , and products from local and domestic supplie le res will possibly increase the positive impact on	ers if feasible	
applied where possible: Procure construction mater Employ local contractors w Note: The proposed mitigat	rials, goods, here possib tion measur	cal economy through direct, indirect and indi- and products from local and domestic supplied le res will possibly increase the positive impact on POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	ers if feasible	
applied where possible: Procure construction mater Employ local contractors w Note: The proposed mitigat not affect the weighting the	rials, goods, here possib tion measur ereof.	cal economy through direct, indirect and indicated and products from local and domestic supplied leteres will possibly increase the positive impact on POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as	ers if feasible the local economy;	however, this will
applied where possible: Procure construction mater Employ local contractors w. Note: The proposed mitigat not affect the weighting the	rials, goods, here possib tion measur ereof.	cal economy through direct, indirect and indi- and products from local and domestic supplied res will possibly increase the positive impact on POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development area and	ers if feasible the local economy;	however, this will
applied where possible: Procure construction mater Employ local contractors w. Note: The proposed mitigat not affect the weighting the DURATION EXTENT IMPACT ON IRREPLACEABLE RESOURCES	rials, goods, here possible tion measurereof.	cal economy through direct, indirect and indi- and products from local and domestic supplied le res will possibly increase the positive impact on POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected No irreplaceable resources will be impacted.	the local economy; 10 Slightly	however, this will
applied where possible: Procure construction mater Employ local contractors w. Note: The proposed mitigat not affect the weighting the DURATION EXTENT IMPACT ON IRREPLACEABLE	rials, goods, here possib tion measur ereof.	cal economy through direct, indirect and indi- and products from local and domestic supplied res will possibly increase the positive impact on POST-MITIGATION The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected No irreplaceable resources will be	the local economy; 10 Slightly	however, this will

(ii) Creation of Employment during construction

The construction of SPH8 will require temporary employment of construction workers, foremen, and engineers On-site. Construction is expected to last twelve months where at the peak of construction about 150 people will be working on-site.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

SPH8 will create the same number of employment opportunities, regardless of its layout on the site; thus, layout alternatives are equally preferred.

Table 7-300: SPH8: Assessment of Employment during construction

		IMPACT ON EMPLOYMENT		
PROJECT PHASE	Constructi	on Phase		
DIRECT IMPACT	Creation o	of temporary employment opportunities (On-site	
INDIRECT IMPACT	Improved	income of households whose members a	re employed on the pi	roject
CUMULATIVE IMPACT	Creation c	of temporary employment opportunities in	n the area	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	30	low positive		
		PROPOSED MITIGATION MEASURE	S	
The following is recommend	ded to incre	ase the employment opportunities create	d in the local commun	ities, where feasible:
Employ labour intensive me	ethods in co	nstruction, where feasible		
Employ local residents and	communitie	es, where possible		
Utilise local suppliers, when	e possible			
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and	Slightly Beneficial	Definite

		processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected			
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	30	low positive	·		
CONFIDENCE LEVEL					
High					

(iii) Reduction of Land Area available for productive farming

The proposed site of SPH8 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the majority of SPH8 comprised of low – very low and low - moderate potential land. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH8 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH8.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-301: SPH8: Assessment of Impact on agricultural production

Reduction of Land Area available for Productive Farming					
PROJECT PHASE	Construct	Construction and Operational Phase			
DIRECT IMPACT	Loss of ag	gricultural production within the footprint a	lue to land sterilisatio	on	
INDIRECT IMPACT	Negligibl	e to no indirect impact			
CUMULATIVE IMPACT	Negligible	e to no cumulative effects			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	6	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,	Negligible	Definite	

Hiah		CONFIDENCE LEVEL		
SIGNIFICANCE	-18	very low negative		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	U	3
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3
		POST-MITIGATION		
Rehabilitation of land show after the closure of the pro		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming
		PROPOSED MITIGATION MEASURES		
SIGNIFICANCE	-18	very low negative		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
		cultural and social functions and processes are minimally affected		

(iv) Loss of Property

An influx of job seekers to the area during the construction phase may result in stock theft and burglaries. The number of workers and duration of construction will not be affected by the technology alternatives; thus, all alternatives are equally preferred.

Table 7-302: SPH8: Assessment of loss of property

		IMPACT ON CRIME LEVELS				
PROJECT PHASE	Construct	Construction Phase				
DIRECT IMPACT	Temporar	Temporary increase in crime associated with the influx of people				
INDIRECT IMPACT	Reduced I	evel of security in and around the proposed	facility			
CUMULATIVE IMPACT	No to neg	ligible cumulative impact				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	10	2		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				

SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
The following mitigations	are advised	to be instituted to minimise and possible e	liminate the impact o	altogether:
Ensure proper fencing and	monitoring	of the fencing is in place		
Maximise job creation and	allocation	to locals as far as practically possible. Recr	uitment of workers s	should be planned in
advance and should not ta	ke place on-	site. This will reduce the probability of work	seekers loitering in t	the area surrounding
the project sites				
Hire additional security pe	rsonnel duri	ing the construction period		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
	-	CONFIDENCE LEVEL		-
High				

(j) Terrestrial Biodiversity & Faunal Impact

(i) Direct Impact - Destruction of faunal habitat

Clearing or disturbance to natural vegetation for the construction of SPH8 will remove up to 428ha of natural grassland habitat. This includes the burrows of many fossorial species as well as termite mounds which provide a source of food for species such as aardvark and mongoose.

Two technology alternatives for the battery to be used in the BESS have been proposed. As the type of battery used will not alter the footprint of the BESS the alternatives are rated as equal for the impact of clearance of natural habitat.

Table 7-303: SPH8: Destruction of faunal habitat

DESTRUCTION OF FAUNAL HABITAT					
PROJECT PHASE	Construct	tion phase			
DIRECT IMPACT	Destructi	on of faunal habitat			
INDIRECT IMPACT					
CUMULATIVE IMPACT	Loss of ho	abitat and habitat connectivity			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-21	3	
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or	Highly detrimental	Definite	

IMPACT ON IRREPLACEABLE RESOURCES SIGNIFICANCE	1 - 63	are substantially affected Irreplaceable resources will be impacted high negative	
		social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities	

PROPOSED MITIGATION MEASURES

Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays. Only indigenous grasses found in the area must be used for rehabilitation

Undertake vegetation clearing during the dry season, and outside of the breeding season of burrowing fauna

If possible, the movement of animals through the sites must be permitted during operations. The use of fencing that will allow the movement of small to medium fauna through would help mitigate the effect of fences acting as barriers. This can be achieved by constructing a fence that has places for animals to crawl through and is not difficult for fleeing animals and birds to see. For example, black mesh panel fencing can be used where gaps of approximately 30 cm high and 50 cm wide and spaced at regular intervals are cut/installed. The tops of these gaps must be smoothed off to limit the chance of wildlife being injured when passing through. The use of barbed wire must be avoided

The proposed activities must remain within the project footprint

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	10	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-30	low negative		
		CONFIDENCE LEVEL		
Medium				

(ii) Direct Impact - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death. The clearing of ground for the foundations of the PV arrays will destroy burrows, potentially causing injury or death to burrowing animals. Furthermore, the presence of the construction site and personnel may result in negative interactions with fauna, such as hunting or killing animals perceived to be pests.

Regarding the technology alternative for the type of battery used in the BESS for all facilities, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread

into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-304: SPH8: Injury or death to fauna

		INJURY OR DEATH TO FAUNA		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	Injury or	death to fauna		
INDIRECT IMPACT				
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-54	moderate negative		

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

No wild animal may under any circumstance be handled, removed or be interfered with by construction workers

To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

Ideally construction should not continue at night so as to avoid potential collisions with nocturnal fauna

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	4	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely

IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be		
RESOURCES	1	impacted		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
High				

(iii) Indirect Impacts - Disturbance and displacement of fauna

Construction activities have the potential to cause disturbance to fauna inhabiting the natural grassland through noise, vibrations, and light (if construction continues after dark). Security lights for the solar facilities during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-305: SPH8: Disturbance and displacement of fauna

	DISTUR	RBANCE AND DISPLACEMENT OF FAUNA		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland	
CUMULATIVE IMPACT	Displacen	nent of fauna		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-36	low negative		

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

Ideally construction activities should cease at night to minimise the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals

Lighting during construction should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-10	very low negative		
CONFIDENCE LEVEL				
Medium				

(iv) Indirect Impacts – Pollution and contamination of natural areas

During construction, dust from exposed areas and roads, and litter from construction workers have the potential to pollute the surrounding natural vegetation. The use of dust suppressants, as well as hydrocarbons from vehicles and machinery, have the potential to contaminate soils and ground water, and be washed into the nearby natural pans during high rainfall events. The battery technology alternatives are rated the same and hence are covered in the same table.

Table 7-306: SPH8: Pollution and contamination of natural areas

	POLLUTION	AND CONTAMINATION OF NATURAL AR	EAS	
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Pollution a	nd contamination of natural areas		
CUMULATIVE IMPACT	Habitat deg	gradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-15	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-15	5
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-45	moderate negative		
	-	ROPOSED MITIGATION MEASURES		
		cer (ECO) must be appointed to oversee all	construction activit	ies
		for leaks and serviced on a regular basis		
		in the most appropriate manner		
No washing of vehicles must ta	•			
During construction, dust on co	nstruction ro	oads must be suppressed using a water tar	nker	

Dumping of solid waste in natu	ral areas, inc	luding cigarette butts and litter by constru	uction workers must	be prohibited
Appropriate solid waste dispose	al facilities m	ust be provided for workers during constr	uction	
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
		CONFIDENCE LEVEL		
High				

(v) Indirect Impacts – Increased potential of invasion by alien vegetation

During construction, the removal of natural vegetation and disturbance to the soil will increase the likelihood of invasion by alien plant species. Alien species establish easily and quickly on bare soil by colonisation or from seeds existing in the seed bank of the soil. Infestation by alien and invasive species will lead to degradation of the surrounding natural habitat and will increase the potential of spread into the greater landscape. In addition, the vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds. This impact is relevant to all the proposed arrays equally and has therefore been assessed in one table for the construction phase.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-307: SPH8: Increased potential of invasion by alien vegetation

IN	ICREASED P	OTENTIAL OF INVASION BY ALIEN VEGET	TATION	
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Increased	l potential of invasion by alien vegetation		
CUMULATIVE IMPACT	Habitat a	legradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite

IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be	
RESOURCES	U	impacted	
SIGNIFICANCE	-42	moderate - negative	

PROPOSED MITIGATION MEASURES

An independent Environmental Control Officer (ECO) must be appointed to oversee all construction activities monthly All areas cleared of natural vegetation must be rehabilitated. Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays and other cleared areas. Only indigenous grasses found in the area must be used for rehabilitation. This must be advised by the

An invasive alien plant species management and monitoring plan must be implemented during the construction phase. Monitoring should continue into the operational phase and through and for a period after decommissioning. This should be advised by the botanist

All alien seedlings and saplings must be removed as they become evident for the duration of construction and during the operational phase. Manual / mechanical removal is preferred to chemical control

All construction vehicles and eq	uipment i	must be free of plant material before enter	ring the site	
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative	•	
		CONFIDENCE LEVEL		
Hiah				

(k) Transport Impact

Traffic impacts anticipated to occur during the construction phase of the project are construction related traffic and noise and dust pollution.

Two technology alternative for the BESS have been proposed. There is no difference in the impacts from a traffic perspective between the alternatives.

Table 7-308: SPH8: Traffic Impacts - Construction Phase

TRAFFIC IMPACT					
PROJECT PHASE	Construct	Construction phase			
DIRECT IMPACT		Traffic congestion due to an increase in traffic caused by the transportation ofequipment, material and staff to site			
INDIRECT IMPACT	Construct	ion traffic on roads might generate dus	st and noise.		
CUMULATIVE IMPACT	Traffic de	lays on the surrounding road network.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the	Slightly Detrimental	Definite	

IMPACT ON IRREPLACEBLE RESOURCES		affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected No irreplaceable resources will beimpacted.		
SIGNIFICANCE	-30	low negative POSED MITIGATION MEASURES		
Stagger component delivery to Reduce the construction perio Dust suppression of gravel roc	o site; d (if possibi		during the construc	ction phase, asrequired.
construction phase.	•	internal roads and the access road a arries in close proximity to the site (if a		_
Staff and general trips should	occur outsi			
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is ratedas Short term	5	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will beimpacted.		

(I) Landscape and Visual Impact

-15

very low negative

Medium

SIGNIFICANCE

Four visual impacts were identified for SPH8 during the construction, operational phase and decommissioning phase

CONFIDENCE LEVEL

- Landscape change
- Impact on Protected Areas
- Impact on local roads
- Impact on homesteads
- Light pollution

These impacts would all occur during the construction, operation and decommissioning phase. Impacts would peak once the facility is constructed, remain relatively constant during the operational phase and then decrease during the decommissioning phase.

The type of battery technology used in the BESS would not impact on the assessment of visual impacts and so the tables below cover both technology options.

Table 7-309: SPH8 Landscape change

		LANDSCAPE CHANGE		
	Construction	n, Operational & Decommissioning Pho	ases. Impacts will increa	se to peak level on
	completion	of construction, be relatively constant	during operation and d	ecrease again from
PROJECT PHASE	_	during decommissioning.		
DIRECT IMPACT	Change of c	haracter due to industrialisation of a No	atural Landscape	
INDIRECT IMPACT				
CUMULATIVE IMPACT	Extension of	f landscape industrialisation due to othe	er electrical infrastructur	e projects
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURE		
		s as low as possible relative to existing <u>c</u>		
		g landscape and maintain existing vege		
-	-	tures such as drainage pans. it is noted		n achieved in layout
		and restriction of access to these areas		
Reinstate any areas of veg	etation that h	nave been disturbed during construction	;	
Remove all temporary wor				
		ion cover post-construction and implem		
Remove infrastructure not	required for t	the post-decommissioning use of the sit	e;	
Monitor areas for vegetati	ion cover post	-decommissioning and implement reme	edial actions.	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
		CONFIDENCE LEVEL		
High				
				

NOTES

- 11. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 12. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-310: SPH8 Industrialization of the landscape as seen from Nielsview NR

SP	H8 INDUSTRI	ALISATION OF THE LANDSCAPE AS SE	EN FROM NIELSVIEW NR			
	Construction	n, Operational & Decommissioning P	hases. Impacts will incre	ease to peak level on		
	completion	of construction, be relatively constant	during operation and dec	rease again from peak		
PROJECT PHASE	levels during	g decommissioning.				
DIRECT IMPACT	Industrialisa	ation of the view from Nielsview NR du	e to this project.			
INDIRECT IMPACT						
	Extension o	f industrialisation of views from Pro	tected Areas due to thi	s and other electrical		
CUMULATIVE IMPACT	infrastructu	re projects				
DIMENSION	RATING					
		PRE-MITIGATION				
		The duration of the activity				
	4	associated with the impact will last				
DURATION	4	more than 5 years and as such is				
		rated as Long Term	0	3		
		The extent of the impact is rated as	· ·	J		
EXTENT	3	Local as it affects the development				
EXIENI	3	The state of the s				
CEVEDITY.	-	area and adjacent properties				
SEVERITY	0	Negligible				
IMPACT ON	_	No irreplaceable resources will be				
IRREPLACEBLE	0	impacted.	Negligible	Definite		
RESOURCES		mpacted.				
SIGNIFICANCE	-42	Very low negative				
		PROPOSED MITIGATION MEASU	RES			
Plan to maintain the heig	ght of structu	res as low as possible relative to existir	ng ground levels;			
Minimise disturbance of	the surround	ing landscape and maintain existing ve	getation around the deve	elopment;		
		atures such as drainage pans. it is not	_	-		
		g and restriction of access to these are				
		t have been disturbed during construct				
Remove all temporary w	_	t have been distarbed during construct	1011,			
	•	ation cover post-construction and impl	amont romodial actions:			
		r the post-decommissioning use of the				
Kemove injrustructure in	ot required jo		site,			
		POST-MITIGATION				
		The duration of the activity				
DURATION	4	associated with the impact will last				
		more than 5 years and as such is				
		rated as Long Term	0	3		
		The extent of the impact is rated as				
EXTENT	3	Local as it affects the development				
		area and adjacent properties				
SEVERITY	0	Negligible				
IMPACT ON		No important de la constitución	Climbal de la la la la la la la la la la la la la	D-6' "		
IRREPLACEBLE	0	No irreplaceable resources will be	Slightly detrimental	Definite		
RESOURCES		impacted.				
SIGNIFICANCE	-21	low negative				
-	_	CONFIDENCE LEVEL				
High						
		NOTES				
		vias hava no influence on visual impact	1 11 11 11			

- 11. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 12. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-311: Industrialization of the landscape as seen from local roads, SPH8

INI	OUSTRIALISA'	TION OF THE LANDSCAPE AS SEEN FROM	LOCAL ROADS, SPH8	
PROJECT PHASE	T	n, Operational & Decommissioning Phases		
DIRECT IMPACT	Industrialis	ation of the view from local roads due to t	his project.	
INDIRECT IMPACT				
CUMULATIVE IMPACT	Extension of infrastructu	of industrialisation of views from local are projects	l roads due to this (and other electrical
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental	
SIGNIFICANCE	-21	low negative		
		PROPOSED MITIGATION MEASURES		
Plan site levels to minimis	e earthworks	to ensure that levels are not elevated;		
Plan to maintain the heigi				
		ng landscape and maintain existing vegeta	tion around the develo	pment;
		en along the southern edge of the array cl		,
·		tures such as drainage pans;		
		have been disturbed during construction;		
		nave been disturbed during construction,		
Remove all temporary wo		tion and make a material and make a make a make a make a make a make a make a make a make a make a make a make	at was a dial a atia was	
		tion cover post-construction and implement		
Remove infrastructure no	t required for	the post-decommissioning use of the site;		
	T	POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long term	0	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	0	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
High				
		NOTES		
13. The alternative batte similar structures.	ry technologi	es have no influence on visual impact as b	ooth alternatives are lik	ely to be enclosed in

14. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-312 SPH8: Industrialization of the landscape as seen from local homesteads

1PHX	NDUSTRIALIS	SATION OF THE LANDSCAPE AS SEEN FRO	M LOCAL HOMESTEADS		
ЭГПО	_	n, Operational & Decommissioning Pha			
		completion of construction, be relatively constant during operation and decrease again from peak			
PROJECT PHASE		levels during decommissioning.			
DIRECT IMPACT		Industrialisation of the view from local homesteads due to this project.			
INDIRECT IMPACT					
CUMULATIVE IMPACT	Extension of infrastructu	f industrialisation of views from local h	omesteads due to this	and other electrical	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
Dilli Litoro II		PRE-MITIGATION	CONSTRUCT	I.K.Z.II.IOOD	
		The duration of the activity			
		associated with the impact will last			
DURATION	4	more than 5 years and as such is rated			
		as Long Term	-14	3	
		The extent of the impact is rated as			
EXTENT	3	Local as it affects the development			
		area and adjacent properties			
		The severity of the impact is rated as			
		Moderate negative as the affected			
		environment is altered but natural,			
SEVERITY	-2	cultural and social functions and			
SEVERITI		processes continue albeit in a		Definite	
		modified way; and valued, important,	Moderately Detrimental		
		sensitive or vulnerable systems or			
		communities are negatively affected			
IMPACT ON		No irreplaceable resources will be			
IRREPLACEBLE	0	impacted.			
RESOURCES					
SIGNIFICANCE	-42	moderate - negative PROPOSED MITIGATION MEASURES	3		
Plan to maintain the heigi	ht of structure				
		g landscape and maintain existing vegeto	ation around the develor	ment.	
	ne samoamam	SW and E edges of solar cluster closest to		inche,	
Construct / grow 2m high	screen alona		ajjecteu nomesteuus,		
			that this has laraely hee	n achieved in lavout	
Plan to protect existing n	atural site fed	itures such as drainage pans. it is noted	<u> </u>	n achieved in layout	
Plan to protect existing no planning, however ongoin	atural site fea ng monitoring	tures such as drainage pans. it is noted to and restriction of access to these areas is	s necessary;	n achieved in layout	
Plan to protect existing na planning, however ongoin Reinstate any areas of veg	atural site fed ng monitoring getation that	itures such as drainage pans. it is noted	s necessary;	n achieved in layout	
Plan to protect existing no planning, however ongoin Reinstate any areas of veg Remove all temporary wo	atural site fea ig monitoring getation that rks;	ntures such as drainage pans. it is noted a and restriction of access to these areas is have been disturbed during construction;	s necessary;	n achieved in layout	
Plan to protect existing na planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are	atural site fea ig monitoring getation that rks; as for vegetat	ntures such as drainage pans. it is noted a and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and impleme	necessary;	n achieved in layout	
Plan to protect existing na planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are	atural site fea ig monitoring getation that rks; as for vegetat	ntures such as drainage pans. it is noted and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and implement the post-decommissioning use of the site	necessary;	n achieved in layout	
Plan to protect existing na planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are	atural site fea ig monitoring getation that rks; as for vegetat	atures such as drainage pans. it is noted a and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and impleme the post-decommissioning use of the site POST-MITIGATION	necessary;	n achieved in layout	
Plan to protect existing niplanning, however ongoing Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are Remove infrastructure no	atural site fed og monitoring getation that rks; as for vegetat t required for	tures such as drainage pans. it is noted and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and implement the post-decommissioning use of the site POST-MITIGATION The duration of the activity	necessary;	n achieved in layout	
Plan to protect existing na planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are	atural site fea ig monitoring getation that rks; as for vegetat	atures such as drainage pans. it is noted a and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and impleme the post-decommissioning use of the site POST-MITIGATION	necessary;	n achieved in layout	
Plan to protect existing niplanning, however ongoing Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are Remove infrastructure no	atural site fed og monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and implement the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18	necessary;	n achieved in layout	
Plan to protect existing niplanning, however ongoing Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are Remove infrastructure no	atural site fed og monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and implement the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated	nt remedial actions;	,	
Plan to protect existing niplanning, however ongoing Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are Remove infrastructure no	atural site fed og monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is and restriction of access to these areas is have been disturbed during construction; tion cover post-construction and implement the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term	nt remedial actions;	,	
Plan to protect existing non- planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are Remove infrastructure no	atural site fea ig monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is have been disturbed during construction; ion cover post-construction and impleme the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term The extent of the impact is rated as Local as it affects the development area and adjacent properties	nt remedial actions;	,	
Plan to protect existing non- planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are Remove infrastructure no	atural site fea ig monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is thave been disturbed during construction; from cover post-construction and implement the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as	nt remedial actions;	· .	
Plan to protect existing niplanning, however ongoing Reinstate any areas of very Remove all temporary work Monitor rehabilitated are Remove infrastructure no DURATION EXTENT	atural site fea ig monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is thave been disturbed during construction; from cover post-construction and implement the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects	nt remedial actions;	· .	
Plan to protect existing non- planning, however ongoin Reinstate any areas of veg Remove all temporary wo Monitor rehabilitated are Remove infrastructure no	atural site fea ig monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is thave been disturbed during construction; tion cover post-construction and impleme the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that	nt remedial actions;	· .	
Plan to protect existing niplanning, however ongoing Reinstate any areas of very Remove all temporary work Monitor rehabilitated are Remove infrastructure no DURATION EXTENT	atural site fed g monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is thave been disturbed during construction; the post-construction and implement the post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the sevirity associated with the impact will last 18 months – 5 years and as such is rated as as the impact as it affects the development area and adjacent properties. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions	ent remedial actions; ; -6	3	
Plan to protect existing in planning, however ongoin Reinstate any areas of ver Remove all temporary wo Monitor rehabilitated are Remove infrastructure no DURATION EXTENT SEVERITY	atural site fed g monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is thave been disturbed during construction; tion cover post-construction and impleme the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that	nt remedial actions;	,	
Plan to protect existing in planning, however ongoin Reinstate any areas of ver Remove all temporary wo Monitor rehabilitated are Remove infrastructure no DURATION EXTENT SEVERITY IMPACT ON	atural site fed g monitoring getation that rks; as for vegetat t required for 3	and restriction of access to these areas is thave been disturbed during construction; from cover post-construction and implement the post-decommissioning use of the site POST-MITIGATION The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	ent remedial actions; ; -6	3	
Plan to protect existing in planning, however ongoin Reinstate any areas of ver Remove all temporary wo Monitor rehabilitated are Remove infrastructure no DURATION EXTENT SEVERITY	atural site fed g monitoring getation that rks; as for vegetat t required for	and restriction of access to these areas is thave been disturbed during construction; the post-construction and implement the post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the site post-decommissioning use of the sevirity associated with the impact will last 18 months – 5 years and as such is rated as as the impact as it affects the development area and adjacent properties. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions	ent remedial actions; ; -6	3	

SIGNIFICANCE	-18	very low negative		
		CONFIDENCE LEVEL		
High				
NOTES				

- 11. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 12. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-313 SPH8 Light pollution

		SPH8 LIGHT POLLUTION		
	Construction	n, Operational & Decommissioning Phas	ses. Impacts will increas	se to peak level on
	completion	of construction, be relatively constant dur	ing operation and decred	ase again from peak
PROJECT PHASE	levels durin	g decommissioning.		
DIRECT IMPACT	Light pollut	ion from the project spoiling the night tim	e environment and nuis	ance to neighbors.
INDIRECT IMPACT				
CUMULATIVE IMPACT	UMULATIVE IMPACT Extension of light pollution due to this and other electrical infrastructure projects			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity		
DURATION	4	associated with the impact will last		
DONATION	4	more than 5 years and as such is rated		
		as Long Term	-14	3
		The extent of the impact is rated as		
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
SEVERITY	-2	cultural and social functions and		
SEVERITI	2	processes continue albeit in a		
		modified way; and valued, important,	Moderately	Definite
		sensitive or vulnerable systems or	Detrimental	Dejiiite
		communities are negatively affected		
IMPACT ON		No irreplaceable resources will be		
IRREPLACEBLE	0	impacted.		
RESOURCES				
SIGNIFICANCE	-42	moderate - negative		
Usa law kay liahtina araw	ad buildings a	PROPOSED MITIGATION MEASURES		nat.
		nd operational areas that is triggered only	y when people are prese	:nt;
		tion sensor triggered security lighting;	46	
		evelopment with no light spillage outside	tne site;	
No tall mast lighting shou	la be usea;	DOCT MAITICATION		
	l	POST-MITIGATION		
		The duration of the activity		
DURATION	2	associated with the impact will last 6-		
		18 months and as such is rated as	0	2
		Short term The extent of the impact is rated as	0	3
EVTENT	4	The extent of the impact is rated as		
EXTENT	1	footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON	U	ivegiigibie		
IRREPLACEBLE	0	No irreplaceable resources will be	Negligible	Definite
RESOURCES	3	impacted.		
SIGNIFICANCE	0	very low negative		<u> </u>
J.G.M. ICANGE	<u> </u>	CONFIDENCE LEVEL		
High		COM IDENCE LEVEL		
riigii		NOTES		
		NUTES		

- 11. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 12. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

7.8.4 Operational Phase

(a) Agricultural Impact

During the operational phase, areas that where vegetation will remain cleared such as access routes, will remain at risk of soil loss through erosion. During the operation phase, staff and maintenance personnel will access the development area to maintain the infrastructure and make repairs, where required. Biodegradable detergents and water will be used to clean the panels, however this is not expected to result in impacts from an agricultural perspective.

Table 7-314: SPH8 Impact significance of soil loss through erosion during the operation phase

		SOIL LOSS THROUGH EROSION			
PROJECT PHASE	Operation	n Phase			
DIRECT IMPACT		Areas where soil surfaces will remain bare such as access routes and between PV arrays, will remain at risk of soil erosion.			
INDIRECT IMPACT		reas can expand into nearby areas and resul	t in land degradation	1.	
CUMULATIVE IMPACT	Increase	in areas at risk of soil erosion.	<u> </u>		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		2	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-14	3	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-42	moderate - negative			
		PROPOSED MITIGATION MEASURES			
regularly be monitored to	detect earl	ternal access routes, as well as areas bor y signs of soil erosion on-set. ust be stabilised using geo-textiles and facili		opment area, must	
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the	Negligible	Definite	

			environment in such a way that natural, cultural and social functions and processes are minimally affected		
IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-18	very low negative		
CONFIDENCE LEVEL					
High					

Table 7-315: SPH8 Impact significance of soil pollution during the operation phase

		SOIL POLLUTION				
PROJECT PHASE	Operation	nal phase				
DIRECT IMPACT	Soil pollu	tion caused by oil and fuel spills or maintena				
		replacement of electrolyte of the redox flow				
INDIDECT IMPACT		I risk of pollutant uptake by vegetation with	iin the aevelopment	area tnat can affect		
INDIRECT IMPACT		environmental and human health				
CUMULATIVE IMPACT		Increase in areas at risk of soil pollution				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION	I	T		
DUDATION	4	The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	-14	1		
EVTENT	2	The extent of the impact is rated as site				
EXTENT	2	as it will affect only the development				
		area				
		The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural,	Moderately			
SEVERITY	-2	cultural and social functions and				
		processes continue albeit in a modified				
		way; and valued, important, sensitive or		Unlikely		
		vulnerable systems or communities are	Detrimental	Í		
IN A DA CT		negatively affected	-			
IMPACT ON	1	luve also entre a second	,			
IRREPLACEBLE	1	Irreplaceable resources will be impacted.				
RESOURCES			-			
SIGNIFICANCE	-14	very low negative PROPOSED MITIGATION MEASURES				
Maintananca must ha und	artakan ra	gularly on all vehicles and maintenance mac	hinary to prayant hy	drocarbon spills		
		be left at the site and must be transporte				
authorised waste dumping		be left at the site and must be transporte	ea with the mainten	unce venicles to un		
		any signs of oil, grease and fuel spillage or th	no procence of waste			
Regularly monitor the BLS	3 ureu jor t	POST-MITIGATION	ie presence oj waste			
		<u> </u>				
DURATION	4	The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	-6	1		
CYTCAIT	1	The extent of the impact is rated as				
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				
		The severity of the impact is rated as Low				
SEVERITY	-1	negative as the impact affects the environment in such a way that natural,				
JLVLNII I	-1	cultural and social functions and				
		processes are minimally affected	Negligible	Unlikely		
IMPACT ON		processes are minimum affected	1			
IRREPLACEBLE	1	Irreplaceable resources will be impacted.				
RESOURCES	_	epiaceable resources will be impueted.				
SIGNIFICANCE	-6	very low negative	l .	<u> </u>		
J. J. 111 10 1110E		,				

(b) Aquatic Impact

During the operation phase, the solar arrays will operate largely unattended and with low maintenance required for more than 20 years. The hard surfaces created by the development may lead to increased runoff. This may lead to increased erosion and sedimentation of the downslope areas. A localised long-term impact (more than 20 years) of low intensity (depending on the distance between the solar arrays and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified aquatic ecosystems in the area.

The only potentially toxic or hazardous materials which would be present in relatively small amounts would be of lubricating oils and hydraulic and insulating fluids. Therefore, contamination of surface or groundwater or soils is highly unlikely.

Significance of impacts after mitigation: The overall significance of the impact on the aquatic ecosystems is expected to be very low. The impacts are rated the same for the battery technology alternatives for the BESS.

Table 7-316: SPH8 Operational phase aquatic ecosystem impacts

	AQUATIC ECOSYSTEM IMPACTS				
PROJECT PHASE Opera	PROJECT PHASE Operational phase				
DIRECT IMPACT Distur	pance of aquatic habitat; water quality impacts				
INDIRECT IMPACT Modific	cation of flow and alien vegetation invasion in aquatio	c features			
CUMULATIVE IMPACT Degra	dation of the ecological condition of aquatic ecosyste	ms			
DIMENSION RATII		CONSEQUENCE	LIKELIHOOD		
	PRE-MITIGATION				
DURATION 4	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term	-5	1		
EXTENT 1	The extent of the impact is rated as footprint as it will affects the area in which the proposed activity will occur	-5	1		
SEVERITY -1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected		Likely		
IMPACT ON <i>O</i> IRREPLACEBLE RESOURCES	No irreplaceable resources will be impacted.		·		
SIGNIFICANCE -5	very low negative				

PROPOSED MITIGATION MEASURES

Any disturbance during the operation phase should be limited to the approved development footprints and should avoid disturbance of the soil and natural vegetation cover.

Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areasdo not become infested with invasive alien plants.

Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwaterleaving developed areas.

Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider. In a scenario where services are installed, these systems need to be adequately installed and maintained to prevent any potential contamination of the water

resources on site.				
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term	-5	1
EXTENT	1	The extent of the impact is rated as footprint as it will affects the area in which the proposed activity will occur	-5	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		-5 very low negative		
		CONFIDENCE LEVEL		
Medium				

(c) Avifaunal Impact

(i) Bird fatality at PV facility

Bird fatalities could occur at the site through a number of mechanisms, including collision with PV panels, entanglement in perimeter fence (less likely since developer has chosen to use mesh panel fencing which has a tight weave and birds are less likely to become entangled), electrocution in substations/electrical compounds and others. The battery technology options for the BESS are rated the same and are both covered in the same table.

Table 7-317: SPH8 bird fatality during operational phase

	BIRD FATALITY AT PV FACILITY				
PROJECT PHASE Operational phase					
DIRECT IMPACT	Birds killed	through various interaction with facility infrastr	ucture		
INDIRECT IMPACT					
CUMULATIVE IMPACT	More projec	cts will result in overall higher fatality rates in th	ne area		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and	-8	1	
SEVERITY	-1	adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-8	very low negative			
		PROPOSED MITIGATION MEASURES			

None required at this stage. Once operational, if facility staff identify any fatalities this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive

mitigation measures. Operati quidelines – see Section 8.	onal phase b	oird monitoring should be conducted for at least	t one year as per th	ne best practice
<u>,</u>		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	o	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE -8 very low negative				
CONFIDENCE LEVEL				
Medium		·		·

(ii) Nesting & other use of facility infrastructure by birds

Certain species, in particular doves, pigeons, weavers and crows, are likely to use some of the facility infrastructure for nesting, perching and roosting. At face value this is a positive impact for birds and has been rated as VERY LOW POSITIVE significance both pre and post mitigation. However, where nesting interferes with the operation of the facility this could cause conflict and require management. Nesting on infrastructure also increases the likelihood of bird fatalities occurring through the various mechanism, particularly of young inexperienced birds. No mitigation is required for the impact of the facility on birds through nesting. For the impact of the birds nesting on the facility, the specialist recommends nest management on a case by case basis under the supervision of an avifaunal specialist, and in conformance with all relevant national and provincial legislation. The impact is rated the same for the both battery technology alternatives for the BESS.

Table 7-318: SPH8 impact of bird nesting and other use of facility infrastructure by birds

BIRD NESTING, PERCHING & ROOSTING AT PV FACILITY				
PROJECT PHASE	Operational	l phase		
DIRECT IMPACT				
INDIRECT IMPACT	Birds use inj	frastructure to perch, roost or nest on		
	More proje	cts in the area will probably diminish the likel	hood of this hap	pening as perch
CUMULATIVE IMPACT	availability	will increase		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	,	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely

IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	
SIGNIFICANCE	7	very low positive	

PROPOSED MITIGATION MEASURES

None required at this stage. Once operational, if facility staff identify any nesting which interferes with operations this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. All nest management measures should only be undertaken in compliance with national and provincial environmental legislation in this regard.

	POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	,	1
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	7	very low positive		
CONFIDENCE LEVEL				
Medium				

(d) Bats Impact

Day to day operation and maintenance of the facility may result in disturbance and displacement of bats. The impact is rated the same for both battery technology options for the BESS.

Table 7-319: SPH8 disturbance and displacement effects for bats

	IMPACT O	N POSSIBLE DISTURBANCE & DISPLACEMENT EFF	ECTS		
PROJECT PHASE	Operationa	Operational phase			
DIRECT IMPACT	Disturbanc	Disturbance of bats during operational activities			
INDIRECT IMPACT	Displaceme	nt			
CUMULATIVE IMPACT	Unavailabil	ity of suitable foraging resources in the broader en	vironment for displa	ced individuals	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1	
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.	Detrimental	,	
SIGNIFICANCE	-7	very low negative			
		PROPOSED MITIGATION MEASURES			
Limit operational and main	tenance activ	ities to daylight hours, as far as possible, and min	imise lighting at nig	ht.	

All lighting should preferably use low pressure sodium and warm white LED lights.				
Operational and maintenan	ce activities s	hould be limited to the immediate project footpri	int only.	
Site access should be strictly	y controlled, t	o avoid unnecessary disturbance.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE -7 very low negative				
CONFIDENCE LEVEL				
Medium				

Table 7-320: SPH8 bat roost disturbance

		MPACT ON POSSIBLE ROOST DISTURBANCE		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Disturbance	of roosting bats during operational activities		
INDIRECT IMPACT	Roost aban	donment		
	Unavailabili	ity of suitable roosting resources in the brod	ader environment	for abandoned
CUMULATIVE IMPACT	individuals			-
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
	-	such is rated as Long Term	-7	1
	_	The extent of the impact is rated as site as it		_
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
324211111	_	albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems or	Slightly	Unlikely
		communities are negatively affected	Detrimental	Offlikely
IIMPACT ON		communicies are negatively affected		
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES	1	inteplaceable resources will be impacted.		
SIGNIFICANCE	-7	Low negative		
SIGNIFICANCE		MITIGATION MEASURES TO BE INCLUDED IN THE	FMPr	
All lighting should preferable		ssure sodium and warm white LED lights.	LIVIII	
		ivities, avoid all movement and noise around mea	lium sensitivity area	15
		hould be limited to the immediate project area.	.a constantly unco	
•		o avoid unnecessary disturbance.		
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
- · · · · · · · · · · ·	·	such is rated as Long Term	-7	1
		The extent of the impactis rated as site as it	,	_
EXTENT	2	will affect only the development area		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
	_	cultural and social functions and processes are	Slightly	
		minimally affected	detrimental	Unlikely
IMPACT ON		, -,,		
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES	_	-,		
SIGNIFICANCE	-7	very low negative		<u> </u>
		CONFIDENCE LEVEL		
Medium				

(e) Botanical Impacts

Maintenance activities will require management of vegetation which may result in loss of natural vegetation. The impact is rated the same for both battery technology options for the BESS.

Table 7-321: SPH8 loss of Western Free State Grassland during operational phase

		LOSS OF VEGETATION		
PROJECT PHASE	Operationa			
DIRECT IMPACT	Direct impa			
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
	-	such is rated as Long Term	_	_
		The extent of the impact is the footprint as it	-5	1
EXTENT	1	only affects the area in which the proposed		
		activity will occur.		
		The severity of the impact is rated as Low		
		negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes are	Negligible Ui	
		minimally affected		Unlikely
IMPACT ON				
IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
When and where possible, w	egetation cle	aring should be undertaken during the dry seasor	1.	
Only clear vegetation where		**		
	-	will be decided and approved by the Project M	anager and appoin	nted ECO before
construction commences on	site and sho	uld not be located within drainage lines.		
		POST-MITIGATION		
		The duration of the activity associated with		
DURATION	1	the impact will last 0-6 months and as such is		
		rated as Temporary	-2	1
		The extent of the impact is rated as footprint	_	_
EXTENT	1	as it only affects the area in which the		
		proposed activity will occur		
		The severity of the impact is rated as Low		
	_	negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and processes are	Negligible	Unlikely
IMPACT ON		minimally affected	_	
IMPACT ON IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES	U	ivo irrepiaceable resources will be illipacted.		
SIGNIFICANCE	-2	very low negative		I
		CONFIDENCE LEVEL		
Medium				

(f) Groundwater Impact

Similar to the construction phase, the operational phase of the SPH8 will require approximately $1,000 \, \text{m}^3/\text{a} \, (0.03 \, \text{L/s})$. This does not exceed the regionally mapped yield of the underling aquifer $(0.5-2.0 \, \text{L/s})$. It is not currently planned to use groundwater for the operational phase of this project however if this changes a water use licence will need to be applied.

The principal risks for groundwater contamination that have been identified are the use of cleaning agents for cleaning of PV panels and for dust suppression of internal roads. If required, it is encouraged that water alone is used to conduct these tasks. Alternatively, the PV cleaning

agents and dust suppression mixes must be environmentally friendly and should breakdown naturally without causing ingression of harmful chemicals into the environment.

The proposed development will require a BESS. Currently two different technologies are being considered, i.e. either Solid State Lithium Batteries (SSLB) or Vanadium Redox Flow Battery Energy Storage Systems (VRFB). Both of these two BESS systems require an electrolyte. The SSLB contain an ethylene carbonate or di-ethyl carbonate electrolyte and the VRFB system will require that an estimate of 3 000 m³ of sulfuric acid solution with vanadium ions electrolyte is stored on site for each Springhaas Facility. The BESS systems will also require cooling systems and these systems could potentially either be water based or it may be refrigerant based systems which used chemicals such as ethylene glycol- based coolants.

The containers that the BESS systems are held in are equipped with a "Clean agent" which is a fires suppression systems that can release a powder/gas into the container to snuff fires. These systems usually leave a residue on the equipment that will need to be cleaned off. With any chemical storage there is always a risk of chemical fires that will need to be put out with water or foam and the waste water from these activities could contain contaminants that should not be let to run off into the environment.

The fire safety systems, refrigerants, electrolyte solutions and the waste products produced from these systems could contaminate the soil and groundwater and all measures should be taken to prevent leaks or spills on the ground.

The impact on groundwater levels is rated the same for both battery technology alternatives for the BESS.

Table 7-322 SPH8: Impact of lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place)

Potential impact on groundwater level due to over abstraction						
PROJECT PHASE	Operational	Operational Phase				
DIRECT IMPACT	Lowering of	groundwater level due to over abstraction				
INDIRECT IMPACT	Drying of sp	Drying of springs in the area				
CUMULATIVE IMPACT	Permanent (rmanent damage to the aquifer system in the area				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	2		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-16	2		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately	Likely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				

SIGNIFICANCE	-32	low – negative					
PROPOSED MITIGATION MEASURES							
If boreholes are used it must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 –							
Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring.							
Adhere to the boreho	Adhere to the borehole's safe yield and to monitor water levels and flow.						
Groundwater abstraction volumes must be monitored.							
POST-MITIGATION							
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as	0	1			
		such is rated as Long Term					
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur					
SEVERITY	0	Negligible	Negligible	Unlikely			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.					
SIGNIFICANCE	0	very low negative	•				
CONFIDENCE LEVEL							
Medium							

Table 7-323: SPH8 Impact of contamination of groundwater as a result of cleaning agents used for cleaning the solar panels

Potential impa	act on ground	water as a result of cleaning agents used for cl	eaning the solar pa	nels.		
PROJECT PHASE	Operational Phase					
DIRECT IMPACT	Contamination of groundwater					
INDIRECT IMPACT	Damage to the vegetation or ecosystem it the area					
CUMULATIVE IMPACT	Long-term reduced groundwater quality					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2		
EXTENT	з	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	2		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-32	low - negative				
		PROPOSED MITIGATION MEASURES				
Use environmentall that will not cause o		ng agents that breakdown naturally (biodegrae s.	dable detergents/gi	reen soaps) and		
		POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the				

			proposed activity will occur		
SEVERITY		0	Negligible	Negligible	Unlikely
IMPACT	ON	1	Irreplaceable resources will be		
IRREPLACEBLE		1	impacted.		
RESOURCES					
SIGNIFICANCE		0	very low negative		
CONFIDENCE LEVEL					
Medium					

Redox flow batteries contain electrolyte solution which needs to be replaced approximately every 15 to 20 years. During replacement of electrolyte there is a risk of leaks or spills. This impact is only applicable to the redox flow batteries as lithium-ion batteries are solid state batteries.

Table 7-324: SPH8 Impact table for contamination of groundwater quality as a result of leaking or spills from the electrolyte solution from the battery energy storage system (BESS)

Potential impact on gr	•	ty as a result of leaking or spills from t	the electrolyte solut	tion from the		
		tery energy storage system (BESS)				
PROJECT PHASE		Operational Phase				
DIRECT IMPACT	Contamination of groundwater					
INDIRECT IMPACT	Damage to the vegetation or ecosystem it the area					
CUMULATIVE IMPACT	Long-term redu	ced groundwater quality				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties				
SEVERITY IMPACT ON IRREPLACEBLE	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or Communities are negatively affected Irreplaceable resources will be	Moderately Detrimental	Likely		
RESOURCES	1	impacted.				
SIGNIFICANCE	-32	low - negative				
	_	POSED MITIGATION MEASURES				
Ensure that all electrolyte or chemicals stored or used on site have secondary containments systems in place with reliable leak detection, annunciation in place. Ensure that all chemicals are handled on concrete bunded surfaces and not on bare soil.						
		S systems should be removed and disp		ely.		
Waste water produced by	fire hydrants sho	uld not be allowed to runoff into the e	environment.			
POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the				

		area in which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be	Negligible	Unlikely
RESOURCES	1	impacted.		
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL	- ·	
Medium				

(g) Heritage Impact

(i) Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts during operation of SPH8 relate only to the presence of the facility in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the facility. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a degree of change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. The impacts are the same for both technology options for the batteries for the BESS.

Table 7-325: SPH8: Assessment of operation phase impacts to the cultural landscape

		CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	Operation	Operation Phase				
DIRECT IMPACT	Alteration (of the rural landscape character through the pre	sence of a solar ener	gy facility		
INDIRECT IMPACT	None					
CUMULATIVE IMPACT	Impacts wi	ll be greater with multiple facilities being presen	nt			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	2		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-7	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental			
SIGNIFICANCE	-21	low - negative				
	PROPOSED MITIGATION MEASURES					
Keep all maintenance wor	k within the	authorised footprint.		_		
Minimise night-time light pollution in the area (visual recommendations to be followed to achieve this).						
POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3		

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

(h) Socio-Economic Impact

(i) Stimulation of the Local Economy during operations

The operational period of SPH8 is a minimum of 20 years. Of the money spent annually during the operations period, a significant portion will likely comprise of salaries and wages of the Springhaas employees. The operations of the facility will make some contribution towards the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

No differentiate can be made between battery technology alternatives for the BESS. The technology alternatives are considered in **Table 7-218** and **Table 7-219**.

Table 7-326: SPH8: Assessment of Economic stimulation during operations

STIMULATION OF THE LOCAL	ECONOMY	DURING OPERATIONS			
PROJECT PHASE	Operation	Operational Phase			
DIRECT IMPACT	Long-term	n increase in production and GDP in the local ecor	поту		
INDIRECT IMPACT	Improved	household income and increased business sales in	n the local econom	у	
CUMULATIVE IMPACT	Increase ii	n production and GDP in the regional economy			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with			
DORATION	4	the impact will last more than 5 years and as such is rated as Long Term	8	3	
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	0	3	
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	24	low positive			
PROPOSED MITIGATION MEA	SURES				

Where feasible, procure goods	and servi	ices required for the operation of the plant from the	e local economy	
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	48	moderate positive	_	
CONFIDENCE LEVEL				
High	·	·	·	

(ii) Creation of Employment and increased household income during operations

The operation of SPH8 will require functional and maintenance employees. It is envisaged that about 8 direct jobs per facility will be created during the operations phase, which will occur for a duration of 20 years. About 70% of these jobs are to be filled by people from the local communities as they will be low-skilled employment opportunities. Employment of the eight individuals for the entire operational period will increase their household income, improve their standard of living and benefit their families.

SPH8 will create the same number of employment opportunities, regardless of its location on the site; thus, layout alternatives are equally preferred. The type of battery used in the BESS will also not significantly affect employment alternatives, thus both technology alternatives are equally preferred.

Table 7-327: SPH8 Assessment of employment during operations

CREATION OF EMPLOYMENT AND INCREASED HOUSEHOLD INCOME DURING OPERATIONS				
PROJECT PHASE	Operation	al Phase		
DIRECT IMPACT	Creation o	f permanent employment opportunities in the	local and regional	economy
INDIRECT IMPACT	Improved	income of households whose members are em	ployed on the proje	ect
CUMULATIVE IMPACT	Creation o	f permanent employment opportunities in the	region	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and		
		as such is rated as Long Term	8	3
		The extent of the impact is rated as	8	3
EXTENT	4	Regional as the effects of the impact		
		extends beyond municipal boundaries		

SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
PROPOSED MITIGATION MEAS	SURES			
Where feasible, aim to fill all t	he positions	by labour from the local community		
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	. 8	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		
CONFIDENCE LEVEL				
High				

(iii) Improved municipal service delivery

SPH8 will have a capacity of up to 150MWac and will be connected to the national grid through Eskom substation and generated electricity will be sold nationwide. The proposed project, albeit relatively small, will contribute towards improving National electricity availability; thus, improving the government service delivery, and could potentially also aid in growing the local economy by increasing the overall supply of electricity in the local economy. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas.

The layout alternatives and BESS technology alternatives will not affect the capacity of the solar facility; thus all alternatives are equally preferred.

Table 7-328: SPH8: Assessment of service delivery improvement

IMPROVED MUNICIPAL SERVICE DELIVERY					
PROJECT PHASE	Operation	Operational phase			
DIRECT IMPACT	It will like	It will likely Improve the local electricity supply if fed to the grid			
INDIRECT IMPACT	Improved	Improved standard of living within the region			
CUMULATIVE IMPACT	Improved	Improved electricity availability			
DIMENSION	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
PRE-MITIGATION					

DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3	
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries			
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	48	moderate positive			
PROPOSED MITIGATION MEASURES					
No mitigations proposed					

(iv) Reduction of Land Area available for productive farming

The proposed site of SPH8 and surrounding land is currently used for small-scale livestock. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH8 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH8.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The different battery technology alternatives will not affect the impact ratings.

Table 7-329: SPH8: Assessment of Impact on agricultural production

	Reduc	tion of Land Area available for Productive	Farming			
PROJECT PHASE	Operation					
DIRECT IMPACT	Loss of ac	Loss of agricultural production within the footprint due to land sterilisation				
INDIRECT IMPACT		e to no indirect impact				
CUMULATIVE IMPACT		to no cumulative effects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	6	3		
		The extent of the impact is rated as	D	3		
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				
		The severity of the impact is rated as				
		Low negative as the impact affects the				
SEVERITY	-1	environment in such a way that natural,		Definite		
		cultural and social functions and				
		processes are minimally affected	Negligible			
IMPACT ON		Irreplaceable resources will be				
IRREPLACEABLE	1	impacted.				
RESOURCES		mpactea.				
SIGNIFICANCE	-18	very low negative				
		PROPOSED MITIGATION MEASURES				
Rehabilitation of land shou after the closure of the pro		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming		
		POST-MITIGATION				
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	6	3		
		The extent of the impact is rated as	D	3		
EXTENT	1	footprint as it only affects the area in				
		which the proposed activity will occur				
		The severity of the impact is rated as				
		Low negative as the impact affects the				
SEVERITY	-1	environment in such a way that natural,				
		cultural and social functions and	Negligible	Definite		
		processes are minimally affected	ivegiigible	Dejiiite		
IMPACT ON		Irreplaceable resources will be				
IRREPLACEABLE	1	impacted.				
RESOURCES		,				
SIGNIFICANCE	-18	very low negative				
		CONFIDENCE LEVEL				
High						

(i) Terrestrial Biodiversity and Animal Species

(i) Direct Impacts – Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death.

Regarding the technology alternative for the type of battery used in the BESS for SPH8, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-330: SPH8 Injury or death to fauna

		ALL FACILITIES		
PROJECT PHASE	Operation	nal Phase		
DIRECT IMPACT	Injury or	death to fauna		
INDIRECT IMPACT				
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	-16	2
		The extent of the impact is rated as	10	2
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
SEVERITY	-2	cultural and social functions and		
0_1	_	processes continue albeit in a modified	Moderately	
		way; and valued, important, sensitive	detrimental	Likely
		or vulnerable systems or communities	uetimentui	
		are negatively affected		
IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be		
RESOURCES		impacted		
SIGNIFICANCE	-32	low negative		
		PROPOSED MITIGATION MEASURES		
		ce be handled, removed or be interfered w		
		, drivers of maintenance vehicles must rem		ssibility of animals
		t should be adhered to (recommended 40 l		
		prevent attraction of faunal species to hum		
		osed of in the most appropriate way to pre	vent faunal species ro	iiding the bins and
becoming habituated to humar				
Adequate fire prevention and so		ures must he in nlace. A fire emeraency ma	anaaamant nlan muct	
				be in place
All electrical equipment must b		ed on a regular basis to minimise the risk o		be in place
All electrical equipment must b		ed on a regular basis to minimise the risk o POST-MITIGATION		be in place
	e maintaine	ed on a regular basis to minimise the risk o POST-MITIGATION The duration of the activity associated		be in place
DURATION		POST-MITIGATION The duration of the activity associated with the impact will last more than 5		be in place
	e maintaine	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term		be in place
DURATION	e maintaine	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as	f fire	
	e maintaine	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in	f fire	
DURATION	e maintaine	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	f fire	
DURATION	e maintaine	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as	f fire	
DURATION	e maintaine 4 1	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the	f fire	
DURATION	e maintaine	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that	f fire	1
DURATION	e maintaine 4 1	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions	f fire	
DURATION EXTENT SEVERITY	e maintaine 4 1	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	f fire	1
DURATION EXTENT SEVERITY IMPACT ON IRREPLACEABLE	e maintaine 4 1	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Irreplaceable resources will be	f fire	1
DURATION EXTENT SEVERITY IMPACT ON IRREPLACEABLE RESOURCES	e maintaine 4 1 -1	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Irreplaceable resources will be impacted	f fire	1
DURATION EXTENT SEVERITY IMPACT ON IRREPLACEABLE	e maintaine 4 1 -1	POST-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected Irreplaceable resources will be	f fire	1

(ii) Indirect Impacts – Pollution and contamination of natural areas

During operations, release of grey water into the environment can cause contamination by detergents. Grey water from cleaning of the solar panels has the potential to contaminate soils and ground water and be washed into the nearby natural pans during high rainfall events. This

includes biodegradable detergents used for cleaning the panels, which can accumulate in the soil and be washed into the nearby pans before they break down. Biodegradable detergents can alter the balance of freshwater ecosystems as they promote bacterial growth and lower oxygen levels. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-331: SPH8 Pollution and contamination of natural areas including pans and wetland

POLLUTION AND CONTAMINATION OF NATURAL AREAS INCLUDING PANS AND WETLANDS				
PROJECT PHASE Operational Phase				
DIRECT IMPACT				
INDIRECT IMPACT Pollution and contamination of natural areas – including nearby pans or wetlands				
CUMULATIVE IMPACT	Habitat degradation			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	21	J
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-63	high negative		

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-12	2
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive	Slightly Detrimental	Likely

		or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES	0	impacted		
SIGNIFICANCE	-24	low negative		
CONFIDENCE LEVEL			_	
High				

(iii) Indirect Impacts - Disturbance and displacement of fauna

Security lights for SPH8 during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland adjacent to the facility, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-332: SPH8 Disturbance and displacement of fauna – natural grassland

DISTURBANCE AND DISPLACEMENT OF FAUNA – NATURAL GRASSLAND				
PROJECT PHASE	Operation	nal Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland	
CUMULATIVE IMPACT	Displacen	ment of fauna		
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD		
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-48	Moderate negative		
		PROPOSED MITIGATION MEASURES		

PROPOSED MITIGATION MEASURES

Operations during the night must be avoided to minimise the need for artificial lighting and to reduce the impact of light and noise on nocturnal animals

Lighting during operations should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1

EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-7	very low negative			
	CONFIDENCE LEVEL				
High	•				

(j) Traffic Impact

During the operational phase there will be approximately 8 full time employees on site. Vehicles would access the site for daily operations and maintenance as and when required. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-333 SPH8: Traffic impacts during operation phase

TRAFFIC IMPACTS				
PROJECT PHASE	Operation	al Phase		
DIRECT IMPACT	Traffic con	gestion due to the trips generated by the operati	ion of the facility	
INDIRECT IMPACT		ated noise and dust pollution		
CUMULATIVE IMPACT		ays on the surrounding road network		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	ı	PRE-MITIGATION	T	
DURATION	4	The duration of the activity associated		
DONATION		with the impact will lastmore than 5 years		
		and as such is		
		rated as Long Term	0	3
EXTENT	3	The extent of the impact is rated asLocal as		
		it affects the development area and		
		adjacent properties		
SEVERITY	0	Negligible		
IMPACT ON	0	No irreplaceable resources will be		
IRREPLACEBLE		impacted.	Negligible	Definite
RESOURCES		Impacted.		
SIGNIFICANCE	0	very low negative		
		PROPOSED MITIGATION MEASURES		
		r outside of peak traffic periods; and		
		t regular maintenance of gravel roads (located v		lary,including the
access road to the site) occ	urs during op	peration phase to minimise/mitigate dust pollution	on.	
	ı	POST-MITIGATION	T	
DURATION	4	The duration of the activity associated		
DONATION		with the impact will lastmore than 5 years		
		and as such is rated as Long Term	0	3
EXTENT	2	The extent of the impact is rated assite as it		
		will affect only the development area		
SEVERITY	0	Negligible		
IMPACT ON	0	No irreplaceable resources will be	Negligible	Definite
IRREPLACEBLE		impacted.	Negligible	Dejiiite
RESOURCES				
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL	<u>.</u>	
High				
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7.8.5 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered **Section 7.7**.

7.8.6 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities and is covered in **Section 7.8.**

7.8.7 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The cumulative impact assessment is available in **Section 7.9.**

Table 7-334: SPH8 impact summary

Impact	Nature	Rating pre-mitigation	Rating post mitigation
Design/Planning/Pre-Construction Phase			
No impacts identified			
Construction Phase			
Agricultural impacts			
Land use change from livestock farming to energy generation	Negative	Moderate	Low
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Impaired soil health as a result of soil pollution	Negative	High	Very low
Aquatic impacts			
Disturbance and water quality impacts	Negative	Moderate	Low
Avifaunal impacts			
Destruction of bird habitat during construction	Negative	Moderate	Low
Disturbance of birds during construction	Negative	Very low	Very low
Bat impacts			
Bat habitat modification	Negative	Very low	Very low
Disturbance and displacement of bats	Negative	Very low	Very low
Possible roost disturbance	Negative	Low	Very low
Bat roost destruction	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Medium	Low

Groundwater impacts			
Lowering of the groundwater level due to over abstraction for	Negative	Low	Very low
construction phase (only applicable if abstraction takes place)	Nanativa	LOW	very low
Contamination of groundwater as a result of accidental oil spillages or fuel leakages	Negative	Very low	Very low
Heritage impacts			
Impact on archaeological sites	Negative	Very low	Very low
Impact on graves	Negative	Low	Very low
Impact on cultural landscape	Negative	Low	Low
Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-economic impacts			
Stimulation of the economy during construction	Positive	Low	Low
Employment opportunities	Positive	Low	Low
Reduction in land available for productive farming	Negative	Very low	Very low
Loss of property	Negative	Low	Very low
Terrestrial biodiversity and animal species (faunal) impacts			
Destruction of faunal habitat	Negative	High	Low
Injury or death to fauna	Negative	Moderate	Very low
Disturbance and displacement of fauna	Negative	Low	Very low
Pollution and contamination of natural areas	Negative	Moderate	Very low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Traffic impacts			
Traffic congestion	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Moderate	Low
Industrialisation of the landscape as seen from local roads	Negative	Low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
Operational Phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Soil pollution	Negative	Very low	Very low
Aquatic impacts			
Increased run-off, pollution	Negative	Very low	Very low
Aquatic			
Disturbance of aquatic habitat; water quality impacts	Negative	Very low	Very low
Avifauna impacts			
Bird fatality through interaction with infrastructure	Negative	Very low	Very low
Nesting and use of other infrastructure by birds	Positive	Very low	Very low
Bat impacts			
Disturbance and displacement	Negative	Very low	Very low
	ĺ		

Roost disturbance	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Very low	Very low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place).	Negative	Low	Very low
Contamination of groundwater from use of cleaning agents	Negative	Low	Very low
Contamination of groundwater from leaks or spills from BESS	Negative	Low	Very low
Heritage impacts			
Impact on cultural landscape	Negative	Low	Low
Socio-economic impacts			
Economic stimulation during operations	Positive	Low	Moderate
Employment opportunities	Positive	Low	Low
Improved service delivery	Positive	Moderate	Moderate
Reduction in land available for productive farming	Negative	Very low	Very low
Terrestrial biodiversity and animal species			
Injury or death of fauna	Negative	Low	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Very low
Disturbance and displacement of fauna –natural grassland and rocky outcrops	Negative	Moderate	Very low
Traffic impact			
Traffic congestion	Negative	Very low	Very low
Palaeontological impacts			
Destruction of fossils	NA	NA	NA
Decommissioning phase	NA	NA	NA
	NA	NA	NA
Decommissioning phase	NA Negative	NA Moderate	NA Very low
Decommissioning phase Agricultural impacts			
Decommissioning phase Agricultural impacts Soil loss through erosion	Negative	Moderate	Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction	Negative Negative	Moderate Moderate	Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution	Negative Negative	Moderate Moderate	Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts	Negative Negative Negative	Moderate Moderate High	Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts	Negative Negative Negative	Moderate Moderate High	Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts	Negative Negative Negative Negative	Moderate Moderate High Very low	Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds	Negative Negative Negative Negative	Moderate Moderate High Very low	Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts	Negative Negative Negative Negative	Moderate Moderate High Very low Very low	Very low Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements	Negative Negative Negative Negative	Moderate Moderate High Very low Very low	Very low Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts	Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low	Very low Very low Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation	Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low	Very low Very low Very low Very low Very low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation Groundwater	Negative Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low Low	Very low Very low Very low Very low Very low Low
Decommissioning phase Agricultural impacts Soil loss through erosion Impaired soil functionality caused by compaction Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation Groundwater Contamination from construction activities	Negative Negative Negative Negative Negative Negative	Moderate Moderate High Very low Very low Low	Very low Very low Very low Very low Very low Low

Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-Economic impacts			
Impact on the economy	Positive	Very low	Very low
Creation of temporary employment opportunities in the local and regional economy	Positive	Very low	Very low
Terrestrial biodiversity and animal species			
Destruction of novel ⁸ faunal habitat (i.e. grassed areas under the	Negative	Moderate	Very low
panels where fauna may recolonise after construction) Injury or death to animals (due to collisions with construction	110811111		,
vehicles or destruction of burrows that have established under the panels)	Negative	Moderate	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Very low
Disturbance to and displacement to fauna and edge effects – natural grassland	Negative	Low	Very Low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Reestablishment of movement corridors through the landscape due to removal of fences and return to open grassland	Negative	Very low	Low positive
Traffic impacts			
Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
No-Go Alternative			
Agricultural	Negative	Very low	Very low
Aquatic	Negative		Very low-
Avifauna	Negative	Very low	negligible Very low
Bats	Negative		1
Botanical	Negative	Very low	Very low
Heritage	Negative	Low	Low
Transport- Traffic congestion	Negative	Very low	Very low
Terrestrial biodiversity and animal species	Negative/	Very Low	Very Low Very low
	positive	Low negative	positive
Socio-economic Socio-economic	NA- no impact, forgone + impacts	NA	NA
Destruction of fossils	NA NA	NA	NA
Landscape and Visual	Negligible	No impact/NA	No impact/NA
Groundwater Impacts	Negligible	NA	NA
Cumulative impacts			

⁸ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

Agricultural	Negative	Very low	Very low
Aquatic	Negative	Low	Low
Avi-fauna	Negative	Moderate	Moderate
Bats	Negative	Low	Low
Botanical	Negative	Very low	Very low
Heritage	Negative	Moderate	Low
Socio-economic - Impact on the economy- construction	Positive	-	Moderate
Socio-economic -Creation of employment during construction	Positive	-	Moderate
Socio-economic -Reduction in land available for productive farming	Negative	-	Low
Socio-economic -Stimulation of the economy – operations	Positive	-	Moderate
Socio-economic -Employment - operations	Positive	-	Moderate
Socio-economic -Improved municipal service delivery	Positive	-	Moderate
Socio-economic -Loss of property	Negative	-	Low
Socio-economic - Stimulation of economy - decommissioning	Positive	-	Very low
Terrestrial biodiversity	Negative	High	Moderate
Transport	Negative	Low	Very Low
Landscape and visual	Negative	-	Low
Destruction of fossils	NA	NA	NA
Groundwater: Aquifer system and water quality	Negative	Low- Very Low	Low – Very Low

7.9 Springhaas 9 Detailed Impact Assessment

7.9.1 Alternatives Considered

(a) Technology Alternatives

Two technology alternatives namely lithium-ion and redox flow batteries were considered for the BESS.

(b) No-Go Alternative

The no-go alternative was considered for all seven of the proposed facilities. The impact of the no-go alternative was rated as the same for all seven facilities. The no-go alternative is assessed in **Section 7.8**.

7.9.2 Pre-construction phase

No significant impacts for the pre-construction phase have been identified by any specialist studies or by the EAP for SPH9.

7.9.3 Construction Phase

(a) Agricultural Impact

The most significant agricultural impacts associated with the development of SPH9 will occur during the construction phase when the site is fenced off, vegetation is removed and the soil surface is prepared for the installation of infrastructure.

The entire footprint of SPH9 is classified as low sensitivity from an agricultural perspective.

SPH9 was also classified in terms of agricultural potential. The entire site is classified as low to very low potential.

Tables 7-173 – 7-176 Two BESS technology options are under consideration. From an agricultural perspective there is no difference in impacts between the technology options.

Table 7-335: SPH9: Impact of land use change from livestock farming to renewable energy generation

LAN	D USE CHANG	E FROM LIVESTOCK FARMING TO ENERG	Y GENERATION	
PROJECT PHASE	Construction	n Phase		
DIRECT IMPACT		n of boundary fence and PV infrastructu enewable energy generation	re will change land	use from livestock
INDIRECT IMPACT		on of agriculture in other areas or other	vise reduction of live	estock produced in
CUMULATIVE IMPACT		areas where agriculture is converted into	other land uses	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION	<u> </u>	
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as	-14	3
EXTENT	2	site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		

PROPOSED MITIGATION MEASURES

Springhaas Solar Facility 3 (Pty) Ltd must provide market-related compensation that will allow the current land users to have the same or better ability to sustain their livelihood.

Ensure that the final infrastructure layout remains within the fenced off area of the development footprint.

Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area.

The use of main access routes by construction vehicles and equipment must do so with consideration of nearby agricultural land users who use the same access routes for farming activities.

All left-over construction material must be removed from site once construction on a land portion is completed.

No materials removed from development area must be allowed to be dumped in nearby livestock farming areas. No boundary fence must be opened without the landowners' permission. No open fires made by the construction teams are allowable during the construction phase. POST-MITIGATION The duration of the activity associated with the impact will **DURATION** 4 last more than 5 years and as such is rated as Long Term -7 The extent of the impact is rated **EXTENT** 2 as site as it will affect only the development area The severity of the impact is rated as Low negative as the impact affects the environment in such a **SEVERITY** -1 way that natural, cultural and social functions and processes are Definite **Slightly Detrimental** minimally affected IMPACT ON Irreplaceable resources will be **IRREPLACEBLE** 1 impacted. **RESOURCES** SIGNIFICANCE -21 low - negative **CONFIDENCE LEVEL** High

Table 7-336: SPH9: Impact significance of soil loss through erosion during the construction phase

		SOIL LOSS THROUGH EROSION		
PROJECT PHASE	Constructio	n Phase		
DIRECT IMPACT		Loss of soil particles from areas where construction activities result in the removal of vegetation from the surface.		
INDIRECT IMPACT	Sparse to no	o vegetation growth in eroded areas	i.	
CUMULATIVE IMPACT	Increase in	areas exposed to soil erosion		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	moderate - negative		
PROPOSED MITIGATION MEASURES				

Limit vegetation removal from the soil surface to the areas of infrastructure development such as access routes as well as around the foundations of the PV arrays and buildings.

Vegetation clearance must only be undertaken immediately prior to construction activities and only within the development footprint

Once construction of an area has been completed, level any remaining soil removed from excavation pits (where the PV arrays will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface where it is exposed to rain and wind. This is applicable to all construction areas, except where topsoil stockpiles must remain for site rehabilitation of specific areas.

Stormwater channels on site must be designed to minimise the soil erosion risk that results from surface water runoff.

Where possible, conduct the construction activities outside of the rainy season.

		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
High				

Table 7-337: SPH9: Impact significance of impaired soil functionality caused by compaction

		IMPAIRED SOIL FUNCTIONALITY		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT	The weig compacti	ht and movement of vehicles and equipme on.	ent over the surfac	e will result in soil
	Compact	ed soil have reduced pore space and water in	filtration rate. Com	pacted soil surfaces
INDIRECT IMPACT	increase	the rate of surface water runoff, especially af	ter a rainfall event.	
CUMULATIVE IMPACT	Increase	in areas affected by soil compaction.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-18	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	moderate - negative		
PROPOSED MITIGATION MEASURES				

Only allow vehicles and equipment to travel on designated access routes and not anywhere else within the development area.

Use existing main access routes and internal farm roads where possible and avoid using other areas in the site as temporary access routes.

Vehicles and equipment must park in designated parking areas.

Materials must be off-loaded and stored in designated laydown area.

Where possible, conduct the construction activities outside of the rainy season as wet soil compacts easily as opposed to dry soil.

ury son.				
		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	r	3
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
		CONFIDENCE LEVEL		
High			_	<u> </u>

Table 7-338: SPH9: Impact significance of impaired soil health as a result of soil pollution

		IMPAIRED SOIL HEALTH		
PROJECT PHASE	Construction	Phase		
DIRECT IMPACT	and material spillage of cor state contains	can be caused by oil and fuel spills from vehicl waste on site. Should the vanadium redox rosive and environmentally toxic electrolyte is erised batteries are used, there is a possibility toxic and flammable gasses.	flow batteries be uppossible. In the case	used for the BESS, e that lithium solid
INDIRECT IMPACT	environmento	t of pollutant uptake by vegetation within to all and human health.	he development are	ea that can affect
CUMULATIVE IMPACT		eas at risk of soil pollution.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated as Local	-21	3
EXTENT	3	as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Highly detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-63	high negative		
		PROPOSED MITIGATION MEASURES		
Maintenance must be u	ındertaken regu	larly on all vehicles and construction equipme	ent to prevent hydro	ocarbon spills.

Any waste generated during construction must be stored into designated containers and removed from the site by the construction teams.

Any left-over construction materials must be removed from the development area.

The development area must be monitored by the Environmental Control Officer (ECO) to detect any early signs of fuel and oil spills and waste dumping. The ECO must also report any spills from batteries.

Ensure battery transport and installation is undertaken by accredited staff and contractors.

Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation.

		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-5	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-5	3
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
	CONFIDENCE LEVEL			
High	•			

(b) Aquatic Impact

Construction phase activities would result in disturbance of soil and clearing of vegetation. Water quality impacts may occur from batching of concrete on site, hydrocarbon spills and other construction activities.

There is no difference in impacts between the two battery technology options for BESS, the impact assessment table covers both alternatives.

Table 7-339: SPH9: Impact of aquatic ecosystems during the construction phase

		AQUATIC ECOSYSTEM IMPACTS		
PROJECT PHASE	Construction	Phase		
DIRECT IMPACT	Disturbance	of aquatic habitat; water quality impacts		
INDIRECT IMPACT	Modification	of flow and alien vegetation invasion in aquatic fea	itures	
CUMULATIVE IMPACT	Degradation	of the ecological condition of aquatic ecosystems		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
	4	The duration of the activity associated with the		
DURATION		impact will last more than 5 years and as such is		
		rated as Long term	-14	2
	2	The extent of the impact is rated as Local as it		3
EXTENT	3	affects only the development area and adjacent		
EXTENT		properties		ļ
	-2	The severity of the impact is rated as Moderate		
		as the affected environment is altered but natural,		
SEVERITY		cultural and social functions and processes		
		continue albeit in a modified way; and valued,	Moderately	Definite
		important, sensitive or vulnerable systems or	Detrimental	-
		communities are negatively affected.		
IMPACT ON	0	No irreplaceable resources will be impacted.		

SIGNIFICANCE	-42	Moderate negative	
RESOURCES			
IRREPLACEBLE			

PROPOSED MITIGATION MEASURES

A buffer of at least 250 m between the significant aquatic ecosystems (larger pans) and all the proposed project activities should be maintained (noting that this is already honoured in the proposed layout for all facilities).

Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers, while retaining the topography and cover vegetation within the wider drainage areas through the site is preferred to reduce the potential modification to the way in which water drains through these areas.

The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.

During the construction phase, site management must be undertaken at the laydown and construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities such as hydrocarbon spills. The solar panels will be washed with water and a biodegradable/greendetergent.

Any stormwater that does arise within the construction sites must be handled appropriately to trap sediments and reduce flow velocities where necessary.

Development within the drainage areas, where located within a proposed facility, will however need to consider stormwater management measures and should avoid impacting on the movement of water through the more seasonally wet areas. Minimal disturbance to the topography and cover vegetation in these areas is recommended.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last 0-6 months and as such is rated asTemporary	-12	2
EXTENT	2	The extent of the impact is rated as footprint as it only affects the area in which the proposed activitywill occur		
SEVERITY	-2	The severity of the impact is rated as Moderate as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.		Likely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-24	low negative		
		CONFIDENCE LEVEL		
High				

(c) Avifaunal Impact

(i) Habitat destruction associated with the construction of the facility

Habitat destruction and alteration will occur during the construction phase of SPH9. The majority of the development footprint would be transformed from its current state to a renewable energy facility. SPH9 will transform approximately 207ha of habitat. Most of this is in a fairly natural state currently, or in the case of arable lands is still accessible and useable for birds foraging.

Table 7-340: SPH9: Formal rating of destruction of bird habitat during construction

	DESTRUCTION OF BIRD HABITAT DURING CONSTRUCTION
PROJECT PHASE	Construction phase
DIRECT IMPACT	Transformation of natural habitat into PV facility
INDIRECT IMPACT	

CUMULATIVE IMPACT	Yes - Larger	area transformed from natural habitat					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint	-12	3			
EXTENT	1	as it only affects the area in which the proposed activity will occur					
SEVERITY	-2	The severity of the impact is rated as Moderate as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.	Slightly Detrimental	Definite			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.					
SIGNIFICANCE	-36	moderate – negative					
		PROPOSED MITIGATION MEASURES					
There is no specific mitigat adherence to no-go buffers	•	Impact avoidance has already been implemente	ed in the design pho	ase through the			
		POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	3			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-12	3			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.					
SIGNIFICANCE	-36	low - negative					
		CONFIDENCE LEVEL					

(ii) Disturbance of birds & displacement effects

High

Disturbance of avifauna during the construction (and thereafter during maintenance and operational and decommissioning) of the facility and all development alternatives and associated infrastructure is likely to occur. Disturbance of breeding birds is typically of greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. It is noted that no breeding sites have been identified on site at this stage.

There is no difference between the location and technology options in terms of disturbance and displacement of birds.

Table 7-341: SPH9: Formal rating of disturbance of birds during construction

PROJECT PHASE	Construction phase & operations phase to lesser extent

DURATION 2 impact will last 6-18 m as Short term The extent of the impact street developm properties The severity of the impact in such a way that no	IVATION	CONSEQUENCE -5	LIKELIHOOD
DIMENSION RATING PRE-MITIC The duration of the acc impact will last 6-18 mm as Short term The extent of the impact street affects the developm properties The severity of the impact in such a way that no	IVATION GATION ctivity associated with the conths and as such is rated act is rated as Local as it ment area and adjacent impact is rated as Low		
DURATION 2 impact will last 6-18 mg as Short term The extent of the impact street development properties The severity of the impact in such a way that no	GATION tivity associated with the conths and as such is rated act is rated as Local as it ment area and adjacent impact is rated as Low		
DURATION 2 impact will last 6-18 m as Short term The extent of the impact of the imp	tivity associated with the conths and as such is rated act is rated as Local as it ment area and adjacent impact is rated as Low	-5	1
DURATION 2 impact will last 6-18 m as Short term The extent of the important affects the developm properties The severity of the impact of	onths and as such is rated act is rated as Local as it nent area and adjacent impact is rated as Low	-5	1
EXTENT 3 affects the developm properties The severity of the innegative as the impact in such a way that no	nent area and adjacent impact is rated as Low		
SEVERITY -1 negative as the impact in such a way that na	•		
functions and processe	atural, cultural and social es are minimally affected	- Negligible	Unlikely
IMPACT ON IRREPLACEBLE 0 No irreplaceable resou RESOURCES	ırces will be impacted.		
SIGNIFICANCE -5 very low negative			<u> </u>
PROPOSED MITIGA	TION MEASURES		
There is no specific mitigation required as there are no partic General good environmental practice should be implemented minimising the impact on the receiving environment as much as	d during construction in te s possible.		
POST-MITI	<u> </u>		
	ctivity associated with the conths and as such is rated	-5	1
	act is rated as Local as it nent area and adjacent	-5	
SEVERITY -1 negative as the impact in such a way that na	impact is rated as Low t affects the environment atural, cultural and social es are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE O No irreplaceable resou RESOURCES		-	
SIGNIFICANCE -5 very low negative			

(d) Bats Impact

Medium

The facility boundary for SPH9 overlaps one medium sensitivity areas from a bat perspective. During the construction of SPH9 habitat modification would occur, disturbance and displacement of bats may occur and bat roosts may be disturbed or destroyed.

Two technology options are under consideration for the BESS. For bat impacts the type of technology used for the BESS is not considered relevant. Both technology options are considered equally acceptable.

Table 7-342: SPH9: Bat habitat modification

IMPACT ON POSSIBLE HABITAT MODIFICATION					
PROJECT PHASE	Construction phase				
DIRECT IMPACT	Modification of habitat through the removal of vegetation cover and water sources				
INDIRECT IMPACT	Displacement				

CUMULATIVE IMPACT Loss of foraging resources for local bat population					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	4	2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	2	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Nogligiblo	Likoby	
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.	Negligible	Likely	
SIGNIFICANCE	-4	very low negative			

PROPOSED MITIGATION MEASURES

This impact may be reduced by limiting the removal of vegetation and available water sources, as far as possible.

All construction activities should be limited to the assessed footprint only.

Avoid all high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should any changes or expansion take place to the boundary of the facility a bat specialist must provide input to confirm that these changes are acceptable in terms of the avoidance of high sensitivity areas.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction, rehabilitation of all disturbed areas, inclusive of that beyond permanent infrastructure footprints, (e.g. temporary access tracks and laydown areas) must be undertaken.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6to 18 months and as such is rated asShort term	-4	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
Medium	•		_	

Table 7-343: SPH9: Disturbance and displacement effects for bats

	IMPAC	FON POSSIBLE DISTURBANCE & DISPLACEMENT EFFEC	TS				
PROJECT PHASE	Construction	Construction phase					
DIRECT IMPACT	Disturbance	of bats during construction activities					
INDIRECT IMPACT	Displaceme	nt					
CUMULATIVE IMPACT	CUMULATIVE IMPACT Unavailability of suitable foraging resources in the broader environment for displaced individuals						
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1			
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area					

SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Manifela	Halibak
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.	Negligible	Unlikely
SIGNIFICANCE	-5	very low negative		

PROPOSED MITIGATION MEASURES

Limit construction activities to daylight hours only and minimise lighting at night, as far as possible.

Avoid high sensitive areas completely. With the layouts currently assessed, this has been achieved. Should any changes or expansion take place to the boundaries, a bat specialist must provide input to confirm that these changes are acceptable in terms of avoidance of high sensitivity areas.

All construction activities should be limited to the assessed project footprint only.

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will beimpacted.		
SIGNIFICANCE	-5	very low negative		
		CONFIDENCE LEVEL		
Medium				

Table 7-344: SPH9: Bat roost disturbance

IMPACT ON POSSIBLE ROOST DISTURBANCE						
PROJECT PHASE	Construction	onstruction phase				
DIRECT IMPACT	Disturbance	of roosting bats during construction activities				
INDIRECT IMPACT	Roost aband	donment				
CUMULATIVE IMPACT	Unavailabili	ity of suitable roosting resources in the broader environ	ment for abandonedii	ndividuals		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1		
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.	Novlinible	Unlikalı		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely		
SIGNIFICANCE	-5	low negative				

PROPOSED MITIGATION MEASURES

All construction activities should be limited to the assessed project footprint only.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough toidentify any potential occupied roosts, if construction does not take place within 5 years of the initial bat study.

If occupied roosts are confirmed (after the 5-year period, as described above), then these should be buffered according to best practice.

POST-MITIGATION

DURATION	2	The duration of the activity associated with the impact will last 6 to 18 months and as suchis rated as Short term	-5	1
EXTENT	2	The extent of the impact israted as site as it will affectonly the development area		
SEVERITY	-1	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
CONFIDENCE LEVEL				
Medium			•	

Table 7-345: SPH9: Bat Roost destruction

		IMPACT OF POSSIBLE ROOST DESTRUCTION				
PROJECT PHASE	Construction					
DIRECT IMPACT		of potential bat roosting features				
INDIRECT IMPACT		Reduction of available roosting sites and/or Mortality				
CUMULATIVE IMPACT		roosting resources to support the local population and p	notential increased	hatmortality		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
DIIVIENSION	KATING	PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD		
	I	The duration of the activity associated with the		I		
DUDATION	2	impact will last 6 to 18 months and as suchis rated				
DURATION	2	1 .	-			
		as Short term	-5	1		
EXTENT	2	The extent of the impact is rated as site as it will				
		affect only thedevelopment area				
		The severity of the impact is rated as Moderate				
SEVERITY		negative as the affected environment is altered but				
	-1	natural, cultural and social functions and processes				
		continue albeit in a modified way; and valued,				
		important, sensitive or vulnerable systems or	Negligible	Unlikely		
		communities are negatively affected		,		
IMPACT ON						
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.				
RESOURCES						
SIGNIFICANCE	-5	Low negative				
	PROPOS	ED MITIGATION MEASURES TO BE INCLUDED IN THE E	MPr			
		xisting farmsteads and trees, as far as possible.				
		bidders status has been awarded), a bat specialist shou				
identify any potential o	ccupied roosts	s, if construction does not take place within 5 years of t	he initial bat study.	ı.		
If occupied roosts are co	onfirmed (afte	r the 5-year period, as described above), then these sho	uld be buffered acc	cording to best		
practice.						
All construction activities	es should be li	mited to the assessed project footprint only.				
		POST-MITIGATION				
		The duration of the activity associated with the				
DURATION	2	impact will last 6 to18 months and as suchis rated				
		as Short term	4	1		
		The extent of the impact is rated as footprint as it	-4	1		
EXTENT	1	only affects the area in which the proposedactivity				
		will occur				
		The severity of the impact is rated as Lownegative				
CEL (EDIT)		as the impactaffects the environment in such away				
SEVERITY	-1	that natural, cultural and social functions and	Negligible	Unlikely		
		processes are minimally affected				

IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resourceswill be impacted.			
SIGNIFICANCE		-8	very low negative			
CONFIDENCE LEVEL						
Medium						

(e) Botanical Impacts

The development of SPH9 would result in extensive but localized loss of relatively undisturbed (unploughed but grazed) Western Free State Clay Grasslands.

The shade effect of the panels on the grassland vegetation is not known and it not easily predicted. There will be space under the panels for grass and other plants to grow. However, the microclimate is likely to be different to that of open grassland, so a different suite of plant species is likely to colonize the space under the solar panels.

Two technology options are proposed for the BESS. The technology alternatives will make no difference on the botanical impact assessment and as such these alternatives are covered in the **Table 7-19**.

Table 7-346: SPH9: Impact of loss of Western Free State Clay Grassland

LOSS OF VEGETATION					
PROJECT PHASE	Construction Phase				
DIRECT IMPACT	Removal of	natural vegetation: Western Free State Clay Grass	slands		
INDIRECT IMPACT	None deteri	mined			
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term.	-15	3	
EXTENT	3	The impacts will be localized to the designated target areas.			
SEVERITY	-2	The severity of the potential impact will be moderate negative.			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Moderately Detrimental	Definite	
SIGNIFICANCE	-45	medium - negative			
PROPOSED MITIGATION MEASURES					

The first mitigation measures necessary would be the relocation of **Ammocharis coranica** bulbs if they cannot be avoided. Ideally the bulb should be lifted when they area dormant (winter) but that would mean traversing the entire area of the SPH sites in the preceding summer and marking every occurrence of these plants. A more practical approach would be to unearth the bulbs during the construction phase and relocating and planting them soon after removal.

Secondly, all areas that are disturbed during construction and that are not needed during the operational phase should be rehabilitated, using natural grasses that occur in the area. It would be possible for some grasses and forbs to survive under the panels, but it is difficult to predict the extent of such growth, nor which plant species would grow effectively under the panels.

POST-MITIGATION POST-MITIGATION					
DURATION	2	The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.	-5	3	

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
High				

(f) Groundwater Impact

The water required during the construction phase of SPH9 is approximately $18,000\text{m}^3$ per year. The water requirement lies well within the yield potential of the underlying fractured rock aquifer (i.e. 0.5-2.0 L/s). It must be noted that at present the use of groundwater is not proposed however if this changes the potential impacts of groundwater abstraction are shown in **Table 7-185.**

Earthmoving plant and/or construction vehicles will be used on site during the construction phase. Use of vehicles presents a risk of groundwater contamination by fuel and oil leakage.

Two technology options (lithium-ion vs redox flow batteries) were considered for SPH9. The alternatives considered are equally preferred.

Table 7-347: SPH9: Impact table for the lowering of the groundwater level due to over abstraction for construction phase (only applicable if abstraction takes place).

	Potential imp	act on groundwater level due to over ab	straction			
PROJECT PHASE	Construction I	Phase				
DIRECT IMPACT	Lowering of g	Lowering of groundwater level due to over abstraction				
INDIRECT IMPACT	Drying of sprii	ngs in the area				
CUMULATIVE IMPACT	Permanent da	mage to the aquifer system in the area				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term				
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-14	2		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely		
IMPACT ON	1	Irreplaceable resources will be				

IRREPLACEBLE RESOURCES		impacted.				
SIGNIFICANCE	-28	low - negative				
	PROPOSED MITIGATION MEASURES					
Test pumping of water bore	If boreholes are used it must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 — Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring. Adhere to the borehole's safe yield and to monitor water levels and flow.					
Groundwater abstraction v	olumes must be	e monitored.				
		POST-MITIGATION				
DURATION EXTENT	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term The extent of the impact is rated	0	1		
		as footprint as it only affects the area in which the proposed activity will occur				
SEVERITY	0	Negligible				
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely		
SIGNIFICANCE	0	very low negative				
CONFIDENCE LEVEL						
Medium						

The main risk associated with the construction phase is groundwater contamination from the use of construction vehicles and heavy machinery on-site.

Table 7-348: SPH9: Impact of contamination of groundwater as a result of accidental oil spillages or fuel leakages during the construction and decommissioning phases.

Potential impact on	Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages				
PROJECT PHASE	T PHASE Construction and Decommissioning Phase				
DIRECT IMPACT	Groundwate	er contamination			
INDIRECT IMPACT	Damage to	the vegetation or ecosystem it the area			
CUMULATIVE IMPACT	Long term r	educed groundwater quality			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term		2	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	5		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	regigioie	LINCIY	
SIGNIFICANCE	-10	very low negative			
_		PROPOSED MITIGATION MEASURES			

Vehicles must be maintained regularly and kept in a good working order.

Dirty water should be captured, to be re-used where possible. No dirty water is allowed to be discharged into the surrounding environment.

No heavy equipment or vehic and machinery where possibl	-	excavation area when not in use. Drip trays t	o be used under st	tationary vehicles
, ,		POST-MITIGATION		
DURATION	3	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
Medium		·	·	

(g) Heritage Impact

(i) Impacts to archaeological resources

Impacts to archaeological resources at SHP4 are limited to the possible destruction of isolated background scatter artefacts which have very low to no cultural significance. Impacts will be direct and permanent but because of the low cultural significance the severity is very low negative.

Two technology alternatives were considered for the battery technology for the BESS. Both technology options are equally preferred.

Table 7-349: SPH9: Assessment of construction phase impacts to archaeological sites.

Archaeological impacts				
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT	Destruction	n of isolated artefacts		
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	None			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as footprint as	-6	3
EXTENT	1	it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Naciaible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	-18	very low negative		

PROPOSED MITIGATION MEASURES					
None required as the ruin recorded.	n is in poor	condition and does not have any special architecture	al qualities that n	eed to be further	
No materials to be remov	ved from an	y other ruins in the wider project area.			
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	3	
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE -18 very low negative					
CONFIDENCE LEVEL					
High	•				

(ii) Impacts to graves

Impacts to graves for SPH9 are not expected because all identified graves have been avoided by the facility layout. There is still the chance of an unmarked grave being present, or even a marked grave that was not found during the survey. The chances are considered low, however. The impact on graves applies equally to both technology alternatives.

Table 7-350: SPH9: Assessment of construction phase impacts to graves

IMPACTS TO GRAVES						
PROJECT PHASE	Construction	on Phase				
DIRECT IMPACT	Destruction	Destruction of graves, including their coverings and possibly human remains				
INDIRECT IMPACT	None					
CUMULATIVE IMPACT	Destruction	n of graves, including their coverings and po	ssibly human rema	ins		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-18	2		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	20	_		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Likely		
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-36	low – negative				

PROPOSED MITIGATION MEASURES

Farm-style wire fences should be erected around all known and unfenced graves (i.e. waypoints 362 & 404) within the farm portion affected by construction. Pedestrian access gates must be provided and the fences must be located a minimum of 5 m away from all graves.

All graves to be treated as no-go areas with temporary signage as required.

POST-MITIGATION					
DURATION		4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	40	
EXTENT		1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-18	1
SEVERITY		-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Unlikely
IMPACT IRREPLACEABLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE -18 very low negative					
CONFIDENCE LEVEL					
High					

(iii) Impacts to the cultural landscape SPH9

No landscape features such as hills and pans will be impacted by SPH9. The impact on cultural landscape is due to the construction activities (construction vehicles and equipment) on site which is a rural landscape.

Table 7-351: SPH9 Assessment of construction phase impacts to the cultural landscape

CULTURAL LANDSCAPE IMPACTS					
PROJECT PHASE	Construction Phase				
DIRECT IMPACT		Alteration of the rural landscape character through the introduction of construction equipment and vehicles and all the associated activities on site			
INDIRECT IMPACT	None				
CUMULATIVE IMPACT	Impacts wi	ll be greater with multiple facilities being (constructed at once		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	3	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite	

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
Keep construction period				
Rehabilitate any areas no	t needed duri	ing operation as soon as possible.		
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	3
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	low – negative		
CONFIDENCE LEVEL				
High				

(h) Palaeontological Impact

Palaeontological impacts would be the destruction of fossils from construction activities. The site as a whole is considered as low sensitivity in terms of palaeontology.

Table 7-352: SPH9: Assessment of the potential impacts to possible paleontological resources considers the criteria below

		PALAEONTOLOGY IMPACTS				
PROJECT PHASE	Construct	Construction, Operational and de commissioning Phases				
DIRECT IMPACT	Destruction	on of fossils in the footprint				
INDIRECT IMPACT						
CUMULATIVE	Loss of fo	ssil heritage and scientific knowledge				
IMPACT						
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	-2	3		
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-2	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite		
IMPACT ON IRREPLACEBALE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite		
SIGNIFICANCE	-6	Very Low Negative				

PROPOSED MITIGATION MEASURES						
If fossils are found	d once excava	tions for foundations and amenities have commenced	then they should be	photographed,		
removed and put	in a safe plac	e. Photographs should be sent to a palaeontologist to	assess their scient	ific value. If the		
fossils are importe	ant the palaeo	ntologist must obtain a permit from SAHRA, visit the site	e and remove the fo	ssils for curation		
and storage in a r	recognised fac	lity such as a museum or palaeontology department in	a university			
If no fossils are fo	If no fossils are found, no action will be required					
POST-MITIGATIO	N					
DURATION	OURATION 1 The duration of the activity associated with the					
impact will last 0-6 months and as such is rated						
	as Temporary					
EXTENT	1	The extent of the impact is rated as footprint as it				

DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	2	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	2	3
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	6	Very Low Positive		
CONFIDENCE LEVEL				
High				

(i) Socio-Economic Impact

(i) Stimulation of the Economy during construction

The size of the Tokologo LM's economy was estimated at R2,170 million at current prices (2022) and primarily comprises of the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. That being said, it is likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the development of SPH9 through local procurement.

The stimulation of the economy will not be dependent on the technology options of the SPH9; thus, the battery technology alternatives are equally preferred.

Table 7-353: SPH9: Impact of Economic Stimulation during construction

IMPACT ON ECONOMY						
PROJECT PHASE	ECT PHASE Construction Phase					
DIRECT IMPACT	Temporal	ry increase in production and GDP in the local	есопоту			
INDIRECT IMPACT	Improved household income and increased business sales in the local economy					
CUMULATIVE IMPACT	Temporal	ry increase in production and GDP in the region	nal economy			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIH				
PRE-MITIGATION						
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		3		

SEVERITY IMPACT ON IRREPLACEABLE RESOURCES SIGNIFICANCE	0	and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected No irreplaceable resources will be impacted. low positive	Slightly Beneficial	Definite
		The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural		

PROPOSED MITIGATION MEASURES

To optimise the stimulation of the local economy through direct, indirect and induced effects, the following should be applied where possible:

Procure construction materials, goods, and products from local and domestic suppliers if feasible

Employ local contractors where possible

Note: The proposed mitigation measures will possibly increase the positive impact on the local economy; however, this will not affect the weighting thereof.

			POST-MITIGATION		
DURATION		2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as short term	10	3
EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	,
SEVERITY		2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT IRREPLACEABLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	·	30	low positive		
			CONFIDENCE LEVEL		

(ii) Creation of Employment during construction

The construction of SPH9 will require temporary employment of construction workers, foremen, and engineers On-site. Construction is expected to last twelve months where at the peak of construction about 150 people will be working on-site.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

SPH9 will create the same number of employment opportunities, regardless of its layout on the site; thus, layout alternatives are equally preferred.

Table 7-354: SPH9: Assessment of Employment during construction

		IMPACT ON EMPLOYMENT				
PROJECT PHASE	Constructi	on Phase				
DIRECT IMPACT	Creation c	f temporary employment opportunities (On-site			
INDIRECT IMPACT	Improved	income of households whose members a	re employed on the pr	oject		
CUMULATIVE IMPACT	Creation o	f temporary employment opportunities i	n the area			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated				
DURATION	2	with the impact will last 6-18 months				
		and as such is rated as short term	10	3		
		The extent of the impact is rated as		· ·		
EXTENT	3	Local as it affects the development				
		area and adjacent properties				
		The severity of the impact is rated as				
		Moderate positive as the affected				
		environment is altered but natural,				
SEVERITY	2	cultural and social functions and				
		processes continue albeit in a modified way; and valued, important,		Definite		
		sensitive or vulnerable systems or	Slightly Beneficial			
		communities are positively affected				
IMPACT ON		1 1 1				
IRREPLACEABLE	0	No irreplaceable resources will be				
RESOURCES		impacted.				
SIGNIFICANCE	30	low positive				
		PROPOSED MITIGATION MEASURE	S			
The following is recommended to increase the employment opportunities created in the local communities, where feasible:						
Employ labour intensive me				, ,		
Employ local residents and						
Utilise local suppliers, when						
•••	•	POST-MITIGATION				
		The duration of the activity associated				
DURATION	2	with the impact will last 6-18 months				
		and as such is rated as short term	10	3		
		The extent of the impact is rated as	10	3		
EXTENT	3	Local as it affects the development				
		area and adjacent properties				
		The severity of the impact is rated as				
		Moderate positive as the affected				
		environment is altered but natural,				
SEVERITY	2	cultural and social functions and				
		processes continue albeit in a				
		modified way; and valued, important,	Slightly Beneficial	Definite		
		sensitive or vulnerable systems or communities are positively affected				
IMPACT ON		, , , ,				
IRREPLACEABLE	0	No irreplaceable resources will be				
RESOURCES		impacted.				
SIGNIFICANCE	30	low positive	1			
		CONFIDENCE LEVEL				
High						
rngn						

(iii) Reduction of Land Area available for productive farming

The proposed site of SPH9 and surrounding land is currently used for small-scale livestock. The agricultural assessment classified the whole of SPH9 as being of low – very low and low agricultural potential. The farmers with livestock on the land proposed for the facilities will

simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH9 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH9.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The footprint of the BESS will be the same regardless of which battery technology is used. There is therefore no difference in the impact between the two technology alternatives.

Table 7-355: SPH9: Assessment of Impact on agricultural production

	Reduction of Land Area available for Productive Farming						
PROJECT PHASE		tion and Operational Phase					
DIRECT IMPACT		gricultural production within the footprint a	lue to land sterilisation	on			
INDIRECT IMPACT	Negligibl	Negligible to no indirect impact					
CUMULATIVE IMPACT	Negligible	e to no cumulative effects					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	2			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	0	3			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negliqible	Definite			
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.	3 3				
SIGNIFICANCE	-18	very low negative					
		PROPOSED MITIGATION MEASURES					
Rehabilitation of land shou after the closure of the pro		ce at the end of the project's life to allow for	r the land to be used j	for livestock farming			
		POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	6	3			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	0	3			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the	Negligible	Definite			

			environment in such a way that natural, cultural and social functions and processes are minimally affected		
IMPACT IRREPLACEABLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-18	very low negative	·	
CONFIDENCE LEVEL					
High					

(iv) Loss of Property

An influx of job seekers to the area during the construction phase may result in stock theft and burglaries. The number of workers and duration of construction will not be affected by the technology alternatives; thus, all alternatives are equally preferred.

Table 7-356: SPH9: Assessment of loss of property

IMPACT ON CRIME LEVELS						
PROJECT PHASE	Construct					
DIRECT IMPACT		ry increase in crime associated with the infl	ux of neonle			
INDIRECT IMPACT		evel of security in and around the proposed				
CUMULATIVE IMPACT		ligible cumulative impact	Juenty			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
DIVILIAZION	IXATING	PRE-MITIGATION	CONSEQUENCE	LIKELIHOOD		
	1	The duration of the activity associated				
DURATION	2	with the impact will last 6-18 months				
DONATION	_	and as such is rated as Short term				
		The extent of the impact is rated as	-10	3		
EXTENT	3	Local as it affects the development area				
		and adjacent properties				
		The severity of the impact is rated as				
		Moderate negative as the affected				
		environment is altered but natural,				
		cultural and social functions and				
SEVERITY	-2	processes continue albeit in a modified				
		way; and valued, important, sensitive or	Slightly			
		vulnerable systems or communities are	Detrimental	Definite		
		negatively affected				
IMPACT ON						
IRREPLACEBLE	0	No irreplaceable resources will be				
RESOURCES		impacted.				
SIGNIFICANCE	-30	low - negative		İ		
		PROPOSED MITIGATION MEASURES				
The following mitigations	are advised	to be instituted to minimise and possible e	liminate the impact o	altogether:		
Ensure proper fencing and	monitoring	of the fencing is in place				
Maximise job creation and	allocation	to locals as far as practically possible. Recr	uitment of workers s	hould be planned in		
	ke place on-	-site. This will reduce the probability of work	seekers loitering in t	he area surrounding		
the project sites						
Hire additional security pe	rsonnel dur	ing the construction period				
		POST-MITIGATION				
		The duration of the activity associated				
DURATION	2	with the impact will last 6-18 months				
		and as such is rated as Short term	-5	3		
		The extent of the impact is rated as				
EXTENT	3	Local as it affects the development area				
		and adjacent properties				
		The severity of the impact is rated as				
SEVERITY	-1	Low negative as the impact affects the	Negligible	Definite		
		environment in such a way that natural,				

			cultural and social functions and processes are minimally affected		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE		-15	very low negative		
CONFIDENCE LEVEL					
High			_	<u> </u>	

(j) Terrestrial Biodiversity & Faunal Impact

(i) Direct Impact - Destruction of faunal habitat

Clearing or disturbance to natural vegetation for the construction of SPH9 will remove up to 428ha of natural grassland habitat. This includes the burrows of many fossorial species as well as termite mounds which provide a source of food for species such as aardvark and mongoose.

Two technology alternatives for the battery to be used in the BESS have been proposed. As the type of battery used will not alter the footprint of the BESS the alternatives are rated as equal for the impact of clearance of natural habitat.

Table 7-357: SPH9: Destruction of faunal habitat

DESTRUCTION OF FAUNAL HABITAT				
PROJECT PHASE	Construct	ion phase		
DIRECT IMPACT	Destruction	on of faunal habitat		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of ho	abitat and habitat connectivity		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	21	,
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-63	high negative		
		PROPOSED MITIGATION MEASURES		

Avoid complete clearance of natural vegetation, and only clear vegetation where absolutely necessary. As much of the natural grassland as possible must be retained under the panels. Where clearing takes place, topsoil must be retained and used to rehabilitate underneath the arrays. Only indigenous grasses found in the area must be used for rehabilitation

Undertake vegetation clearing during the dry season, and outside of the breeding season of burrowing fauna

If possible, the movement of animals through the sites must be permitted during operations. The use of fencing that will allow the movement of small to medium fauna through would help mitigate the effect of fences acting as barriers. This can be achieved by constructing a fence that has places for animals to crawl through and is not difficult for fleeing animals and birds to see. For example, black mesh panel fencing can be used where gaps of approximately 30 cm high and 50 cm wide

and spaced at regular intervals are cut/installed. The tops of these gaps must be smoothed off to limit the chance of wildlife being injured when passing through. The use of barbed wire must be avoided

The proposed activities must remain within the project footprint

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

a suitably qualified zoologist an	a suitably qualified zoologist and all necessary permits must be in place				
All mitigation measures prescrib	ped by the	avifaunal specialist must be strictly adhered	to		
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-10	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-10	3	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Definite	
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted			
SIGNIFICANCE	-30	low negative			
CONFIDENCE LEVEL					

(ii) Direct Impact - Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death. The clearing of ground for the foundations of the PV arrays will destroy burrows, potentially causing injury or death to burrowing animals. Furthermore, the presence of the construction site and personnel may result in negative interactions with fauna, such as hunting or killing animals perceived to be pests.

Regarding the technology alternative for the type of battery used in the BESS for all facilities, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-358: SPH9: Injury or death to fauna

Medium

		INJURY OR DEATH TO FAUNA			
PROJECT PHASE	Construct	Construction Phase			
DIRECT IMPACT	Injury or o	death to fauna			
INDIRECT IMPACT					
CUMULATIVE IMPACT					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	10	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-18	3	

SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be		
RESOURCES		impacted		
SIGNIFICANCE	-54	moderate negative		

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

No wild animal may under any circumstance be handled, removed or be interfered with by construction workers

To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to (recommended 40 km/h)

Ideally construction should not continue at night so as to avoid potential collisions with nocturnal fauna

Just prior to construction, the sites must be searched for large active burrows of species such as Aardvark, or communal burrows of species such as Ground Squirrel. If active / occupied burrows are found, the animals must be evacuated or relocated in an ecologically appropriate manner, just prior to vegetation clearing commences. This must be undertaken by a suitably qualified zoologist and all necessary permits must be in place

All food should be securely stored away to prevent attraction of faunal species to human areas. Bins that are scavenger proof must be used, and all rubbish must be disposed of in the most appropriate way to prevent faunal species raiding the bins and becoming habituated to humans

No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of

All mitigation measures prescribed by the avifaunal specialist must be strictly adhered to

		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	,	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-4	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
High	•			•

(iii) Indirect Impacts - Disturbance and displacement of fauna

Construction activities have the potential to cause disturbance to fauna inhabiting the natural grassland through noise, vibrations, and light (if construction continues after dark). Security lights for the solar facilities during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-359: SPH9: Disturbance and displacement of fauna

	DISTUR	RBANCE AND DISPLACEMENT OF FAUNA		
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland	
CUMULATIVE IMPACT	Displacer	ment of fauna		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Moderately detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-36	low negative		

PROPOSED MITIGATION MEASURES

Wherever possible, construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species

Ideally construction activities should cease at night to minimise the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals

Lighting during construction should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is preferred

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

	POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-10	very low negative			
CONFIDENCE LEVEL					
Medium					

(iv) Indirect Impacts - Pollution and contamination of natural areas

During construction, dust from exposed areas and roads, and litter from construction workers have the potential to pollute the surrounding natural vegetation. The use of dust suppressants, as well as hydrocarbons from vehicles and machinery, have the potential to contaminate soils and ground water, and be washed into the nearby natural pans during high rainfall events. The battery technology alternatives are rated the same and hence are covered in the same table.

Table 7-360: SPH9: Pollution and contamination of natural areas

	POLLUTION	I AND CONTAMINATION OF NATURAL AR	EAS	
PROJECT PHASE	Construction	on Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Pollution a	nd contamination of natural areas		
CUMULATIVE IMPACT	Habitat de	gradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-15	3
		The extent of the impact is rated as	-13	3
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		High negative as the natural, cultural		
		or social functions and processes are		
		altered to the extent that the natural		
SEVERITY	-3	process will temporarily or		
		permanently cease; and valued,	Moderately	Definite
		important, sensitive or vulnerable	detrimental	Dejiiite
		systems or communities are		
		substantially affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted		
SIGNIFICANCE	-45	moderate negative		
		ROPOSED MITIGATION MEASURES		
		cer (ECO) must be appointed to oversee al	l construction activit	ies
		for leaks and serviced on a regular basis		
		in the most appropriate manner		
No washing of vehicles must to				
During construction, dust on co	nstruction ro	pads must be suppressed using a water tar	nker	
		cluding cigarette butts and litter by constru		be prohibited
Appropriate solid waste dispos	al facilities m	oust be provided for workers during constr	uction	
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	-4	1
		The extent of the impact is rated as	-4	1
EXTENT	2	site as it will affect only the		
		development area		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that		
		natural, cultural and social functions	Negligible	Unlikely
		and processes are minimally affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted		
SIGNIFICANCE	-4	very low negative CONFIDENCE LEVEL		

(v) Indirect Impacts – Increased potential of invasion by alien vegetation

During construction, the removal of natural vegetation and disturbance to the soil will increase the likelihood of invasion by alien plant species. Alien species establish easily and quickly on bare soil by colonisation or from seeds existing in the seed bank of the soil. Infestation by alien and invasive species will lead to degradation of the surrounding natural habitat and will increase the potential of spread into the greater landscape. In addition, the vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds. This impact is relevant to all the proposed arrays equally and has therefore been assessed in one table for the construction phase.

The technology alternatives for the BESS will not change the ratings for this impact.

Table 7-361: SPH9: Increased potential of invasion by alien vegetation

IN	CREASED P	OTENTIAL OF INVASION BY ALIEN VEGET	TATION	
PROJECT PHASE	Construct	tion Phase		
DIRECT IMPACT				
INDIRECT IMPACT	Increased	l potential of invasion by alien vegetation	1	
CUMULATIVE IMPACT	Habitat d	legradation		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-42	moderate - negative		
0.0		PROPOSED MITIGATION MEASURES		
An independent Environmenta		ficer (ECO) must be appointed to oversee	all construction activ	uities monthly
All areas cleared of natural veg clear vegetation where absolu panels. Where clearing takes p	getation mu tely necesso lace, topso	ust be rehabilitated. Avoid complete cleard ary. As much of the natural grassland as all must be retained and used to rehabilito aund in the area must be used for rehabil	ance of natural veget possible must be reto ate underneath the a	ration, and only nined under the rrays and other
Monitoring should continue int be advised by the botanist	o the opera	ent and monitoring plan must be impleme ational phase and through and for a perioc	d after decommission.	ing. This should
All alien seedlings and saplings must be removed as they become evident for the duration of construction and during				
the operational phase. Manual / mechanical removal is preferred to chemical control				
All construction vehicles and equipment must be free of plant material before entering the site				
		POST-MITIGATION		
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1

EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted		
SIGNIFICANCE	-4	very low negative		
CONFIDENCE LEVEL				
High				

(k) Transport Impact

Traffic impacts anticipated to occur during the construction phase of the project are construction related traffic and noise and dust pollution.

Two technology alternative for the BESS have been proposed. There is no difference in the impacts from a traffic perspective between the alternatives.

Table 7-362: SPH9: Traffic Impacts - Construction Phase

		TRAFFIC IMPACT			
PROJECT PHASE	Construct	Construction phase			
DIRECT IMPACT		Traffic congestion due to an increase in traffic caused by the transportation ofequipment, material and staff to site			
INDIRECT IMPACT	Construct	ion traffic on roads might generate dus	st and noise.		
CUMULATIVE IMPACT		ays on the surrounding road network.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY IMPACT ON	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected No irreplaceable resources will	Slightly Detrimental	Definite	
IRREPLACEBLE RESOURCES		beimpacted.			
SIGNIFICANCE	-30	low negative			
	PRC	POSED MITIGATION MEASURES			

Stagger component delivery to site;

Reduce the construction period (if possible);

Dust suppression of gravel roads (internal roads and the access road to the site) during the construction phase, asrequired. Regular maintenance of gravel roads (internal roads and the access road to the site) by the Contractor during the construction phase.

The use of mobile batching plants and quarries in close proximity to the site (if available and feasible); and Staff and general trips should occur outside of peak traffic periods.

POST-MITIGATION

	last 6-18 months and as such is ratedas Short term	F	1		
3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	5	1		
-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected	Negligible	Unlikely		
0	No irreplaceable resources will beimpacted.				
SIGNIFICANCE -15 very low negative					
CONFIDENCE LEVEL					
	-1	The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected No irreplaceable resources will beimpacted. -15 very low negative	The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected No irreplaceable resources will beimpacted. The extent of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and socialfunctions and processes are minimally affected No irreplaceable resources will beimpacted.		

(I) Landscape and Visual Impact

Four visual impacts were identified for SPH9 during the construction, operational phase and decommissioning phase

- Landscape change
- Impact on Protected Areas
- Impact on local roads
- Impact on homesteads
- Light pollution

These impacts would all occur during the construction, operation and decommissioning phase. Impacts would peak once the facility is constructed, remain relatively constant during the operational phase and then decrease during the decommissioning phase.

The type of battery technology used in the BESS would not impact on the assessment of visual impacts and so the tables below cover both technology options.

Table 7-363: SPH9 Landscape change

LANDSCAPE CHANGE					
		n, Operational & Decommissioning Pho	•	· · · · · · · · · · · · · · · · · · ·	
		of construction, be relatively constant	during operation and d	lecrease again from	
PROJECT PHASE	peak levels	during decommissioning.			
DIRECT IMPACT	Change of c	haracter due to industrialisation of a No	atural Landscape		
INDIRECT IMPACT					
CUMULATIVE IMPACT	Extension of	Extension of landscape industrialisation due to other electrical infrastructure projects			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			

SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	moderate - negative		
		PROPOSED MITIGATION MEASURE	S	
Plan to maintain the heigh	t of structure	s as low as possible relative to existing g	ground levels;	
Minimise disturbance of th	ne surroundin	g landscape and maintain existing vege	tation around the develo	pment;
,	•	tures such as drainage pans. it is noted and restriction of access to these areas	5 ,	n achieved in layout
Reinstate any areas of veg	etation that h	have been disturbed during construction);	
Remove all temporary wor	rks;			
	, ,	ion cover post-construction and implem		
		the post-decommissioning use of the sit		
Monitor areas for vegetati	ion cover post	t-decommissioning and implement reme	edial actions.	
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	low - negative		
		CONFIDENCE LEVEL		
High				
NOTES				

- 13. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 14. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-364: SPH9 Industrialization of the landscape as seen from Nielsview NR

SPH9 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM NIELSVIEW NR					
		n, Operational & Decommissioning P. of construction, be relatively constant o			
PROJECT PHASE	levels during	levels during decommissioning.			
DIRECT IMPACT	Industrialisa	Industrialisation of the view from Nielsview NR due to this project.			
INDIRECT IMPACT					
	Extension of	Extension of industrialisation of views from Protected Areas due to this and other electrical			
CUMULATIVE IMPACT	infrastructure projects				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	

	DDF MITICATION				
		PRE-MITIGATION	1		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	ŕ		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-21	Very low negative			
		PROPOSED MITIGATION MEASU	IRES		
Plan to maintain the hei	ght of structu	res as low as possible relative to existir	ng ground levels;		
		ing landscape and maintain existing ve			
	-	atures such as drainage pans. it is not		een achieved in layout	
		g and restriction of access to these are			
		t have been disturbed during construct	tion;		
Remove all temporary w					
		ation cover post-construction and impl			
Remove infrastructure n	ot required fo	r the post-decommissioning use of the	site;		
		POST-MITIGATION	T	T	
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE	0	No irreplaceable resources will be	Slightly detrimental	Definite	

CONFIDENCE LEVEL

High

RESOURCES SIGNIFICANCE

NOTES

- 13. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 14. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-365: Industrialization of the landscape as seen from local roads, SPH9

impacted.

low negative

INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM LOCAL ROADS, SPH9				
PROJECT PHASE	Construction	n, Operational & Decommissioning Phase	25	
DIRECT IMPACT	Industrialisa	tion of the view from local roads due to	this project.	
INDIRECT IMPACT				
	Extension of industrialisation of views from local roads due to this and other electrical			
CUMULATIVE IMPACT	infrastructure projects			
DIMENSION	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last	0	3

-21

	Í	than E years and as such is rated		I
		more than 5 years and as such is rated as Long Term		
		The extent of the impact is rated as		
EXTENT	3	Local as it affects the development		
EXICIVI	3			
CEVEDITY	0	area and adjacent properties		
SEVERITY	U	Negligible		
IMPACT ON	_	No irreplaceable resources will be	M!!aibla	Dafinite.
IRREPLACEBLE	0	impacted.	Negligible	Definite
RESOURCES				
SIGNIFICANCE		Very low negative		
		PROPOSED MITIGATION MEASURES	,	
		to ensure that levels are not elevated;		
Plan to maintain the heigh		<u> </u>		
Minimise disturbance of th	he surroundin	ng landscape and maintain existing vegeto	ation around the develor	oment;
Construct and/ or plant a	2m high scree	en along the southern edge of the array cl	uster	
Plan to protect existing no	itural site fea	tures such as drainage pans;		
Reinstate any areas of veg	getation that	have been disturbed during construction;		
Remove all temporary wo		<u> </u>	-	
		tion cover post-construction and impleme	nt remedial actions;	
		the post-decommissioning use of the site		
		POST-MITIGATION		
		The duration of the activity		
55.TION	1	associated with the impact will last		
DURATION	4	more than 5 years and as such is rated		
		as Long term	0	3
		The extent of the impact is rated as		
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		Low negative as the impact affects		
SEVERITY	0	the environment in such a way that		
		natural, cultural and social functions		5 %
		and processes are minimally affected	Negligible	Definite
IMPACT ON				
IRREPLACEBLE	0	No irreplaceable resources will be		
RESOURCES		impacted.		
SIGNIFICANCE	0	very low negative		
		CONFIDENCE LEVEL		
High				
		NOTES		

- 15. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 16. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-366 SPH9: Industrialization of the landscape as seen from local homesteads

SPH9 INDUSTRIALISATION OF THE LANDSCAPE AS SEEN FROM LOCAL HOMESTEADS					
		n, Operational & Decommissioning Pha			
	completion	of construction, be relatively constant du	ring operation and decre	ase again from peak	
PROJECT PHASE	levels during	g decommissioning.			
DIRECT IMPACT	Industrialisa	Industrialisation of the view from local homesteads due to this project.			
INDIRECT IMPACT					
	Extension o	Extension of industrialisation of views from local homesteads due to this and other electrical			
CUMULATIVE IMPACT	infrastructu	re projects			
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD			
PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last	-14	3	

			PROPOSED MITIGATION MEASURES	5	
SIGNIFICANCE		-42	moderate - negative		
IMPACT IRREPLACEBLE RESOURCES	ON	0	No irreplaceable resources will be impacted.		
SEVERITY		-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
EXTENT		3	as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties		
			more than 5 years and as such is rated		

1 1101 0020 1111110/11

Plan to maintain the height of structures as low as possible;

Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;

Construct / grow 2m high screen along SW and E edges of solar cluster closest to affected homesteads;

Plan to protect existing natural site features such as drainage pans. it is noted that this has largely been achieved in layout planning, however ongoing monitoring and restriction of access to these areas is necessary;

Reinstate any areas of vegetation that have been disturbed during construction;

Remove all temporary works;

Monitor rehabilitated areas for vegetation cover post-construction and implement remedial actions;

Remove infrastructure not required for the post-decommissioning use of the site;

POST-MITIGATION					
DURATION	3	The duration of the activity associated with the impact will last 18 months – 5 years and as such is rated as medium term	-6	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-18	very low negative			

CONFIDENCE LEVEL

High

NOTES

- 13. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in similar structures.
- 14. The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-367 SPH9 Light pollution

SPH9 LIGHT POLLUTION					
	Construction, Operational & Decommissioning Phases. Impacts will increase to peak level on completion of construction, be relatively constant during operation and decrease again from peak				
PROJECT PHASE	levels during decommissioning.				
DIRECT IMPACT	Light pollution from the project spoiling the night time environment and nuisance to neighbors.				
INDIRECT IMPACT					

CUMULATIVE IMPACT Extension of light pollution due to this and other electrical infrastructure projects					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite	
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE	-42	moderate - negative			
		PROPOSED MITIGATION MEASURES			
Use low key lighting arour	nd buildings a	nd operational areas that is triggered onl	ly when people are prese	nt;	
Utilise infra-red security s	ystems or mo	tion sensor triggered security lighting;			
Ensure that lighting is foci	used on the de	evelopment with no light spillage outside	the site;		
No tall mast lighting shou	ld be used;				
		POST-MITIGATION			
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	0	3	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur			
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite	
SIGNIFICANCE 0 very low negative					
CONFIDENCE LEVEL					
High					
NOTES					

NOTES 13. The alternative battery technologies have no influence on visual impact as both alternatives are likely to be enclosed in

7.9.4 Operational Phase

similar structures.

(a) Agricultural Impact

During the operational phase, areas that where vegetation will remain cleared such as access routes, will remain at risk of soil loss through erosion. During the operation phase, staff and maintenance personnel will access the development area to maintain the infrastructure and make repairs, where required. Biodegradable detergents and water will be used to clean the panels, however this is not expected to result in impacts from an agricultural perspective.

^{14.} The No-Go alternative could result in a limited number of additional agricultural buildings being developed. However, this is likely to result in negligible landscape change or visual impact.

Table 7-368: SPH9 Impact significance of soil loss through erosion during the operation phase

		SOIL LOSS THROUGH EROSION			
PROJECT PHASE	Operation	n Phase			
DIRECT IMPACT	Areas where soil surfaces will remain bare such as access routes and between PV arrays, will remain at risk of soil erosion.				
INDIRECT IMPACT	Eroded a	reas can expand into nearby areas and resul	t in land degradatior).	
CUMULATIVE IMPACT		in areas at risk of soil erosion.			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
		The duration of the activity associated			
DURATION	4	with the impact will last more than 5			
		years and as such is rated as Long Term	-14	3	
		The extent of the impact is rated as site	-14	3	
EXTENT	2	as it will affect only the development			
		area			
		The severity of the impact is rated as			
		Moderate negative as the affected			
		environment is altered but natural,			
SEVERITY	-2	cultural and social functions and			
		processes continue albeit in a modified way; and valued, important, sensitive or			
		vulnerable systems or communities are	Moderately	Definite	
		negatively affected	Detrimental	•	
IMPACT ON		negative, appearan			
IRREPLACEBLE	1	Irreplaceable resources will be impacted.			
RESOURCES	_	irreplaceable resources will be irripacted.			
SIGNIFICANCE	-42	moderate - negative			
SIGNIFICANCE	-42	PROPOSED MITIGATION MEASURES			
The development area i	adudina in	ternal access routes, as well as areas bord	daring an the dayal	anmont area must	
	_	y signs of soil erosion on-set.	dering on the deven	opinent urea, must	
		y signs of son erosion on-set. ust be stabilised using geo-textiles and facili	tated re-venetation		
ij soli erosion is detected,	the area in	POST-MITIGATION	tatea re-vegetation.		
		The duration of the activity associated			
DURATION	4	with the impact will last more than 5			
Bothtion		years and as such is rated as Long Term			
		The extent of the impact is rated as	-6	3	
EXTENT	1	footprint as it only affects the area in			
		which the proposed activity will occur			
		The severity of the impact is rated as Low			
		negative as the impact affects the			
SEVERITY	-1	environment in such a way that natural,			
		cultural and social functions and	Negligible	Definite	
		processes are minimally affected		_ = =,	
IMPACT ON		I towards a set to a second se			
IRREPLACEBLE	1	Irreplaceable resources will be impacted.			
RESOURCES SIGNIFICANCE	-18	very low negative			
SIGNIFICANCE	-18	CONFIDENCE LEVEL			
High		CONFIDENCE LEVEL			
High					

Table 7-369: SPH9 Impact significance of soil pollution during the operation phase

SOIL POLLUTION				
PROJECT PHASE	Operational phase			
DIRECT IMPACT	Soil pollution caused by oil and fuel spills or maintenance materials and domestic waste left on site. The replacement of electrolyte of the redox flow batteries, also pose soil pollution risk.			

	Increased	I risk of pollutant uptake by vegetation with	in the development	area that can affect	
INDIRECT IMPACT		nental and human health	the development	area criac carr ajjecc	
CUMULATIVE IMPACT	Increase in areas at risk of soil pollution				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION	,		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	1	
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	-14		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-14	very low negative			
		PROPOSED MITIGATION MEASURES			
No domestic and other waste dumping	vaste must g area.	gularly on all vehicles and maintenance mac be left at the site and must be transporte	ed with the mainten	ance vehicles to an	
Regularly monitor the BES	S area for a	any signs of oil, grease and fuel spillage or th	e presence of waste.		
	1	POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur			
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			
SIGNIFICANCE	-6	very low negative			
		CONFIDENCE LEVEL			

(b) Aquatic Impact

High

During the operation phase, the solar arrays will operate largely unattended and with low maintenance required for more than 20 years. The hard surfaces created by the development may lead to increased runoff. This may lead to increased erosion and sedimentation of the downslope areas. A localised long-term impact (more than 20 years) of low intensity (depending on the distance between the solar arrays and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified aquatic ecosystems in the area.

The only potentially toxic or hazardous materials which would be present in relatively small amounts would be of lubricating oils and hydraulic and insulating fluids. Therefore, contamination of surface or groundwater or soils is highly unlikely.

Significance of impacts after mitigation: The overall significance of the impact on the aquatic ecosystems is expected to be very low. The impacts are rated the same for the battery technology alternatives for the BESS.

Table 7-370: SPH9 Operational phase aquatic ecosystem impacts

		AQUATIC ECOSYSTEM IMPACTS					
PROJECT PHASE							
DIRECT IMPACT	Disturban	ce of aquatic habitat; water quality impacts					
INDIRECT IMPACT	Modificat	ion of flow and alien vegetation invasion in aquation	features				
CUMULATIVE IMPACT	Degradati	ion of the ecological condition of aquatic ecosystem	ms				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION	•				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term	-12	2			
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area					
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly	Likely			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.					
SIGNIFICANCE	-24	very low negative					

PROPOSED MITIGATION MEASURES

Any disturbance during the operation phase should be limited to the approved development footprints and should avoid disturbance of the soil and natural vegetation cover.

Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areasdo not become infested with invasive alien plants.

Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwaterleaving developed areas.

Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider. In a scenario where services are installed, these systems need to be adequately installed and maintained to prevent any potential contamination of the water resources on site.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such israted as Long Term	-5	1
EXTENT	1	The extent of the impact is rated as footprint as it will affects the area in which the proposed activity will occur	-5	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		

SIGNIFICANCE	-5 very low negative			
CONFIDENCE LEVEL				
Medium				

(c) Avifaunal Impact

(i) Bird fatality at PV facility

Bird fatalities could occur at the site through a number of mechanisms, including collision with PV panels, entanglement in perimeter fence (less likely since developer has chosen to use mesh panel fencing which has a tight weave and birds are less likely to become entangled), electrocution in substations/electrical compounds and others. The battery technology options for the BESS are rated the same and are both covered in the same table.

Table 7-371: SPH9 bird fatality during operational phase

BIRD FATALITY AT PV FACILITY						
PROJECT PHASE	Operational	Operational phase				
DIRECT IMPACT	Birds killed	through various interaction with facility infrastr	ucture			
INDIRECT IMPACT						
CUMULATIVE IMPACT	More projec	cts will result in overall higher fatality rates in th	ne area			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as	-8	1		
EXTENT	3	it affects the development area and adjacent properties				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-8	very low negative				
		PROPOSED MITIGATION MEASURES				

None required at this stage. Once operational, if facility staff identify any fatalities this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. Operational phase bird monitoring should be conducted for at least one year as per the best practice guidelines – see Section 8.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	o o	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative		

	CONFIDENCE LEVEL	
Medium		

(ii) Nesting & other use of facility infrastructure by birds

Certain species, in particular doves, pigeons, weavers and crows, are likely to use some of the facility infrastructure for nesting, perching and roosting. At face value this is a positive impact for birds and has been rated as VERY LOW POSITIVE significance both pre and post mitigation. However, where nesting interferes with the operation of the facility this could cause conflict and require management. Nesting on infrastructure also increases the likelihood of bird fatalities occurring through the various mechanism, particularly of young inexperienced birds. No mitigation is required for the impact of the facility on birds through nesting. For the impact of the birds nesting on the facility, the specialist recommends nest management on a case by case basis under the supervision of an avifaunal specialist, and in conformance with all relevant national and provincial legislation. The impact is rated the same for the both battery technology alternatives for the BESS.

Table 7-372: SPH9 impact of bird nesting and other use of facility infrastructure by birds

	BIRD N	SESTING, PERCHING & ROOSTING AT PV FACILITY	1				
PROJECT PHASE	Operationa	l phase					
DIRECT IMPACT	-						
INDIRECT IMPACT	Birds use in	frastructure to perch, roost or nest on					
	More proje	cts in the area will probably diminish the likel	ihood of this happ	pening as perch			
CUMULATIVE IMPACT	availability	will increase					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as					
		such is rated as Long Term	_	_			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	7	1			
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly	Unlikely			
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Beneficial				
SIGNIFICANCE	7	very low positive					
516111116711162	<u> </u>	PROPOSED MITIGATION MEASURES					
None required at this stage. Once operational, if facility staff identify any nesting which interferes with operations this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. All nest management measures should only be undertaken in compliance with national and provincial environmental legislation in this regard.							
		POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	7	1			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	7	1			

SEVERITY		1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Unlikely
IMPACT	ON				
IRREPLACEBLE		0	No irreplaceable resources will be impacted.		
RESOURCES					
SIGNIFICANCE		7	very low positive		
CONFIDENCE LEVEL					
Medium					

(d) Bats Impact

Day to day operation and maintenance of the facility may result in disturbance and displacement of bats. The impact is rated the same for both battery technology options for the BESS.

Table 7-373: SPH9 disturbance and displacement effects for bats

IMPACT ON POSSIBLE DISTURBANCE & DISPLACEMENT EFFECTS						
PROJECT PHASE	Operationa	l phase				
DIRECT IMPACT	Disturbanc	Disturbance of bats during operational activities				
INDIRECT IMPACT	Displaceme					
CUMULATIVE IMPACT	Unavailabili	ty of suitable foraging resources in the broader en	vironment for displa	aced individuals		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1		
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely		
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.	Detrimental			
SIGNIFICANCE	-7	very low negative				
		PROPOSED MITIGATION MEASURES				
		ities to daylight hours, as far as possible, and mini	imise lighting at nig	ht.		
		ssure sodium and warm white LED lights.				
		hould be limited to the immediate project footpr	int only.			
Site access should be strictl	y controlled,	to avoid unnecessary disturbance.				
		POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last morethan 5 years and as suchis rated as Long Term	-7	1		
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly detrimental	Unlikely		

IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE		-7	very low negative		
CONFIDENCE LEVEL					
Medium					

Table 7-374: SPH9 bat roost disturbance

		IMPACT ON POSSIBLE ROOST DISTURBANCE		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Disturbance	e of roosting bats during operational activities		
INDIRECT IMPACT	Roost aban			
	Unavailabil	ity of suitable roosting resources in the bro	ader environment	for abandoned
CUMULATIVE IMPACT	individuals			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated with		
DURATION	4	the impact will last more than 5 years and as		
		such is rated as Long Term	-7	1
EXTENT	2	The extent of the impact is rated as site as it		
		will affect only the development area		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		Unlikely
		albeit in a modified way; and valued,	Slightly	
		important, sensitive or vulnerable systems or	Detrimental	
		communities are negatively affected	Detrinicitai	
IMPACT ON				
IRREPLACEBLE	1	Irreplaceable resources will be impacted.		
RESOURCES				
SIGNIFICANCE	-7	Low negative		
		MITIGATION MEASURES TO BE INCLUDED IN THI	E EMPr	
		ssure sodium and warm white LED lights.		
		ivities, avoid all movement and noise around med	dium sensitivity ared	as.
Operational and maintenar	nce activities s	should be limited to the immediate project area.		
Site access should be strictl	y controlled, t	o avoid unnecessary disturbance.		
		POST-MITIGATION	T	
		The duration of the activity associated with		
DURATION	4	the impact will last morethan 5 years and as		
		such is rated as Long Term	-14	1
EXTENT	2	The extent of the impactis rated as site as it		
=		will affect only the development area		1
		The severity of the impact is rated as		
		Moderate negative as the affected		
	_	environment is altered but natural, cultural		
SEVERITY	-2	and social functions and processes continue		
		albeit in a modified way; and valued,	Moderately	Unlikely
		important, sensitive or vulnerable systems or	detrimental	
INADACT	-	communities are negatively affected		
IMPACT ON		Imagina a his sansusansiili ha isaa a a ta d		
IRREPLACEBLE	1	Irreplaceable resourceswill be impacted.		
RESOURCES SIGNIFICANCE	-28	very low negative		1
JIGHH ICANCE	-20	CONFIDENCE LEVEL		
Medium		CONTIDENCE LEVEL		

(e) Botanical Impacts

Maintenance activities will require management of vegetation which may result in loss of natural vegetation. The impact is rated the same for both battery technology options for the BESS.

Table 7-375: SPH9 loss of Western Free State Grassland during operational phase

		LOSS OF VEGETATION		
PROJECT PHASE	Operationa	l Phase		
DIRECT IMPACT	Direct impa	ct		
INDIRECT IMPACT				
CUMULATIVE IMPACT	Loss of Wes	tern Free State Clay Grasslands		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-5	1
EXTENT	1	The extent of the impact is the footprint as it only affects the area in which the proposed activity will occur.	,,	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-5	very low negative		
		PROPOSED MITIGATION MEASURES		
		earing should be undertaken during the dry seasor	1.	
Only clear vegetation where				
		will be decided and approved by the Project M	anager and appoin	ted ECO before
construction commences or	n site and sho	uld not be located within drainage lines.		
		POST-MITIGATION		
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	-2	1
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	2	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-2	very low negative	<u> </u>	<u> </u>

(f) Groundwater Impact

Similar to the construction phase, the operational phase of the SPH9 will require approximately $1,000 \, \text{m}^3/\text{a} \, (0.03 \, \text{L/s})$. This does not exceed the regionally mapped yield of the underling aquifer $(0.5-2.0 \, \text{L/s})$. It is not currently planned to use groundwater for the operational phase of this project however if this changes a water use licence will need to be applied.

The principal risks for groundwater contamination that have been identified are the use of cleaning agents for cleaning of PV panels and for dust suppression of internal roads. If required, it is encouraged that water alone is used to conduct these tasks. Alternatively, the PV cleaning

agents and dust suppression mixes must be environmentally friendly and should breakdown naturally without causing ingression of harmful chemicals into the environment.

The proposed development will require a BESS. Currently two different technologies are being considered, i.e. either Solid State Lithium Batteries (SSLB) or Vanadium Redox Flow Battery Energy Storage Systems (VRFB). Both of these two BESS systems require an electrolyte. The SSLB contain an ethylene carbonate or di-ethyl carbonate electrolyte and the VRFB system will require that an estimate of 3 000 m³ of sulfuric acid solution with vanadium ions electrolyte is stored on site for each Springhaas Facility. The BESS systems will also require cooling systems and these systems could potentially either be water based or it may be refrigerant based systems which used chemicals such as ethylene glycol- based coolants.

The containers that the BESS systems are held in are equipped with a "Clean agent" which is a fires suppression systems that can release a powder/gas into the container to snuff fires. These systems usually leave a residue on the equipment that will need to be cleaned off. With any chemical storage there is always a risk of chemical fires that will need to be put out with water or foam and the waste water from these activities could contain contaminants that should not be let to run off into the environment.

The fire safety systems, refrigerants, electrolyte solutions and the waste products produced from these systems could contaminate the soil and groundwater and all measures should be taken to prevent leaks or spills on the ground.

The impact on groundwater levels is rated the same for both battery technology alternatives for the BESS.

Table 7-376 SPH9: Impact of lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place)

Potential impact on groundwater level due to over abstraction					
PROJECT PHASE	Operational	Operational Phase			
DIRECT IMPACT	Lowering of	Lowering of groundwater level due to over abstraction			
INDIRECT IMPACT	Drying of sp	rings in the area			
CUMULATIVE IMPACT	Permanent	damage to the aquifer system in the area			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	2	
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately	Likely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.			

SIGNIFICANCE	-32	low – negative			
		PROPOSED MITIGATION MEASURES			
If boreholes are used	it must be cor	rectly yield tested according to the National Sto	andard (SANS 1029	9-4:2003, Part 4 –	
Test pumping of wate	er boreholes).	This includes a Step Test, Constant Discharge Te	est and recovery m	onitoring.	
Adhere to the boreho	le's safe yield	and to monitor water levels and flow.			
Groundwater abstrac	tion volumes	must be monitored.			
		POST-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as			
		such is rated as Long Term	0	1	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	U	1	
SEVERITY	0	Negligible			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.	Negligible	Unlikely	
SIGNIFICANCE 0 very low negative					
	CONFIDENCE LEVEL				
Medium					

Table 7-377: SPH9 Impact of contamination of groundwater as a result of cleaning agents used for cleaning the solar panels

Potential impa	act on ground	water as a result of cleaning agents used for cl	eaning the solar pa	nels.			
PROJECT PHASE	Operational						
DIRECT IMPACT	Contaminat	ion of groundwater					
INDIRECT IMPACT	Damage to	Damage to the vegetation or ecosystem it the area					
CUMULATIVE IMPACT	Long-term r	Long-term reduced groundwater quality					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2			
EXTENT	з	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-10	2			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely			
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.					
SIGNIFICANCE	-32	low - negative					
		PROPOSED MITIGATION MEASURES					
Use environmentall that will not cause d		ng agents that breakdown naturally (biodegrae s.	dable detergents/gi	reen soaps) and			
		POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the					

			proposed activity will occur		
SEVERITY		0	Negligible	Negligible	Unlikely
IMPACT	ON	1	Irreplaceable resources will be		
IRREPLACEBLE		1	impacted.		
RESOURCES					
SIGNIFICANCE		0	very low negative		
CONFIDENCE LEVEL					
Medium					

Redox flow batteries contain electrolyte solution which needs to be replaced approximately every 15 to 20 years. During replacement of electrolyte there is a risk of leaks or spills. This impact is only applicable to the redox flow batteries as lithium-ion batteries are solid state batteries.

Table 7-378: SPH9 Impact table for contamination of groundwater quality as a result of leaking or spills from the electrolyte solution from the battery energy storage system (BESS)

Potential impact on groundwater quality as a result of leaking or spills from the electrolyte solution from the							
r otentiai iii paat on gi	•	ery energy storage system (BESS)	ine electrony te solut				
PROJECT PHASE Operational Phase							
DIRECT IMPACT	Contamination	of groundwater					
INDIRECT IMPACT	Damage to the	vegetation or ecosystem it the area					
CUMULATIVE IMPACT	Long-term redu	ced groundwater quality					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2			
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties					
SEVERITY IMPACT ON IRREPLACEBLE	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or Communities are negatively affected Irreplaceable resources will be	Moderately Detrimental	Likely			
RESOURCES	1	impacted.					
SIGNIFICANCE	-32	low - negative					
	PRO	POSED MITIGATION MEASURES					
		red or used on site have secondary e. Ensure that all chemicals are hand					
Any waste products produ	ced form the BESS	ទ systems should be removed and disp	oosed of appropriate	ely.			
Waste water produced by	fire hydrants shou	uld not be allowed to runoff into the ϵ	environment.				
	POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	1			
EXTENT	1	The extent of the impact is rated as footprint as it only affects the					

		area in which the proposed activity will occur				
SEVERITY	0	Negligible				
IMPACT ON IRREPLACEBLE	1	Irreplaceable resources will be	Negligible	Unlikely		
RESOURCES	1	impacted.				
SIGNIFICANCE	0	very low negative				
CONFIDENCE LEVEL						
Medium						

(g) Heritage Impact

(i) Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts during operation of SPH9 relate only to the presence of the facility in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the facility. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a degree of change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. The impacts are the same for both technology options for the batteries for the BESS.

Table 7-379: SPH9: Assessment of operation phase impacts to the cultural landscape

		CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	PROJECT PHASE Operation Phase					
DIRECT IMPACT	Alteration	Alteration of the rural landscape character through the presence of a solar energy facility				
INDIRECT IMPACT	None					
CUMULATIVE IMPACT	Impacts wi	ll be greater with multiple facilities being presen	nt			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	2		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-/	3		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.	Detrimental			
SIGNIFICANCE	-21	low - negative				
		PROPOSED MITIGATION MEASURES				
Keep all maintenance wor	k within the	authorised footprint.				
Minimise night-time light	Minimise night-time light pollution in the area (visual recommendations to be followed to achieve this).					
POST-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3		

EXTENT		3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY		-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite	
IMPACT IRREPLACEABLE RESOURCES	ON	0	No irreplaceable resources will be impacted.			
SIGNIFICANCE		-21	low - negative			
CONFIDENCE LEVEL						
High	High					

(h) Socio-Economic Impact

(i) Stimulation of the Local Economy during operations

The operational period of SPH9 is a minimum of 20 years. Of the money spent annually during the operations period, a significant portion will likely comprise of salaries and wages of the Springhaas employees. The operations of the facility will make some contribution towards the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

No differentiate can be made between battery technology alternatives for the BESS. The technology alternatives are considered in **Table 7-218** and **Table 7-219**.

Table 7-380: SPH9: Assessment of Economic stimulation during operations

STIMULATION OF THE LOCAL	ECONOMY	DURING OPERATIONS				
PROJECT PHASE	Operation	Operational Phase				
DIRECT IMPACT	Long-term	n increase in production and GDP in the local ecor	поту			
INDIRECT IMPACT	Improved	household income and increased business sales in	n the local econom	у		
CUMULATIVE IMPACT	Increase ii	n production and GDP in the regional economy				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
PRE-MITIGATION						
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as				
EXTENT	4	such is rated as Long Term The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	8	3		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	24	low positive				
PROPOSED MITIGATION MEA	SURES					

Where feasible, procure goods	and servi	ices required for the operation of the plant from th	e local economy	
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	10	3
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	48	moderate positive	_	
CONFIDENCE LEVEL				
High	·	·	·	

(ii) Creation of Employment and increased household income during operations

The operation of SPH9 will require functional and maintenance employees. It is envisaged that about 8 direct jobs per facility will be created during the operations phase, which will occur for a duration of 20 years. About 70% of these jobs are to be filled by people from the local communities as they will be low-skilled employment opportunities. Employment of the eight individuals for the entire operational period will increase their household income, improve their standard of living and benefit their families.

SPH9 will create the same number of employment opportunities, regardless of its location on the site; thus, layout alternatives are equally preferred. The type of battery used in the BESS will also not significantly affect employment alternatives, thus both technology alternatives are equally preferred.

Table 7-381: SPH9 Assessment of employment during operations

CREATION OF EMPLOYMENT AND INCREASED HOUSEHOLD INCOME DURING OPERATIONS					
PROJECT PHASE	Operation	al Phase			
DIRECT IMPACT	Creation o	f permanent employment opportunities in the	local and regional	economy	
INDIRECT IMPACT	Improved	income of households whose members are em	ployed on the proje	ect	
CUMULATIVE IMPACT	Creation o	f permanent employment opportunities in the	region		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
BURATION		The duration of the activity associated with			
DURATION	4	the impact will last more than 5 years and			
		as such is rated as Long Term	8	3	
		The extent of the impact is rated as		-	
EXTENT	4	Regional as the effects of the impact			
		extends beyond municipal boundaries			

SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES		impacted.		
SIGNIFICANCE	24	low positive		
PROPOSED MITIGATION MEAS				
Where feasible, aim to fill all t	he positions	by labour from the local community		
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	8	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries	0	3
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	24	low positive		1
CONFIDENCE LEVEL				
High				

(iii) Improved municipal service delivery

SPH9 will have a capacity of up to 150MWac and will be connected to the national grid through Eskom substation and generated electricity will be sold nationwide. The proposed project, albeit relatively small, will contribute towards improving National electricity availability; thus, improving the government service delivery, and could potentially also aid in growing the local economy by increasing the overall supply of electricity in the local economy. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas.

The layout alternatives and BESS technology alternatives will not affect the capacity of the solar facility; thus all alternatives are equally preferred.

Table 7-382: SPH9: Assessment of service delivery improvement

IMPROVED MUNICIPAL SERVICE DELIVERY						
PROJECT PHASE	Operation	Operational phase				
DIRECT IMPACT	It will like	It will likely Improve the local electricity supply if fed to the grid				
INDIRECT IMPACT	Improved	Improved standard of living within the region				
CUMULATIVE IMPACT	Improved	electricity availability				
DIMENSION	RATING	RATING MOTIVATION CONSEQUENCE LIKELIHOOD				
PRE-MITIGATION						

DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3		
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries				
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately Beneficial	Definite		
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	48	moderate positive				
PROPOSED MITIGATION N	PROPOSED MITIGATION MEASURES					
No mitigations proposed						

(iv) Reduction of Land Area available for productive farming

The proposed site of SPH9 and surrounding land is currently used for small-scale livestock. The farmers with livestock on the land proposed for the facilities will simply relocate their livestock to land nearby, thus not having an impact on the agricultural production within the area. The area where SPH9 is located will be sterilised for the duration of construction and operation, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. However, all of the affected landowners have indicated their willingness to relocate their livestock and other activities. Thus, loss of agricultural activity and income will not occur.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation; therefore, no negative effects on the current activities observed in the surrounding area are expected due to visual or noise effects that may be created by the development of SPH9.

The proposed facilities will have the same electricity capacity per layout and are expected to have largely a similar footprint with negligible size difference; thus, no significant differentiation among site layout alternatives can be made. The different battery technology alternatives will not affect the impact ratings.

Table 7-383: SPH9: Assessment of Impact on agricultural production

	Redu	ction of Land Area available for Productive	Farming				
PROJECT PHASE	PROJECT PHASE Operational Phase						
DIRECT IMPACT	Loss of a	gricultural production within the footprint a	lue to land sterilisatio	on			
INDIRECT IMPACT		le to no indirect impact					
CUMULATIVE IMPACT	Negligible	e to no cumulative effects					
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD			
		PRE-MITIGATION					
		The duration of the activity associated					
DURATION	4	with the impact will last more than 5					
		years and as such is rated as Long Term	6	3			
		The extent of the impact is rated as	D	3			
EXTENT	1	footprint as it only affects the area in					
		which the proposed activity will occur					
		The severity of the impact is rated as					
		Low negative as the impact affects the	Negligible				
SEVERITY	-1	environment in such a way that natural,					
		cultural and social functions and					
		processes are minimally affected		Definite			
IMPACT ON		Irreplaceable resources will be					
IRREPLACEABLE	1	impacted.					
RESOURCES		mpacca.					
SIGNIFICANCE	-18	very low negative					
		PROPOSED MITIGATION MEASURES					
•		ce at the end of the project's life to allow fo	r the land to be used ;	for livestock farming			
after the closure of the pro	ject.	DOCT MITIGATION					
	Ī	POST-MITIGATION		Ī			
DUDATION		The duration of the activity associated					
DURATION	4	with the impact will last more than 5					
		years and as such is rated as Long Term	6	3			
EVTENT	1	The extent of the impact is rated as footprint as it only affects the area in					
EXTENT	1	which the proposed activity will occur					
		The severity of the impact is rated as					
		Low negative as the impact affects the					
SEVERITY	-1	environment in such a way that natural,					
SEVERIT	-1	cultural and social functions and					
		processes are minimally affected	Negligible	Definite			
IMPACT ON							
IRREPLACEABLE	1	Irreplaceable resources will be					
RESOURCES		impacted.					
SIGNIFICANCE	-18	very low negative		L			
		CONFIDENCE LEVEL					
High							

(i) Terrestrial Biodiversity and Animal Species

(i) Direct Impacts – Injury or death to fauna

The movement of large construction vehicles and maintenance vehicles during the operational phase will pose the threat of collisions with fauna causing injury or death.

Regarding the technology alternative for the type of battery used in the BESS for SPH9, the SSL battery has a higher risk of explosion or fire than the VRF battery. Fire could spread into the surround natural grassland and put fauna at risk of injury or death if adequate prevention and safety measures are not in place.

Table 7-384: SPH9 Injury or death to fauna

		ALL FACILITIES		
PROJECT PHASE	Operation	nal Phase		
DIRECT IMPACT	Injury or	death to fauna		
INDIRECT IMPACT				
CUMULATIVE IMPACT				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	-16	2
	_	The extent of the impact is rated as		_
EXTENT	3	Local as it affects the development		
		area and adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
SEVERITY	-2	cultural and social functions and		
		processes continue albeit in a modified	Moderately	12
		way; and valued, important, sensitive	detrimental	Likely
		or vulnerable systems or communities	-	
IMPACT ON IRREPLACEABLE		are negatively affected Irreplaceable resources will be		
RESOURCES	1	impacted resources will be		
SIGNIFICANCE	-32	low negative		
SIGNIFICANCE	-32	PROPOSED MITIGATION MEASURES		
No wild animal may under any	circumstan	ce be handled, removed or be interfered w	ith hy maintenance s	taff
		, drivers of maintenance vehicles must rem	•	• •
		t should be adhered to (recommended 40 i		sibility of arminals
		prevent attraction of faunal species to hum		re scavenaer proof
•		osed of in the most appropriate way to pre		
becoming habituated to human		,		9
		ures must be in place. A fire emergency mo	anagement plan must	be in place
		ed on a regular basis to minimise the risk o		•
		POST-MITIGATION	-	
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term		1
		/ care arra de saerrie ratea de 2011g / crist	-6	1
		The extent of the impact is rated as	-6	_
EXTENT	1		-6	_
EXTENT	1	The extent of the impact is rated as	-6	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as	-6	
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur The severity of the impact is rated as Low negative as the impact affects the	-6	_
EXTENT	1 -1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that		
		The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions	-6 Negligible	Unlikely
SEVERITY		The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.		
SEVERITY IMPACT ON IRREPLACEABLE	-1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected. Irreplaceable resources will be		
SEVERITY IMPACT ON IRREPLACEABLE RESOURCES	-1 1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected. Irreplaceable resources will be impacted.		
SEVERITY IMPACT ON IRREPLACEABLE	-1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur. The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected. Irreplaceable resources will be		

(ii) Indirect Impacts – Pollution and contamination of natural areas

During operations, release of grey water into the environment can cause contamination by detergents. Grey water from cleaning of the solar panels has the potential to contaminate soils and ground water and be washed into the nearby natural pans during high rainfall events. This

includes biodegradable detergents used for cleaning the panels, which can accumulate in the soil and be washed into the nearby pans before they break down. Biodegradable detergents can alter the balance of freshwater ecosystems as they promote bacterial growth and lower oxygen levels. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-385: SPH9 Pollution and contamination of natural areas including pans and wetland

POLLUTION AND	CONTAM	INATION OF NATURAL AREAS INCLUDING	PANS AND WETLA	NDS		
PROJECT PHASE	Operation	Operational Phase				
DIRECT IMPACT						
INDIRECT IMPACT	Pollution	and contamination of natural areas – incl	uding nearby pans (or wetlands		
CUMULATIVE IMPACT	Habitat d	egradation				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated				
DURATION	4	with the impact will last more than 5				
		years and as such is rated as Long Term	-21	3		
		The extent of the impact is rated as		3		
EXTENT	3	Local as it affects the development				
		area and adjacent properties		<u> </u>		
		The severity of the impact is rated as				
		High negative as the natural, cultural				
		or social functions and processes are				
		altered to the extent that the natural				
SEVERITY	-3	process will temporarily or				
		permanently cease; and valued,	Highly	Definite		
		important, sensitive or vulnerable	detrimental	Dejiiite		
		systems or communities are				
		substantially affected				
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be				
RESOURCES		impacted				
SIGNIFICANCE	-63	high negative				
		PROPOSED MITIGATION MEASURES				

An independent Environmental Control Officer (ECO) must be appointed to oversee operational phase activities at a minimum every 6 months for the first 5 years and then yearly for the rest of the life of the facility

If possible, panels should be cleaned using water that is clear of detergents only (e.g. potable water or borehole water). The use of grey water should be avoided. Should the need arise to clean the panels with detergents, then biodegradable detergents are preferred. Care must be taken not to allow the detergents to accumulate in the soil

All maintenance vehicles must be checked for leaks and serviced on a regular basis

Any spillage must be dealt with rapidly and in the most appropriate manner

No washing of vehicles must take place on site

Dumping of solid waste in natural areas, including cigarette butts and litter by maintenance staff must be prohibited

Appropriate solid waste disposal and ablution facilities must be provided for operational staff

Adequate prevention and safety measures must be in place to avoid leaks to batteries. This includes regular maintenance and replacement of batteries in a timeous manner. Measures must be in place to prevent chemicals leaking into the soil, should damage to the battery occur

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive	Slightly Detrimental	Likely

		or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEABLE	0	No irreplaceable resources will be		
RESOURCES	0	impacted		
SIGNIFICANCE	-24	low negative		
CONFIDENCE LEVEL			_	
High				

(iii) Indirect Impacts – Disturbance and displacement of fauna

Security lights for SPH9 during the operational phase will result in an increase in artificial lighting. This will disturb the fauna utilising the surrounding grassland adjacent to the facility, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance.

The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-386: SPH9 Disturbance and displacement of fauna – natural grassland

DISTUR	BANCE AN	D DISPLACEMENT OF FAUNA – NATURA	L GRASSLAND		
PROJECT PHASE	Operational Phase				
DIRECT IMPACT					
INDIRECT IMPACT	Disturbar	nce to and displacement of fauna – natur	al grassland		
CUMULATIVE IMPACT	Displacement of fauna				
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
		PRE-MITIGATION			
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	2	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties			
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely	
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted			
SIGNIFICANCE	-32	Moderate negative			
		PROPOSED MITIGATION MEASURES			

Operations during the night must be avoided to minimise the need for artificial lighting and to reduce the impact of light and noise on nocturnal animals

Lighting during operations should be avoided as far as possible. Where required, lighting must not include those that fall within the white spectrum or emit ultra-violet light such as high-pressure sodium or mercury lamps. Light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, is

Upward lighting must be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light

POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1	

EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-7	very low negative		
CONFIDENCE LEVEL				
High	•			

(j) Traffic Impact

During the operational phase there will be approximately 8 full time employees on site. Vehicles would access the site for daily operations and maintenance as and when required. The impacts are rated the same for both battery technology alternatives for the BESS.

Table 7-387 SPH9: Traffic impacts during operation phase

		TRAFFIC IMPACTS			
PROJECT PHASE Operational Phase					
DIRECT IMPACT	Traffic congestion due to the trips generated by the operation of the facility				
INDIRECT IMPACT		ated noise and dust pollution			
CUMULATIVE IMPACT		ays on the surrounding road network			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
	l <i>-</i>	PRE-MITIGATION	I I		
DURATION	4	The duration of the activity associated			
		with the impact will lastmore than 5 years			
		and as such is	_	_	
		rated as Long Term	0	3	
EXTENT	3	The extent of the impact is rated asLocal as			
		it affects the development area and			
		adjacent properties			
SEVERITY	0	Negligible			
IMPACT ON	0	No irreplaceable resources will be			
IRREPLACEBLE		impacted.	Negligible	Definite	
RESOURCES		•			
SIGNIFICANCE	0	very low negative			
Ci Ci I i i i i i i i i i i i i i i i i		PROPOSED MITIGATION MEASURES			
		r outside of peak traffic periods; and			
		t regular maintenance of gravel roads (located w		ary,including the	
access road to the site) occi	urs auring op	eration phase to minimise/mitigate dust pollution	on.		
	1 4	POST-MITIGATION	I I		
DURATION	4	The duration of the activity associated			
		with the impact will lastmore than 5 years		2	
EVENT		and as such is rated as Long Term	0	3	
EXTENT	2	The extent of the impact is rated assite as it			
	_	will affect only the development area			
SEVERITY	0	Negligible			
IMPACT ON	0	No irreplaceable resources will be	Negligible	Definite	
IRREPLACEBLE		impacted.		,	
RESOURCES					
SIGNIFICANCE	0	very low negative			
_		CONFIDENCE LEVEL			
High					
·					

7.9.5 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered **Section 7.7**.

7.9.6 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities and is covered in **Section 7.8.**

7.9.7 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The cumulative impact assessment is available in **Section 7.9.**

Table 7-388: SPH9 impact summary

Impact	Nature	Rating pre-mitigation	Rating post mitigation	
Design/Planning/Pre-Construction Phase				
No impacts identified				
Construction Phase				
Agricultural impacts				
Land use change from livestock farming to energy generation	Negative	Moderate	Low	
Soil loss through erosion	Negative	Moderate	Very low	
Impaired soil functionality caused by compaction	Negative	Moderate	Very low	
Impaired soil health as a result of soil pollution	Negative	High	Very low	
Aquatic impacts				
Disturbance and water quality impacts	Negative	Moderate	Low	
Avifaunal impacts				
Destruction of bird habitat during construction	Negative	Moderate	Low	
Disturbance of birds during construction	Negative	Very low	Very low	
Bat impacts				
Bat habitat modification	Negative	Very low	Very low	
Disturbance and displacement of bats	Negative	Very low	Very low	
Possible roost disturbance	Negative	Low	Very low	
Bat roost destruction	Negative	Low	Very low	
Botanical impacts				
Loss of vegetation	Negative	Medium	Low	

Groundwater impacts			
Lowering of the groundwater level due to over abstraction for	Negative	Low	Very low
construction phase (only applicable if abstraction takes place) Contamination of groundwater as a result of accidental oil spillages	Negative	LOW	very low
or fuel leakages	Negative	Very low	Very low
Heritage impacts			
Impact on archaeological sites	Negative	Very low	Very low
Impact on graves	Negative	Low	Very low
Impact on cultural landscape	Negative	Low	Low
Palaeontological impacts			
Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-economic impacts			
Stimulation of the economy during construction	Positive	Low	Low
Employment opportunities	Positive	Low	Low
Reduction in land available for productive farming	Negative	Very low	Very low
Loss of property	Negative	Low	Very low
Terrestrial biodiversity and animal species (faunal) impacts			
Destruction of faunal habitat	Negative	High	Low
Injury or death to fauna	Negative	Moderate	Very low
Disturbance and displacement of fauna	Negative	Low	Very low
Pollution and contamination of natural areas	Negative	Moderate	Very low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Traffic impacts			
Traffic congestion	Negative	Very low	Very low
Landscape and visual impacts	•		
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Moderate	Low
Industrialisation of the landscape as seen from local roads	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
Operational Phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Low
Soil pollution	Negative	Very low	Very low
Aquatic impacts			
Increased run-off, pollution	Negative	Very low	Very low
Aquatic			
Disturbance of aquatic habitat; water quality impacts	Negative	Very low	Very low
Avifauna impacts			
Bird fatality through interaction with infrastructure	Negative	Very low	Very low
Nesting and use of other infrastructure by birds	Positive	Very low	Very low
Bat impacts			
Disturbance and displacement	Negative	Very low	Very low
	l		

Roost disturbance	Negative	Low	Very low
Botanical impacts			
Loss of vegetation	Negative	Very low	Very low
Groundwater impacts			
Lowering of the groundwater level due to over abstraction for operational phase (only applicable if abstraction takes place).	Negative	Low	Very low
Contamination of groundwater from use of cleaning agents	Negative	Low	Very low
Contamination of groundwater from leaks or spills from BESS	Negative	Low	Very low
Heritage impacts			_
Impact on cultural landscape	Negative	Low	Low
Socio-economic impacts			·
Economic stimulation during operations	Positive	Low	Moderate
Employment opportunities	Positive	Low	Low
Improved service delivery	Positive	Moderate	Moderate
Reduction in land available for productive farming	Negative	Very low	Very low
Terrestrial biodiversity and animal species			
Injury or death of fauna	Negative	Low	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Low
Disturbance and displacement of fauna –natural grassland and rocky outcrops	Negative	Moderate	Very low
Traffic impact			
Traffic congestion	Negative	Very low	Very low
Palaeontological impacts			
Destruction of fossils	NA	NA	NA
Decommissioning phase			
Agricultural impacts			
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction			
	Negative	Moderate	Very low
Impaired soil health as a result of soil pollution	Negative Negative	Moderate High	
			Very low
Impaired soil health as a result of soil pollution			Very low
Impaired soil health as a result of soil pollution Aquatic impacts	Negative	High	Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts	Negative	High	Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts	Negative Negative	High Very low	Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds	Negative Negative	High Very low	Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts	Negative Negative	High Very low Very low	Very low Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements	Negative Negative	High Very low Very low	Very low Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts	Negative Negative Negative	High Very low Very low	Very low Very low Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation	Negative Negative Negative	High Very low Very low	Very low Very low Very low Very low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation Groundwater	Negative Negative Negative Negative	High Very low Very low Low	Very low Very low Very low Very low Low
Impaired soil health as a result of soil pollution Aquatic impacts Disturbance of aquatic habitat, water quality impacts Avifaunal impacts Disturbance of birds Bat impacts Disturbance and displacements Botanical impacts Loss of vegetation Groundwater Contamination from construction activities	Negative Negative Negative Negative	High Very low Very low Low	Very low Very low Very low Very low Low

Destruction of fossils	Negative/ Positive	Very low (negative)	Very low (positive)
Socio-Economic impacts			
Impact on the economy	Positive	Very low	Very low
Creation of temporary employment opportunities in the local and regional economy	Positive	Very low	Very low
Terrestrial biodiversity and animal species			
Destruction of novel ⁹ faunal habitat (i.e. grassed areas under the	Negative	Moderate	Very low
panels where fauna may recolonise after construction) Injury or death to animals (due to collisions with construction			,
vehicles or destruction of burrows that have established under the panels)	Negative	Moderate	Very low
Pollution and contamination of natural areas including pans and wetlands	Negative	High	Very low
Disturbance to and displacement to fauna and edge effects – natural grassland	Negative	Low	Very Low
Increased potential of invasion by alien vegetation	Negative	Moderate	Very low
Reestablishment of movement corridors through the landscape due to removal of fences and return to open grassland	Negative	Very low	Low positive
Traffic impacts			
Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site	Negative	Very low	Very low
Landscape and visual impacts			
Landscape change	Negative	Moderate	Low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	Very low	Very low
Industrialisation of the landscape as seen from local roads	Negative	Very low	Very low
Industrialisation of the landscape as seen from local homesteads	Negative	Moderate	Very low
Light pollution	Negative	Moderate	Very low
No-Go Alternative			
Agricultural	Negative	Very low	Very low
Aquatic	Negative		Very low-
Avifauna	Negative	Very low	negligible Very low
Bats	Negative	Very low	Very low
Botanical	Negative	Low	Low
Heritage	Negative	Very low	Very low
Transport- Traffic congestion	Negative	Very low	Very Low
Terrestrial biodiversity and animal species	Negative/		Very low
	positive	Low negative	positive
Socio-economic	NA- no impact, forgone + impacts	NA	NA
Destruction of fossils	NA NA	NA	NA
Landscape and Visual	Negligible	No impact/NA	No impact/NA
Groundwater Impacts	Negligible	NA	NA
Cumulative impacts			

⁹ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

Agricultural	Negative	Very low	Very low
Aquatic	Negative	Low	Low
Avi-fauna	Negative	Moderate	Moderate
Bats	Negative	Low	Low
Botanical	Negative	Very low	Very low
Heritage	Negative	Moderate	Low
Socio-economic - Impact on the economy- construction	Positive	-	Moderate
Socio-economic -Creation of employment during construction	Positive	-	Moderate
Socio-economic -Reduction in land available for productive farming	Negative	-	Low
Socio-economic -Stimulation of the economy – operations	Positive	-	Moderate
Socio-economic -Employment - operations	Positive	-	Moderate
Socio-economic -Improved municipal service delivery	Positive	-	Moderate
Socio-economic -Loss of property	Negative	-	Low
Socio-economic - Stimulation of economy - decommissioning	Positive	-	Very low
Terrestrial biodiversity	Negative	High	Moderate
Transport	Negative	Low	Very Low
Landscape and visual	Negative	-	Low
Destruction of fossils	NA	NA	NA
Groundwater: Aquifer system and water quality	Negative	Low- Very Low	Low – Very Low

7.10 Decommissioning Phase

Upon completion of the operational phase of the project which will last in excess of 20 years the facilities may be decommissioned. Decommissioning activities would entail removal of infrastructure from site and return of the site to a state similar to the pre-construction condition. The decommissioning impacts would not vary significantly between facilities and so all seven facilities are covered by the impact ratings in this section unless specified otherwise.

(a) Agricultural Impacts

Potential impacts to agriculture during the decommissioning phase would be similar to those in the construction phase namely, soil loss due to erosion, impaired soil functionality and health from compaction and soil pollution. The impacts are rated the same for both location alternatives for the electrical infrastructure compound and the battery technology alternatives for the BESS.

Table 7-389: Impact of decommissioning phase activities on agriculture

Impact	Nature	Pre-mitigation significance	Post mitigation significant
Soil loss through erosion	Negative	Moderate	Very low
Impaired soil functionality caused by compaction	Negative	Moderate	Very low
Impaired soil health as a result	Negative	High	Very low

of soil pollution		

(b) Aquatic Impact

Potential impacts of aquatic ecology during the decommissioning phase would be similar to those in the construction phase. Water quality and flow related risks would be lower than those experienced during the construction phase. The impacts are rated the same for both location alternatives for the electrical infrastructure compound and the battery technology alternatives for the BESS.

Table 7-390 SPH1 Aquatic ecology impacts during decommissioning phase

		AQUATIC ECOSYSTEM IMPACTS		
PROJECT PHASE	Decommi	ssion Phase		
DIRECT IMPACT		ce of aquatic habitat; water quality impacts		
INDIRECT IMPACT		etation invasion in aquatic features		
CUMULATIVE IMPACT		ion of the ecological condition of aquatic ecosyste	ms	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
Dividition	IIAIIII	PRE-MITIGATION	CONSEQUENCE	LIKELITIOOD
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated		
		as Short term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social functions and processes are minimally affected	Negliqible	Unlikely
IMPACT ON IRREPLACEBLE	0	No irreplaceable resources will be impacted.		
RESOURCES	_		-	
SIGNIFICANCE	-4	PROPOSED MITIGATION MEASURES		
The december is a leading in a		nould be limited to existing disturbed areas.		
		-		
		rehabilitated and revegetated		ha naminad
		ing of residual impacts (alien vegetation growth a site management must be undertaken and shoul		
		site management must be undertaken and snow ential pollution sources such as hydrocarbon spills		ress prevention of
		uring decommissioning must be handled appropri		iments and reduce
flowvelocities where n		aring decommissioning mast be nanated appropri	atery to trup seu	ments and reduce
,		raphy and cover vegetation in these areas is reco	mmended	
		the decommissioning of the facilities should be re-		hle disnosal site
7 Waste Materials arr	sing from t	AQUATIC ECOSYSTEM IMPACTS	moved to a saita	ore disposar site.
DURATION	1	The duration of the activity associated with the		
2010/11/01/	_	impact will last 0-6 months and as such is rated		
		as		
		Temporary		
EXTENT	1	The extent of the impact is rated as footprint	-2	1
		as it only affects the area in which the		
		proposed activity		
		will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a waythat natural, cultural and social	Negligible	Unlikely
		functions and		

			processes are minimally affected				
IMPACT	ON	0	No irreplaceable resources will be impacted.				
IRREPLACEBL	E						
RESOURCES							
SIGNIFICANO	E	-2	very low negative				
	CONFIDENCE LEVEL						
High							

(c) Avifaunal Impact

The impacts during the decommissioning of SPH1 will only be that of disturbance of birds, already assessed. The impacts of decommissioning will have the same rating as disturbance during the construction (**Table 7-14**) and are not repeated here. The same mitigation measures would be applied during the decommissioning phase. The impact is rated as very low negative pre and post mitigation.

(d) Bats Impact

The impacts to bats during this phase are likely to be restricted to disturbance and displacement effects. Provided decommissioning activities are restricted to daylight hours, the impact to bats should be very low.

Table 7-391 SPH1: Impacts on possible disturbance & displacement effects during decommissioning

_	IMPACT ON POSSIBLE DISTURBANCE & DISPLACEMENT EFFECTS					
PROJECT PHASE	Decommissi	oning phase				
DIRECT IMPACT	Disturbance	of bats during decommissioning activities				
INDIRECT IMPACT	Displaceme	Displacement				
CUMULATIVE IMPACT	Unavailabili	Inavailability of suitable foraging resources in the broader environment for displacedindividuals				
DIMENSION	RATING	ATING MOTIVATION CONSEQUENCE LIKELIHOOD				
		PRE-MITIGATION				
DURATION	3	The duration of the activity associated with the impact will last 18 months to 5 years and assuch is rated as Medium term	-6		1	
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimallyaffected			Jnlikely	
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resourceswill be impacted.	_ negrigide		·	
SIGNIFICANCE	-6	Very low negative				
		MITIGATION MEASURES TO BE INCLUDED IN TH				
Limit decommissioning acti	vities to dayli	ght hours only and minimise lighting at night, as f	ar as possible			
		POST-MITIGATION		T		
DURATION	3	The duration of the activity associated with the impact will last 18 months to 5 years and assuch is rated as Medium term	-6 1		1	
EXTENT	2	The extent of the impactis rated as site as it will affect only the development area				
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,	Negligible	e	Unlikely	

			cultural and social functions and processes are minimally affected		
IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resourceswill be impacted.		
SIGNIFICANCE		-6	Very low negative		
CONFIDENCE LEVEL					
Medium					

(e) Botanical Impacts

Botanical impacts during the decommissioning phase mainly relate to vehicular traffic on site but it is not anticipated that the decommissioning phase impact would be higher than the construction phase impact. The decommissioning phase impacts would not be affected by any of the proposed the layout alternatives or technology alternative for the BESS. Decommissioning phase impacts are rated as low negative pre and post mitigation.

(f) Groundwater Impact

The main risk associated with groundwater contamination during the decommissioning phase of the proposed SPH1 lies with construction vehicles and heavy machinery which may be required on-site. Therefore the decommissioning phase has the same risks and mitigation measures as the construction phase (**Table 7-21**). The impact is rated as very low negative pre and post mitigation.

(g) Heritage Impact

(i) Impacts to the cultural landscape

Decommissioning phase impacts relate to the presence in the rural landscape of construction equipment and vehicles, as well as to all the expected activity. Impacts to the cultural landscape will occur during the decommissioning phase and last as long as decommissioning lasts (anticipated to be up to about 12 months). Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a considerable change in landscape character and sense of place. The impact significance is rated to low negative before mitigation. Mitigation measures essentially only involve best practice measures such as minimising decommissioning duration and ensuring that full and effective rehabilitation takes place with the present land use being reinstated. Because of the return to the current rural landscape, these measures are expected to lower the significance to very low negative after mitigation (Error! Reference source not found.). There are no cumulative impact concerns. There are no fatal flaws in decommissioning phase terms of impacts to the landscape.

Table 7-392: Assessment of decommissioning phase impacts to the cultural landscape for

CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	Decommissioning Phase			

DIRECT IMPACT		of the rural landscape character through the dall the associated activities on site	presence of construction	equipment and
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	Impacts wi	II be greater with multiple facilities being de	commissioned at once	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION	·	•
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
	_	and as such is rated as Short term		
		The extent of the impact is rated as Local	-10	3
EXTENT	3	as it affects the development area and		
EXTENT		adjacent properties		
		The severity of the impact is rated as		
		Moderate negative as the affected		
		environment is altered but natural,		
		cultural and social functions and		
SEVERITY	-2	I -		
		processes continue albeit in a modified	Slightly Detrimental	
		way; and valued, important, sensitive or		Definite
		vulnerable systems or communities are	,	
IN ADA CT. ONL		negatively affected		
IMPACT ON		No irreplaceable resources will be		
IRREPLACEABLE	0	impacted.		
RESOURCES		,		
SIGNIFICANCE	-30	low - negative		
		PROPOSED MITIGATION MEASURES		
Keep decommissioning pe				
		and rehabilitate all areas on completion of a	lecommissioning.	
Reinstate the present lan	d use (grazin	g and/or agriculture).		
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	2	with the impact will last 6-18 months		
		and as such is rated as Short term	_	2
		The extent of the impact is rated as Local	-5	3
EXTENT	3	as it affects the development area and		
	_			
	I	aajacent properties		
		adjacent properties The severity of the impact is rated as Low		
		The severity of the impact is rated as Low		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural,		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and	Negligible	Definite
	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON		The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be	Negligible	Definite
IMPACT ON IRREPLACEABLE	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted.	Negligible	Definite
IMPACT ON IRREPLACEABLE		The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted. very low negative	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected No irreplaceable resources will be impacted.	Negligible	Definite

(h) Palaeontological Impact

The palaeontological impacts during the decommissioning phase (**Table 7-25**) would be the same as those identified during the construction phase and relate to destruction of fossils. The impact is rated as very low negative pre-mitigation and very low positive post mitigation.

(i) Socio-Economics Impacts

The decommissioning of each of the Springhaas Solar PV facilities would generate a temporary increase in stimulation to the local economy through the creation of employment

opportunities. The proposed layout and technology alternatives would not impact on the rating of this impact.

Table 7-393: Assessment of impact on the economy during the decommissioning phase

		IMPACT ON ECONOMY				
PROJECT PHASE	DJECT PHASE Decommissioning Phase					
DIRECT IMPACT	Temporar	emporary increase in production and GDP in the local economy				
INDIRECT IMPACT	Improved	household income and increased business sa	les in the local econom	у		
CUMULATIVE IMPACT	Temporar	y increase in production and GDP in the regio	onal economy			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	4	3		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	7	3		
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Negligible	Definite		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.				
SIGNIFICANCE	12	very low positive				
		PROPOSED MITIGATION MEASURES				
No mitigations propose	ed		•	•		

As no mitigation measures are proposed the impact would remain a very low positive impact.

Table 7-394: Assessment of impact on employment – decommissioning phase

CREATION OF EMPLOYMENT AND INCREASED HOUSEHOLD INCOME DURING DECOMMISSIONING					
PROJECT PHASE	Decommis	sioning Phase			
DIRECT IMPACT	Creation o	f temporary employment opportunities in	n the local and region	al economy	
INDIRECT IMPACT	Improved	income of households whose member are	e employed on the pro	oject	
CUMULATIVE IMPACT	Creation o	f permanent employment opportunities i	n the region		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD	
PRE-MITIGATION					
DURATION	1	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary	4	3	
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	7	3	
SEVERITY	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved	Negligible	Definite	

IMPACT IRREPLACEBLE RESOURCES	ON 0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	12	very low positive		
		PROPOSED MITIGATION MEASURE	S	
No mitigations propo	sed			

As no mitigation measures are proposed the impact would remain a very low positive impact.

(j) Terrestrial Biodiversity

The impacts on terrestrial biodiversity during decommissioning would be similar to the construction phase impacts. A positive impact will be removal of fences and return of land back to open habitat (current condition/ land use).

Table 7-395: Possible impacts on terrestrial biodiversity from the decommissioning of the solar PV facility

Dossible Immest	Annicohio Facility	Significan	nce Rating	
Possible Impact	Applicable Facility	Pre-mitigation	Post-mitigation	
Destruction of novel ¹⁰ faunal habitat (i.e. grassed areas under the panels where fauna may recolonise after construction)	ALL	Moderate negative	Very low negative	
Injury or death to animals (due to collisions with construction vehicles or destruction of burrows that have established under the panels)	ALL	Moderate negative	Very low negative	
Pollution and contamination of natural areas including pans and wetlands	ALL	Moderate negative	Very low negative	
Disturbance to and displacement to fauna and edge effects – natural grassland	SPH1, SPH3, SPH6, SPH8, SPH9	Low negative	Very low negative	
Disturbance to and displacement to fauna and edge effects – natural grassland and rocky outcrops	SPH4, SPH5	Moderate negative	Low negative	
Increased potential of invasion by alien vegetation	ALL	Moderate negative	Very low negative	
Reestablishment of movement corridors through the landscape due to removal of fences and return to open grassland	ALL	Very low negative	Low positive	

(k) Traffic Impact

The traffic impacts during the decommissioning phase would be similar in nature to those experienced during the construction phase and relate to increase in vehicles accessing the site.

 $^{^{10}}$ Novel habitats are human-built, modified, or engineered niches in places that have been altered in structure and function by human activity

The traffic generated during the decommissioning phase will result in a negative impact on the surrounding road network. It must be noted that the impact will be less than the construction phase.

Table 7-396: SPH1 traffic Impact rating, decommissioning phase

		TRAFFIC IMPACT		
PROJECT PHASE	Decommissio			
DIRECT IMPACT	Traffic congest and staff to se	stion due to an increase in traffic caused by the tr ite	ansportation ofequi	pment, material
INDIRECT IMPACT	Construction	traffic on roads might generate dust and noise.		
CUMULATIVE IMPACT	Traffic delays	on the surrounding road network.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
	_	PRE-MITIGATION		
DUDATION		The duration of the activity associated with the		
DURATION	2	impact will		
	2	last 6-18 months and as such is rated as	-	
		Short term	1	1
		The extent of the impact is ratedas Local as	0	
EXTENT	3	it affects the development area and adjacent		
		properties		
SEVERITY		The severity of the impact is rated as		
SEVERITI		Moderate negative as the affected		
		-		
		environment is altered but natural, cultural		
	-2	and social functions and processes continue		
		albeit in a modified way; and valued,		
		important, sensitive or vulnerable systems or	Slightly	Halilanh.
		communities are negatively	Detrimental Detrimental	Unlikely
		affected	Detrimental	
IMPACT ON		No irreplaceable resources will be		
IRREPLACE	0	impacted.		
BLE		impactea.		
RESOURCES				
SIGNIFICANCE	-10	very low negative		
		PROPOSED MITIGATION MEASURES		
Stagger component del				
Reduce the construction				
	ivel roads (inter	rnal gravel roads and the access road to the site)	during the construc	tionphase, as
required.				
	of gravel roads	(internal gravel roads and the access road to th	ie site) by the Conti	actorduring the
construction phase.				
		quarries in close proximity to the site (if available	and feasible); and	
Staff and general trips s	should occur out	tside of peak traffic periods.		
	•	POST-MITIGATION		
DURATION	2	The duration of the activity associated with the		
DONATION		impact will		
		last 6-18 months and as such is rated as		
		Short term	-5	1
EVITENIT	3	The extent of the impact is ratedas Local as		
EXTENT		it affects the development area and adjacent		
		properties		
	-1	The severity of the impact is rated as Low		
SEVERITY		negative as the impact affects the		
		environment in such a way that natural,		
		cultural and social functions and		
		processes are minimally affected		
	0	processes are minimally affected	Negligible	Unlikely
IMPACT ON	I	No irreplaceable resources will be		
IRREPLACE		impacted.		
BLE		puoteu.		
RESOURCES				
SIGNIFICANCE	-5	very low negative	I I	
-		CONFIDENCE LEVEL		
Madium				
Medium				

(I) Landscape and Visual

The impact of decommissioning would be similar to construction-phase and so the impact tables in section apply here and will not be duplicated. It should be noted that the impacts identified will all gradually increase from the current situation to the impact level indicated during the construction phase, be consistent at the impact levels indicated during the operational phase and decrease again from the levels indicated to close to the current situation during the decommissioning phase.

Dossible Impact	Nature	Applicable	Significance Rating		
Possible Impact		Facility	Pre-mitigation	Post-mitigation	
Landscape change	Negative	SPH3	Moderate	Low	
Industrialisation of the landscape as seen from Nielsview Nature Reserve	Negative	SPH3	Very low	Very low	
Industrialisation of the landscape as seen from local roads	Negative	SPH3	Moderate	Very low	
Industrialisation of the landscape as seen from local homesteads	Negative	SPH3	Moderate	Very low	
Light pollution	Negative	SPH3	Moderate	Very low	

7.11 No-Go Alternative

The no-go alternative refers to the option of not developing the facility. The impact assessment for the no-go alternative is the same for all 7 facilities. The No-go alternative has also been assessed, noting that the property does hold existing development rights and so, not developing the proposed solar PV facilities does not necessarily mean that there would be no changes or impacts on the site.

7.11.1 Agricultural Impact

The no-go option would mean that current agricultural activities continue on the site.

Table 7-397: Impact significance of the no-go alternative on the current land use (livestock farming)

	NO CH	ANGE IN CURRENT LAND USE (LIVESTOCK F	ARMING)	
PROJECT PHASE	-			
DIRECT IMPACT	Livestock	farming will continue as it currently is.		
INDIRECT IMPACT	No indire	ct impacts.		
CUMULATIVE IMPACT	No cumu	lative impacts		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	0	3
SEVERITY	0	Negligible	Negligible	Definite

IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	0	very low negative		
		PROPOSED MITIGATION MEASURES		
No mitigation measures a	re required			
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area	, and the second	3
SEVERITY	0	Negligible		
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Negligible	Definite
SIGNIFICANCE	0	very low negative	•	
		CONFIDENCE LEVEL		
High		<u> </u>	<u>-</u>	

7.11.2 Aquatic Impacts

The no-go impact on aquatic ecosystems is rated as very low to negligible.

7.11.3 Avifauna

The no-go alternative would not result in any new impacts on birds. The current agricultural activities on site do impact on avifauna but birds have evolved to co-exist and the site is not intensively being farmed.

Table 7-398: No-go impact on avifauna

HABITAT DESTRUCTI	ON AND DIS	TURBANCE IMPACTS ON BIRDS THROUGH THE NO-GO AL FARMING	TERNATIVE OR STATUS C	QUO - WHICH IS
PROJECT PHASE	Ongoing, op	perational		
DIRECT IMPACT				
INDIRECT IMPACT		e lands are established, as is the case on this site, farming rbance is ongoing	does not cause much h	abitat destruction.
CUMULATIVE IMPACT	The broader avifauna	r area is farmed in the same way as the site, so farming co	umulatively has a conside	erable influence on
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Cli-hable Doduino ouded	Halifeelee
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	Slightly Detrimental	Unlikely
SIGNIFICANCE	-7	very low negative		
		PROPOSED MITIGATION MEASURES		
None				

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-7	very low negative		
		CONFIDENCE LEVEL		
High				_

7.11.4 Bats

The impact of the no-go alternative on bats would be a continuation of the status quo on sites and existing impacts would continue to affect bats.

Table 7-399: No-go alternative - bats

		IMPACT OF POSSIBLE NO-GO ALTERNAIVE		
PROJECT PHASE	No project p	phase is applicable in the event that the facility is not constru	ıcted	
DIRECT IMPACT	No impacts	are anticipated in the event that the facility is not constructed	ed	
INDIRECT IMPACT	No impacts	are anticipated in the event that the facility is not construct	ed	
CUMULATIVE IMPACT	No addition	al impacts are perceived to exist or contribute towards exist	ing impacts from nearb	y projects
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	1	The duration of the activity associated with the impact		
DURATION	1	will last 0-6 months and as such is temporary	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only	U	1
LATLINI	1	affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON				
IRREPLACEBLE	0	No irreplaceable resources will be impacted.	Negligible	Unlikely
RESOURCES				
SIGNIFICANCE	0	very low negative		
		PROPOSED MITIGATION MEASURES		
No mitigation required	in the event t	hat the facility is not constructed.		
		POST-MITIGATION		
DURATION	1	The duration of the activity associated with the impact		
DURATION	1	will last 0-6 months and as such is temporary	0	1
EXTENT	1	The extent of the impact is rated as footprint as it only	U	1
LAILINI	1	affects the area in which the proposed activity will occur		
SEVERITY	0	Negligible		
IMPACT ON			Negligible	Unlikely
IRREPLACEBLE	0	No irreplaceable resources will be impacted.	Negligible	Officery
RESOURCES				
SIGNIFICANCE	0	very low negative		-
		CONFIDENCE LEVEL		
High				

7.11.1Botanical Impacts

The no-go alternative would result in no changes to the status quo. The land would remain in the same natural state and any changes to occur would be attributed to agriculture and external factors such as climate change. The no-go alternative is rated as low negative.

7.11.2 Heritage Impacts

Heritage impacts, destruction of archaeological sites and graves and alternation of the cultural landscape may occur during continuation of agricultural activities on site.

Table 7-400: Heritage no-go impact

		IMPACT OF POSSIBLE NO-GO ALTERNAIVE		
PROJECT PHASE	N/A			
DIRECT IMPACT	Destruction	of archaeological sites and graves and alternation of the cultural	landscape	
INDIRECT IMPACT	None	, , , , , , , , , , , , , , , , , , , ,	,	
CUMULATIVE IMPACT	None expec	ted		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as long term		2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-6	2
SEVERITY	-1	The severity of the impact is rated as low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.		
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.	Negligible	Likely
SIGNIFICANCE	-12	very low negative		
		PROPOSED MITIGATION MEASURES		
No mitigation required	in the event ti	hat the facility is not constructed.		
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last 0-6 months and as such is temporary	-6	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur	-0	2
SEVERITY	-1	The severity of the impact is rated as low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.	Negligible	Likely
IMPACT ON IRREPLACEBLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	12	very low negative		
		CONFIDENCE LEVEL		
High	<u> </u>			

Note that there would be no impact on palaeontology/ fossils associated with the no-go phase.

7.11.3 Socio-Economic

The no-go alternative option would mean that current farming activities would continue. No stimulation of the local economy in terms of GDP and employment opportunities would occur if the no-go option is chosen.

7.11.4 Terrestrial Biodiversity and Animal Species

Existing impacts in the study area include farm roads and tracks (which are sparsely distributed), fences, past ploughing (old fields), cultivated fields, grazing (moderate to low pressure), and areas where cattle tend to congregate, such as at water points, and trample the ground. Alien trees occur around the disturbed areas such as farm buildings. A few powerlines bisect the landscape and join a substation approximately 4 km to the north.

Table 7-401: No-go alternative on faunal and terrestrial biodiversity

		NO-GO ALTERNATIVE		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	-7	3
		The extent of the impact is rated as site	-/	3
EXTENT	2	as it will affect only the development		
		area		
		The severity of the impact is rated as		
		Low negative as the impact affects the		
SEVERITY	-1	environment in such a way that natural,		
		cultural and social functions and	Slightly	Definite
		processes are minimally affected	Detrimental	Dejiiite
IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be impacted		
RESOURCES		mreplaceable resources will be impacted		
SIGNIFICANCE	-21	low - negative		
		PROPOSED MITIGATION MEASURES		
Farm roads must remain limited				
		ed and overstocking of livestock avoided		
Cows must not be allowed to co				
Cultivation must remain within				
Invasive alien plants removed fi	om the site	and the further establishment and spread	controlled	
All barbed wire on the lower ru	ng of the fe	nces should be removed or replaced with n	on-barbed wire to a	allow animals to
move under without harm				
		POST-MITIGATION		
		The duration of the activity associated		
DURATION	4	with the impact will last more than 5		
		years and as such is rated as Long Term	7	2
		The extent of the impact is rated as site	,	2
EXTENT	2	as it will affect only the development		
		area		
		The severity of the impact is rated as		
		Low positive as the impact affects the		
SEVERITY	1	environment in such a way that natural,	Slightly	
		cultural and social functions and	Beneficial	Likely
		processes are minimally improved	Denejiciai	
IMPACT ON IRREPLACEABLE	1	Irreplaceable resources will be		
RESOURCES	1	impacted.		
SIGNIFICANCE	14	very low positive		

CONFIDENCE LEVEL
Medium

7.11.1 Transport

The no-go alternative would mean that the negative impacts on the surrounding road network associated with the construction and decommissioning phases would not occur.

Table 7-402L No-go alternative impact on transport

		TRAFFIC IMPACT		
PROJECT PHASE	N/A			
DIRECT IMPACT	Traffic cong	gestions		
INDIRECT IMPACT	Traffic on r	oads might generate dust and noise.		
CUMULATIVE IMPACT	Traffic dela	ys on the surrounding road network.		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as long term	-7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Halleste.
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	detrimental	Unlikely
SIGNIFICANCE	-7	very low negative		
		PROPOSED MITIGATION MEASURES		
None				
		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.	detrimental	
SIGNIFICANCE	-7	very low negative		
		CONFIDENCE LEVEL		
Medium				

7.11.2Landscape and Visual

The no-go alternative could result in a limited number of additional agricultural buildings being developed. This is rated as negligible.

7.11.3 Groundwater

The no-go alternative would involve the continuation of farming activities on site. Groundwater extraction would continue for agricultural activities.

7.12 Cumulative Impacts

The cumulative impact considers the development of all seven Springhaas solar PV facilities in addition to the other projects which are proposed within 30km of the facility.

The cumulative impacts were rated the same for each of the 7 solar PV facilities. The impact assessment below therefore apply to all facilities. The proposed technology alternatives and location alternative do not affect the cumulative impact assessment.

7.12.1 Agricultural Impact

The cumulative impact on agriculture relates the cumulative conversion of agricultural land to other uses.

Table 7-403: Cumulative impact of conversion of grazing land to other land uses

	CONVERSIO	N OF GRAZING LAND INTO OTHER	LAND USES	
PROJECT PHASE	Constructio	n Phase but continues through all p	roject phases	
CUMULATIVE IMPACT	Increase in	areas where agriculture is converte	d into other land uses	
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	10	-
SEVERITY IMPACT ON IRREPLACEBLE	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected Irreplaceable resources will be	Moderately Detrimental	Unlikely
RESOURCES	1	impacted.		
SIGNIFICANCE	-16	very low negative		
	P	PROPOSED MITIGATION MEASURES		
Each project must remain with	nin the author	rised development area.		

Any future additions of infrastructure components must either be located within the development area boundaries or otherwise in very close proximity to existing projects' areas.

		POST-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-8	1
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-8	very low negative	•	•
		CONFIDENCE LEVEL		
High				

7.12.2Aquatic Impacts

The cumulative impact on aquatic ecosystem is likely to be low if mitigated.

7.12.3 Avifauna

The cumulative impact of the solar PV facilities on avifauna of greatest concern is habitat destruction. The cumulative impact of habitat destruction is considered to be of moderate negative significance. The impact assessment methodology used provides an output of low negative. The avifauna specialist has however rated the impact as **moderate negative significance.**

7.12.4 Bats

Cumulative impacts on bats are difficult to predict but would most likely relate to modification of habitat, disturbance and displacement effects and roost disturbance and destruction.

Table 7-404: Cumulative impact on bats

CUMULATIVE IMPACT OF THE FACILITY ON BATS DIECT PHASE Construction, operation and decommissioning phase EECT IMPACT Modification of habitat, disturbance and displacement effects and roost disturbance and destruction Decreased availability of resources to support the regional bat population and potential mortality MULATIVE IMPACT All direct and indirect impacts as listed above, in the broader region DIMENSION RATING MOTIVATION PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
Modification of habitat, disturbance and displacement effects and roost disturbance and destruction Decreased availability of resources to support the regional bat population and potential mortality MULATIVE IMPACT All direct and indirect impacts as listed above, in the broader region DIMENSION RATING MOTIVATION CONSEQUENCE LIKELIHOOD PRE-MITIGATION RATION 4 the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
Decreased availability of resources to support the regional bat population and potential mortality MULATIVE IMPACT All direct and indirect impacts as listed above, in the broader region The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
MULATIVE IMPACT MULATIVE IMPACT All direct and indirect impacts as listed above, in the broader region MOTIVATION CONSEQUENCE LIKELIHOOD PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it properties The severity of the impact is rated as High negative as the natural, cultural or social
PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
PRE-MITIGATION The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
RATION 4 the impact will last more than 5 years and as such is rated as Long Term The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
The extent of the impact is rated as Local as it affects the development area and adjacent properties The severity of the impact is rated as High negative as the natural, cultural or social
negative as the natural, cultural or social
functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected. functions and processes are altered to the extent of the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable detrimental
PACT ON EPLACEBLE 1 Irreplaceable resources will be impacted. SOURCES
NIFICANCE -54 Moderate - negative

PROPOSED MITIGATION MEASURES

Although impacts cannot be eliminated, they may potentially be able to be managed (or possibly reduced) by completely avoiding high sensitivity areas, as well as medium sensitivity areas (as far as possible). With current layouts under consideration no infrastructure is noted to overlap with high sensitivity areas. Should any changes or expansions take place to the boundaries of the relevant facilities, as indicated in the fence lines, a bat specialist must provide input to confirm that these changes are acceptable in terms of avoidance of high sensitivity areas. For SPH4 however, any changes to the layout would require input from a suitable bat specialist. Some medium sensitivity overlap is noted. These areas are recommended to be avoided as far as possible. However, if these areas are not avoidable, all movement and noise (as a result of construction, operation and maintenance activities) should be limited to daylight hours only.

All relevant construction, operational, maintenance and decommissioning activities should be limited to the assessed project footprint only.

All construction and decommissioning activities should be restricted to daylight hours.

All lighting should be minimised at night, with low pressure sodium and warm white LED lights being used.

Prior to construction (after preferred bidders status has been awarded), a bat specialist should conduct a site walkthrough to identify any potential additional sensitive habitats, to confirm the baseline environment, if construction does not take place within 5 years of the initial bat study.

Following construction and decommissioning phases, rehabilitation of all disturbed areas must be undertaken and restored back to their present baseline state.

	POST-MITIGATION					
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-27	1		
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-27	1		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Extremely y detrimental	Likely		

IMPACT IRREPLACEBLE RESOURCES	ON	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE		-54	Moderate - negative		
			CONFIDENCE LEVEL	•	
High					

7.12.5Botanical Impacts

The cumulative botanical impacts are rated as very low negative due to the wide range of the Dry Grassland Biome and the high receptor resilience. This impact is rated as Very Low Negative.

7.12.6 Heritage Impact

Table 7-405: Cumulative impacts on heritage resources

		CUMULATIVE IMPACT ON HERITAGE RESOURCE	S			
PROJECT PHASE	All phases					
DIRECT IMPACT	Destruction	estruction of archaeological sites and graves and alteration of cultural landscape				
INDIRECT IMPACT		-				
		ole development in a small area there is the pot		number of heritage		
CUMULATIVE IMPACT	resources a	nd for the landscape to be overwhelmingly altered	d			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD		
		PRE-MITIGATION				
		The duration of the activity associated with				
DURATION	4	the impact will last more than 5 years and as				
		such is rated as Long Term	-16	3		
		The extent of the impact is rated as Local as it	-10	3		
EXTENT	3	affects the development area and adjacent				
		properties				
		The severity of the impact is rated as				
		moderate negative as the affected				
		environment is altered but natural, cultural or				
SEVERITY	-2	-2 social functions and processes continue albeit				
		in a modified way; and valued important	Moderately			
		sensitive or vulnerable systems or	detrimental	Definite		
IMPACT		communities are negatively affected.				
IMPACT ON IRREPLACEBLE	1	Irranlacaghla rasaureas will be impacted				
RESOURCES	1	Irreplaceable resources will be impacted.				
SIGNIFICANCE	-48	moderate- negative				
		PROPOSED MITIGATION MEASURES				
Avoid or sample archaeo	logical sites	as needed.				
Avoid and protect graves	5.					
Minimise construction pe	eriods.					
Ensure effective rehabilit	ation of any	areas not needed during operation and afte	r decommissioning.			
		POST-MITIGATION				
		The duration of the activity associated with				
DURATION	4	the impact will last more than 5 years and as				
		such is rated as Long Term	-7	3		
		The extent of the impact is rated as Local as it	,	J		
EXTENT	2	affects the development area and adjacent				
		properties				
0-1/1/-	_	The severity of the impact is rated as	Slightly			
SEVERITY	-1	moderate negative as the affected	detrimental	Definite		
		environment is altered but natural, cultural or				

			social functions and processes continue albeit in a modified way; and valued important sensitive or vulnerable systems or communities are negatively affected.		
IMPACT O	N				
IRREPLACEBLE		1	Irreplaceable resources will be impacted.		
RESOURCES					
SIGNIFICANCE		-21	low - negative		
CONFIDENCE LEVEL					
High					

Note that there would be no cumulative impacts in terms of paleontological resources.

7.12.7 Socio-Economic

The following cumulative impacts from a socio-economic perspective may occur.

Table 7-406: Socio-economic cumulative impacts

Impact	Nature	Significance
Impact on the economy- construction	Positive	Moderate
Creation of employment during construction	Positive	Moderate
Reduction in land available for productive farming	Negative	Low
Stimulation of the economy – operations	Positive	Moderate
Employment - operations	Positive	Moderate
Improved municipal service delivery	Positive	Moderate
Loss of property	Negative	Low
Stimulation of economy - decommissioning	Positive	Very low

7.12.8 Terrestrial Biodiversity and Animal Species

The cumulative impact relates to the destruction of a significant area of natural grassland. In addition to the loss of grassland there is the potential for disturbance and displacement of fauna from the local area.

Table 7-407: Cumulative impacts on terrestrial biodiversity and animal species

Possible Impact	Applicable Facility	Significance Rating		
Possible impact	Applicable Facility	Pre-mitigation	Post-mitigation	
Loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity	Cluster development	High negative	Moderate negative	

7.12.9Transport

The construction and decommissioning phases are the only project stages where significant traffic is generated. If all projects were approved and constructed at the same time the roads authority would stagger application for abnormal loads to manage the impact.

Table 7-408: Cumulative impacts – transport

		CUMULATIVE IMPACT ON TRANSPORT		
PROJECT PHASE				
DIRECT IMPACT	Traffic cong	estion and associated dust and noise pollution on th	ne surrounding road n	etwork
INDIRECT IMPACT				
CUMULATIVE IMPACT		,		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
		PRE-MITIGATION		
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3
EXTENT	4	The extent of the impact is rated as regional as it effects of the impact extend beyond municipal boundaries	10	Ĵ
SEVERITY	-3	The severity of the impact is rated as moderate negative as the affected environment is altered but natural, cultural or social functions and processes continue albeit in a modified way; and valued important sensitive or vulnerable systems or communities are negatively affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEBLE RESOURCES	0	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-24	low- negative		
		PROPOSED MITIGATION MEASURES		
Avoid or sample archaeo	logical sites	as needed.		
Avoid and protect graves	_			
Minimise construction pe				
		areas not needed during operation and after o	decommissionina	
Liisure ejjective renubilit	ution of any	POST-MITIGATION	recommissioning.	
		The duration of the activity associated with the		
DURATION	4	impact will last more than 5 years and as such is rated as Long Term	-24	1
EXTENT	2	The extent of the impact is rated as Local as it affects the development area and adjacent properties	-24	1
SEVERITY	-1	The severity of the impact is rated as high negative as the affected environment is altered but natural, cultural or social functions and processes are altered to the extent that natural processes will temporarily or permanently cease; and valued, important sensitive or vulnerable systems or communities are substantially affected.	Highly detrimental	Unlikely
IMPACT ON IRREPLACEBLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-24	low - negative		
		CONFIDENCE LEVEL		
High				

7.12.10 Landscape and Visual

The visual impact of the Springhaas Solar PV facilities is low to very low. As such, the facilities are anticipated to have a low contribution to the overall cumulative impact.

7.12.11 Groundwater

The cumulative impact on groundwater would related to aspects such as long-term reduced groundwater quality and damage to the aquifer system in the area. These impacts have been noted in the impact assessment and would be low to very low, negative.

7.13 High Level Safety Health and Environmental Risk Assessment

A High Level Safety Health and Environmental Risk Assessment was undertaken for the Springhaas Solar PV facilities (**Appendix 10**). The focus of the assessment was the BESS for each facility.

7.13.1Technology Descriptions

Two different types of storage technologies have been considered for the Springhaas PV projects:

- Vanadium Redox Flow Batteries (VRFB), and
- Solid State Lithium Batteries (SSL)

Considering that both of these systems involve the use of chemicals and may impact the environment if incorrectly handled or operated, a specialist risk assessment was undertaken to determine and assess the associated risks. This section presents the summarised results of the risk assessment (iSHEcon, 2022). This risk assessment applies to all facilities.

(a) Vanadium Redox Flow Batteries (VRFB)

The vanadium redox battery (VRB), also known as the vanadium flow battery (VFB) or vanadium redox flow battery (VRFB), is a type of rechargeable flow battery that employs vanadium ions in different oxidation states to store chemical potential energy. Most vanadium batteries are currently used for grid energy storage and there are 100+ installations globally. Some of the issues associated with these batteries include the following:

- Corrosive: They have an inherent risk in that their electrolyte is a sulphuric acid-based solution and is corrosive, but, unlike normal car batteries, they do not include lead and hence do not have lead toxicity risks. Vanadium in different forms can have relatively high toxicity, but in the electrolyte the concentration levels of Vanadium are so low that the VRB is deemed non-toxic. In addition, VRBs have a lower concentration of sulfuric acid than traditional lead-acid batteries.
- Toxic off-gassing: Overheating could however lead to toxicity through off-gassing, and in fires these batteries may release toxic gases.
- Shocks: Other risks include electrical shocks through arc flashes or blasts if the energy system cannot be "turned off". In term of fire risk, the electrolyte has a non-flammable property, and it is unlikely for the battery to catch fire, and there is no "thermal runaway" risk compared to other batteries.

- Hydrogen: In the case of too high voltages hydrogen can be generated as an undesirable by product. In such cases however deviations from safe operating parameters will trigger the shutdown of the system and reduce H2 generation
- Purge waste: Depending on temperate and state of charge, vanadium ions may
 precipitate as solids, and should the concentration of undesirable components
 increase in the electrolyte, a part may need to be purged and replaced with fresh
 electrolyte. This generates a waste.
- Leaks: Leaks may develop in any such system however their impact can be controlled through secondary containment, reliable leak detection and annunciation.

(b) Solid State Lithium Batteries

Lithium-ion batteries are becoming one of the dominant battery technologies for utility systems, and are often referred to as solid state batteries because electrolyte liquid is not freely available in a form that can easily leak or be extracted. Lithium is a light and reactive metal elements and is highly reactive towards water and oxygen. Some of the issues associated with these batteries include the following:

- Thermal decomposition: "Thermal runaway" is a process whereby the lithium salts in the battery break down exothermically cause the battery to get hotter and hotter, faster and faster which eventually leads to the build up of pressure and ultimately the battery vents by releasing fumes which can accumulate and ignite causing fires or explosions. This vented gas will typically also contain toxic compounds like hydrogen fluoride, hydrogen cyanide, and VOCs.
- Propagation: A BESS consists of individual batteries combined into packs and hence thermal runaway in one battery could lead to the heating of an adjacent battery and thereby propagate a "chain reaction" over overheating through the entire system.
 Separation requirements between cells modules is therefore important. This could take the forms of physical spaces or insulation.
- Leaks: Leaks from solid state batteries are extremely unlikely, but should it occur, it
 would be potentially flammable, and highly corrosive (due to presence of hydrofluoric
 acid)

7.13.2 Risk Assessment

Methodology

The detailed risk assessment that was undertaken (iSHEcon, 2022) considered risks associated with the two different battery systems and used a numerical matric system to determine is risks were low, medium, high, or excessive. The assessment also considered the different stage of the project. The table below presents the risk matrix approach used. The rating given were also based on the assumption that the recommended mitigation measures have been implemented.

Table 7-409: Interpretation of risk rating

Risk Rating	Risk Assessment	Risk Evaluation – Management response required
21 to 25	E – Excessive	Implement urgent and immediate corrective action
13 to 20	H – High	Implement corrective action
6 to 12	M – Medium	Review existing systems
1 to 5	L – Low	Maintain existing systems

Risk assessment	Risk evaluation – management response required
E- Excessive	Implement urgent and immediate corrective action
H - High	Implement corrective action
M - Medium	Review existing systems
L – Low	Maintain existing systems

Risk Assessment Rating

The table below present the risks identified for the BESS and indication is provided as to which project phase they would occur in and to which battery technology they would be applicable. Risks were evaluated as excessive (EC), high (H), medium (M) or low (L). The ratings given were also based on the assumption that the recommended mitigation measures have been implemented. The decommissioning phase impacts are not specially presented in the table but would be similar to those identified in the construction and operational phase, but with the addition of possible chronic chemical or biological toxic exposure which may occur when batteries/ electrolyte/ equipment has reached tend of life. This impact is rated as medium.

Table -7-410: Risk assessment summary. This table summarises the Risk Assessment undertaken by iSHEcon (2022). See full report for full details.

No.	Category	Consequences	Project phase	Battery technology	Mitigation measures	Rating
1.	HEALTH					
1.1	Chronic Chemical or Biological Toxic	Illness (from materials e.g. cement, paints, solvents, welding fumes etc.).	Construction	Both VRFB and SSL	Emergency plan in place prior to construction.	L
	Exposure	Skin/lung irritation (vapours from compromised battery compartments).	Operations	Both VRFB and SSL	Possible detectors with alarms. Labelling equipment. Confined spaces procedures. Operational manuals. Maintenance schedules.	M
1.2	Noise	Hearing loss (drilling, piling, due to moving parts e.g. pumps, compressors etc).	Both, but more so during construction	Both VRFB and SSL	Noise monitoring, provision of hearing protection equipment, BESS located > 500m from residence.	L - M
1.3	Environmental	Heat stroke due to high ambient temperatures. Hypothermia due to low temperatures.	Both	Both VRFB and SSL. Night work likely for VRFB	Adequate potable water. PPE to be suitable for weather conditions.	L (const) – M (ops)
1.4	Psychological	Disturbance to small communities due to influx of temporary workers.	Construction	Both VRFB and SSL	Local community involvement. Use local labour as far as possible.	М
		Low performance and productivity due to isolation and repetitive work.	Operations	Both VRFB and SSL	Performance monitoring.	L
1.5	Ergonomics	Back and other injuries (from lifting heavy equipment).	Construction	Both VRFB and SSL	First aid provision.	М
		Working at heights.	Operations	Both VRFB and SSL	Working at heights procedure. Use correct ladders/harnesses as required.	М
2	SAFETY					
2.1	Fire	Injuries. Fatalities unlikely (not highly flammable).	Construction	Both VRFB and SSL	Firefighting equipment to be on site near fuel source (e.g. tanks). Emergency plan to be in place. Hot-work permit and management system required.	M
		Contaminated run-off. Damaged equipment. Fire burns vegetation and spreads offsite.	Operations	Both VRFB and SSL	Limit vegetation in the area. Emergency plan to be in place. Fire extinguishing equipment to be on site. Fire response plan required. Separate site diesel tank, transformers etc from battery packs. Lighting protection may be needed.	М
2.2	Explosion	No credible causes .	Construction	VRFB	n/a	n/a
		Explosion due to flammable gases generated by thermal run away.	Construction	SSL	Using only one transport root to site is preferable. Emergency response plan for this route to be developed.	M

No.	Category	Consequences	Project phase	Battery technology	Mitigation measures	Rating
		Explosion from transformers shorting or overheating.	Operational	VRFB	Emergency response plan and training.	М
		Potential fatalities and damage to equipment due to thermal run away and ignition on hot surfaces, static.	Operational	SSL	Emergency response plan and training.	M
2.3	Acute chemical /biological exposure	Illness due to human pathogens and disease.	Both but lower risk during operations (fewer workers on site)	Both VRFB and SSL	Policies and practices for dealing with known diseases e.g. HIV.	M
		Discomfort, or even fatalities, from insects, snakes, plants.	Both	Both VRFB and SSL	First aid kit on site. First responders to have access to anti-venom on site.	М
		Corrosive burns due to damaged batteries, fumes, leaked electrolyte (VRFB batteries) or due to thermal runaway (SSL batteries).	Operational	Both VRFB and SSL	Training of staff in hazard response. Refer to "Fire" above.	M
2.4	Acute physical impactor violent release of energy	Injury or possibly fatality due to moving construction equipment, heavy loads, elevated loads, working at heights. Damage to equipment.	Construction	Both VRFB and SSL	Emergency response plan to be in place before construction begins.	M
		Injury (or fatality in unlikely worst case) due to moving equipment, working at heights, traffic accidents, earthquakes.	Operations	Both VRFB and SSL	Emergency response plan. Procedures for working at heights, hot work permits, confined spaces etc. Design is to consider seismic activity.	M
2.5	Generation impact	Electrocution due to use of electrical machines.	Construction	Both VRFB and SSL	Maintain equipment. Ability to shut off power on site is required.	М
		Ignition and burns due to area static	Both	Both VRFB and SSL	Correct PPE. If decanting fuels, ensure installations are to standard with regards static.	М
		Lighting strike	Both	Both VRFB and SSL	Work outside to stop during storms. Lighting conductors may be needed.	М
3	ENVIRONMENTAL					
3.1	Emissions	Adverse health impacts on staff due to dust.	Construction	Both VRFB and SSL	Dust masks (as required). Possible dampening of roads.	М
		Pollution (if not contained) and high disposal costs due to cooling water blow down, lab waste, maintenance waste, kitchen waste, sewage.	Operations	Both	Waste management plan to be in place.	M
		Fatal event due to release and accumulation of refrigerant.	Operations	Both	Alarm system in confined space. Procedure for responding to gas leaks (e.g. gas test, ventilate, do not enter alone).	M
		Excessive disposal costs for VRFB electrolyte.	Operations	VRFB	Waste management plan to be in	L

No.	Category	Consequences	Project phase	Battery technology	Mitigation measures	Rating
					place.	
3.2	Pollution	Environmental damage, particularly to groundwater, due to spills of fuels, solvents and transformer oil, sewage, and wastewater.	Construction	Both	Spill clean-up procedures to be in place before commencing.	L
		Localised damage due to spills from batteries, coolant systems, trucks, transformers, parked vehicles, fire water runoff control.	Operation	Both	Spill clean-up procedures to be in place. Spill kits to be in place.	M
3.3	Waste of resource	Delays due to uncontrolled water use.	Construction	Both	Water management plan to be in place.	М
		Battery containers damaged.	Construction	SSL	End of Life plan needs to be in place before any battery containers enter the country as there may be damaged battery units from day 1.	M
		Excessive costs due to large volumes of hazardous waste due to periodic purging of VRFBs or disposal of SSL batteries at end of life	Operations	Both	End of Life plan to be in place e.g. consider if it can be returned to the supplier.	M
4	GENERAL RISKS					
4.1	Aesthetics	Irritation to community due to surface reflecting sunlight, and tall structure in flat areas.	Both	Both	Sheeting likely to be painted, not left as reflective steel. If containerised, keep as single storey (sufficient space is available). Confirm if BESS container colour is suitable.	L
4.2	Financial	Financial loss due to defective technology, or extreme project delays.	• Both	Both	Project insurance for construction phase. Designed by experience contractors.	Low
4.3	Security	Injury or loss of equipment due to theft on site, hi-jacking on route, strikes or civil unrest.	Construction	Both	Fencing around infrastructure, night lighting.	М
		Injury or loss of equipment due to theft.	Operations	Both	Consider motion detection lights and CCTV.	М
		Ransom of the National Electricity Grid due to cyber attacks.	Operations	Both	Cyber emergency procedures should be in place prior to commissioning.	М
4.4	Emergencies	Injuries or even fatalities due to fires, explosions, toxic smoke, traffic accidents equipment failure, structural collapse.	Both	Both	Emergency procedures need to be practiced prior to commencement of construction.	M
		Injuries or even fatalities due to fires, explosions, toxic smoke from thermal runaway.	Construction	SSL	Thermal runaway to be prevented by correct transportation and storage of SSL batteries. Clear handling procedures to be in place.	М
4.5	Legal Compliance	Unknown hazards manifest due to using "cheaper supplier or less developed technology".	Both	Both	Use only internationally reputable battery suppliers who comply with all known regulations/guideline at the time of purchasing.	M

7.13.3 Conclusions

The majority of the risks identified were assessed as either Low or Medium post-mitigation i.e. on the assumption that the recommended mitigation measures have been implemented. No high risks were identified, and no fatal flaws were found with the proposed VRFB or Lithium Solid-state BESS installation options.

VRFB systems do not present significant fire and arcing hazards provided they are correctly operated and maintained. Spills of corrosive, toxic electrolyte is the most significant of the possible hazards (rated as medium) that may be associated with the VRFB system. There are however many preventative design measures that will be included to prevent this, including full secondary containment, level control in tanks and leak detection.

With the SSL system, the most significant hazard is the possibility of thermal runaway and the risk of release of toxic and flammable gas and possible resulting fire or explosions. There are however a number of modern-day design features that are included into such systems to reduce this risk, and due to the containerized approach, and the good practice of separation between containers, the main risks would be limited to areas close to the containers i.e. to transport drivers, employees at the facilities and first responders to incidents. The significant impact zone of a fire and explosion would be limited to within 10m of the container, with minor impacts up to 50m in the case of an explosion. The impacts from harmful gases from toxic smoke should be low provided the units are placed suitably far apart to prevent propagation of fire between units and external fires are prevented. Considering that all the proposed BESS installations are more than 500m from any farmhouses, impacts on surrounding houses would be negligible.

The above risk assessment showed that health and safety risks associated with VRFB systems are lower than those of SSL systems, particulate in terms of fire and explosion risk. VRFB systems pose a higher short-term risk from an environmental spill point of view. From a SHE point of view when considering alternative proposed locations, all are extremely isolated and none present high risks or fatal flaws. Those furthest from watercourses or farmhouses would be preferred.

7.13.4 Recommendations

The following recommendations are made:

- Neither technology presents any safety or health fatal flaws, and the risk assessment does not show a distinct lower overall risk technology option.
- State-of-the-art battery technology should be used with all the necessary protective features e.g. draining of cells during shutdown and standby-mode, full BMS with deviation monitoring and trips, leak detection systems.
- All the preventative measures presented in the specialist risk assessment (iSHEcon, 2022) should be included in the design.
- The overall design should be subject to a full Hazop prior to finalization of the design.

- For the VRFB systems, an end of life (and for possible periodic purging requirements) solution for the large quantities of hazardous electrolyte should be investigated, e.g. can it be returned to the supplier for re-conditioning.
- Prior to bringing any solid-state battery containers into the country an Emergency Response Plan and End of Life Plan should be developed.
- The site layout and spacing between lithium solid-state containers should be such that
 it mitigates the risk of a fire or explosion event spreading from one container to
 another.
- Under certain weather conditions, the noxious smoke from a fire in a lithium battery container could travel some distance from the unit. Location of the facilities needs to ensure a suitable separation distance from public facilities/residences etc.
- Where there is a choice of alternative locations for the BESS, i.e. SPH1, the one that is further from water courses would be preferred.
- While not essential, using one consistent battery technology systems for all the BESS installations associated with the seven (7) Springhaas solar PV facilities would allow for easier training, maintenance, and emergency response in a remote location.

8 Conclusion and Recommendations

Development of seven solar PV facilities are proposed within the Kimberley REDZ, REDZ 5 near Dealesville in the Free State Province. The Integrated Resources Plan identifies the need for South Africa to diversify the energy mix and sets a targets of 17.8GW from renewable sources by 2030. The development of the seven Springhaas solar PV facilities would contribute towards South Africa achieving this target. All of the Springhaas Solar PV facilities are well located, within a REDZ and close to existing substations.

The focus of this chapter is to summarise the predicted changes to the receiving environment from the development of seven Springhaas Solar PV facilities. The focus is furthermore to provide the CA with all relevant information to provide meaning to the assessment of significance made and the resultant consequences of the project.

8.1 Environmental Impact Statement

The environmental impact statement is based on the outcomes of the draft specialist reports and findings, review of applicable document and a site visit by the EAP.

8.1.1 Springhaas Facility 1

All of the negative direct and indirect impacts identified for SPH1 can be mitigation to low or very significance post mitigation. The positive impacts relate to employment opportunities during construction (moderate positive), employment opportunities during operation (low positive). Two very low positive impacts were identified, the first is the use of infrastructure for nesting by birds and the second is a positive impact related to recovery of fossils from site (should fossils be uncovered and can be collected).

Cumulative impacts were assessed for SPH1. The cumulative impact ratings were done on the assumption that all seven Springhaas Solar PV facilities are authorised and constructed along with the other 13 solar PV facilities located within a 30km radius of the site. In reality it is unlikely that all projects would receive preferred bidder status and move forward to construction. All of the negative cumulative impacts were rated as low or very low significance with the exception of:

- Avifauna the cumulative impact of the loss of avifaunal habitat was rated as moderate negative
- Terrestrial biodiversity and animal species- the cumulative impact of loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity was rated as moderate negative.

No fatal flaws were identified for SPH1 during the impact assessment phase and all impacts can be mitigated to acceptable limits.

The site sensitivity for SPH1 can be summarised as follows:

Table 8-1: SPH1 site sensitivity overview

Theme	Site sensitivity	Comment
	verification	OFO/ of the gree is considered as law consistivity. Creally
Agricultural	Low	95% of the area is considered as low sensitivity. Small pockets of moderate sensitivity are located on the site but these are surrounded by low sensitivity land and as such are not deemed viable from a production perspective.
Animal species	Medium	The majority of the footprint of SPH1 comprises of natural grassland with a highly disturbed area where buildings and infrastructure has been established in the south west corner which is rated as very low sensitivity.
Aquatic biodiversity	Low	There are no pans or wetlands within the boundary of SPH1. One drainage feature of low sensitivity is located in western section of the site. A small pan, and its 250m buffer located to the north east of the facility has been avoided by the layout.
Archaeological and cultural heritage theme	Low	No sensitive archaeological resources were identified in the footprint of SPH1.
Avian	Low - Medium	All high sensitivity area (pans and wetlands) have been avoided by the layout. There is a small pan to the north east of the facility which is considered as high sensitivity from an avifaunal perspective a 250m buffer has been applied to this pan and the layout avoids the buffer.
Bats	Low	Low sensitivity rating identified by the Screening Tool is accurate.
Floodline	-	SPH1 is located outside of the 1:100 year floodline.
Geotechnical	-	The site is suitable for the development of a solar PV facility if the recommendation in the geotechnical investigation are implemented.
Landscape/ Visual	Medium	The greater site/study area was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity). There are no high sensitivity areas in SPH1. The site has been classified as a mix of low and medium sensitivity areas. The tallest components of the development (substation in the electrical infrastructure compound) which would have the greatest visual impact are located in low sensitivity area.
Palaeontology	Low	The High sensitivity predicted by the Screening Tool was

Theme	Site sensitivity verification	Comment
		shown, in reality, to be a Low sensitivity.
Plant species	Low	Low sensitivity rating identified by the Screening Tool is accurate.
Risk assessment	-	No off-site risks would be present with the development of SPH 1.
Socio-economic	-	No socio-economic sensitivities were identified which would preclude the development of SPH1.
Terrestrial biodiversity	Medium	The Very High sensitivity predicted by the Screening Tool was shown, in reality, to be a Medium to Medium-High / High sensitivity.
Transport	-	No transport sensitivities were identified. There is an existing access road network which allows access to the site.
Groundwater	Low	The site has a low groundwater vulnerability classification.



Figure 8-1: No-go areas

As can be seen from Figure 8-1 SPH1 avoids all no-go areas.

Due to a high number of environmental sensitivities on site a combined environmental sensitivities map is of limited value. A series of maps have been developed to illustrate the different sensitivities across the greater site/study area.

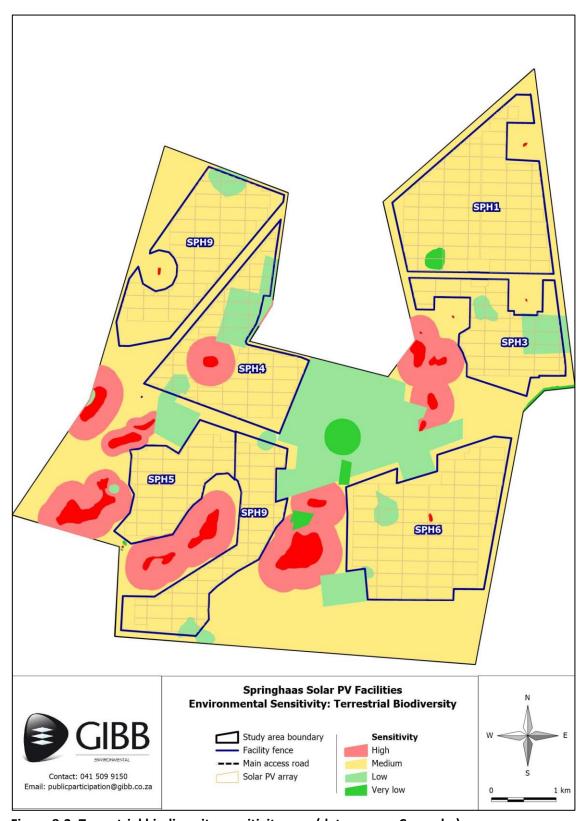


Figure 8-2: Terrestrial biodiversity sensitivity map (data source, Cossypha)

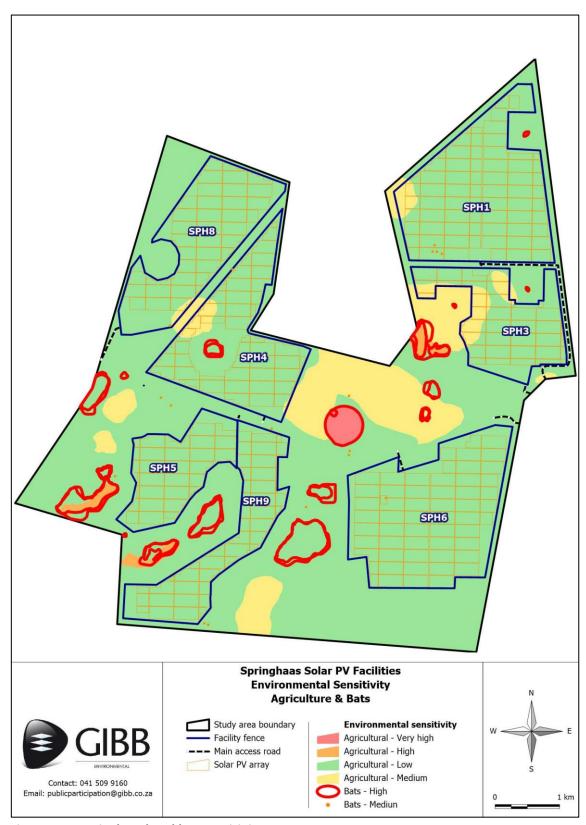


Figure 8-3: Agricultural and bat sensitivity map

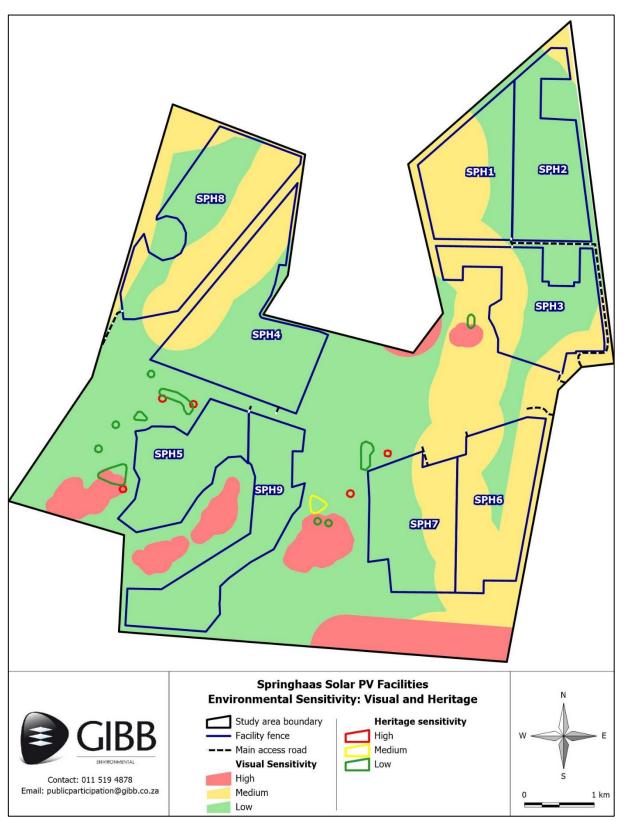


Figure 8-4: Visual and heritage sensitivity

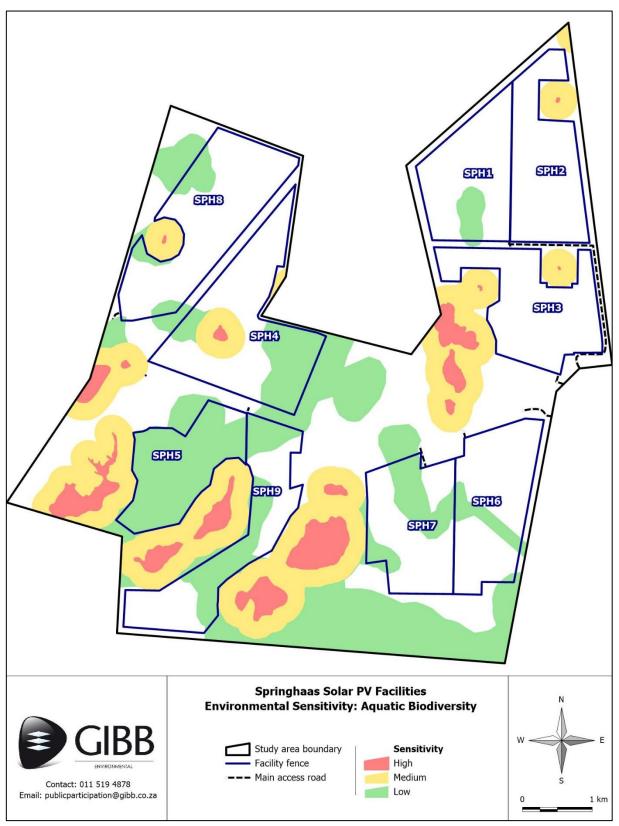


Figure 8-4: Aquatic biodiversity sensitivity

(a) Alternatives

The following alternatives were assessed for SPH1:

- Two location alternatives for the electrical infrastructure compound
- Technology alternatives for the battery technology for the BESS
- No-go option

No fatal flaws were identified with any of the alternatives proposed.

(i) Electrical infrastructure compound alternatives

The majority of specialist studies concluded there is no difference in impact between the two proposed location alternatives for the electrical infrastructure compound.

The Visual Impact Assessment and Risk Assessment both expressed a slight preference for Location Alternative 2. From a visual perspective the location will be slightly less visible from the adjacent public gravel road. Alternative 2 was preferred in terms of the Risk Assessment as it was slightly further away from the closest watercourse. The aquatic specialist study noted that both alternatives are located outside aquatic environments and the buffers of aquatic features and hence both are equally preferred. Both the Visual Impact Assessment and Risk Assessment did however note that either alternative would be acceptable and could therefore be approved.

The Terrestrial Biodiversity and Animal Species Assessment identified the Alternative 1 (preferred alternative) as the preferred alternative as it allowed the footprint of the electrical infrastructure compound to be combined with the footprint of the auxiliary buildings. The study did however note that either alternative would be acceptable and could therefore be approved.

The Applicant's technically preferred location of the electrical infrastructure compound is Alternative 1, the southern location. As no fatal flaws were identified with either of the locations (and any associated impacts can be mitigated to acceptable levels) it is proposed that Alternative 1 be considered as the preferred for authorisation.

(ii) BESS Battery Technology Alternatives

All of the specialist studies found no difference in the impacts of the battery technology alternatives, with the exception of the risk assessment which identified certain risks associated with redox-flow batteries (noting, however, that these can still be mitigated to acceptable levels). No fatal flaws were identified for either battery technology alternative so either alternative would be acceptable for development. As such, it is recommended that the preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

(iii) No-Go Alternative

When comparing the specialists' assessment of the no-go alternative with the proposed development, the adverse impacts would have similar significance, post mitigation. Adverse impacts associated with the no-go alternative typically range from low to very low, while adverse impacts associated with the proposed development also range from low to very (with mitigation) and there would be positive impacts related to the proposed development that would be foregone.

The no-go alternative is not recommended as the project is needed to contribute to the diversification of South Africa's energy mix. In addition the positive socio-economic impacts which range from very low to moderate would not be realised if the project is not authorised.

(b) EAP Recommendations

As outlined in **Chapter 6** (Impact Assessment) of the draft BAR, all impacts associated with the proposed development of SPH1 can be mitigated to acceptable levels.

The EAP therefore recommends that DFFE grant a positive Environmental Authorisation (EA) for the proposed development of SPH1. The mitigation measures identified in the EMPr must be implemented throughout the project duration to ensure impacts are mitigated to acceptable levels.

It is the opinion of the EAP that the BAR and associated specialist studies have been conducted in an objective manner and the BAR process to date complies with the requirements of the 2014 EIA Regulations.

(c) Specialist Recommendations

All of the specialist are in agreement with the recommendation of the EAP that SPH1 can be authorised. Specialists have provided a set of mitigation measures which have been included in the EMPr (**Appendix I**) for the project.

(d) Assumptions and Limitations

A detailed list of assumptions and limitations associated with the DBAR and specialist studies are included in **Section 1.6.** The information provided in the DBAR is deemed of sufficient quality and relevance for the EAP and specialist team to make an informed decision on the recommendations for the project.

8.1.2 Springhaas Facility 3

All of the negative direct and indirect impacts identified for SPH3 can be mitigation to low or very low significance post mitigation. The positive impacts relate to employment opportunities during construction (moderate positive), employment opportunities during operation (low

positive). Two very low positive impacts were identified, the first is the use of infrastructure for nesting by birds and the second is a positive impact related to recovery of fossils from site (should fossils be uncovered and can be collected).

Cumulative impacts were assessed for SPH3. The cumulative impact ratings were done on the assumption that all seven Springhaas Solar PV facilities are authorised and constructed along with the other 13 solar PV facilities located within a 30km radius of the site. In reality it is unlikely that all projects would receive preferred bidder status and move forward to construction. All of the negative cumulative impacts were rated as low or very low significance with the exception of:

- Avifauna the cumulative impact of the loss of avifaunal habitat was rated as moderate negative
- Terrestrial biodiversity and animal species- the cumulative impact of loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity was rated as moderate negative.

No fatal flaws were identified for SPH3 during the impact assessment phase and all impacts can be mitigated to acceptable limits.

The site sensitivity for SPH3 can be summarised as follows:

Table 8-2: SPH3 site sensitivity overview

Theme	Site sensitivity verification	Comment
Agricultural	Low - Medium	The majority of the site comprises of low sensitivity agricultural land. There are small areas of medium sensitivity land on the edge of the facility footprint,
Animal species	Medium	The majority of the footprint of SPH3 comprises of natural grassland with a highly disturbed area where the vegetation has been disturbed by livestock grazing.
Aquatic biodiversity	Low	SPH3 is a relatively dry site. There are no pans, wetlands or drainage regions within the boundary of the facility.
Archaeological and cultural heritage theme	Low	No sensitive archaeological resources were identified in the footprint of SPH3.
Avian	Low - Medium	All high sensitivity areas (pans and wetlands) and their respective ecological buffers have been avoided by the layout.
Bats	Low	Low sensitivity rating identified by the Screening Tool is accurate. SPH3 does not overlap any area which are classified as medium or high sensitivity for bats.
Floodline	-	SPH3 is located outside of the 1:100 year floodline.
Geotechnical	-	The site is suitable for the development of a solar PV facility if the recommendation in the geotechnical investigation are implemented.
Landscape/ Visual	Medium	The greater site/study area was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity). There are no high sensitivity areas in SPH3. There are areas of medium sensitivity land on the eastern and western boundaries of the facility. The collector substation which is the tallest component of SPH3 is located in a low sensitivity area.
Palaeontology	Low	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low sensitivity.
Plant species	Low	Low sensitivity rating identified by the Screening Tool is

		accurate.
Risk assessment	-	No off-site risks would be present with the development of SPH 31.
Socio-economic	•	No socio-economic sensitivities were identified which would preclude the development of SPH3.
Terrestrial biodiversity	Medium	The majority of the site is natural grassland which is ascribed medium sensitivity. Degraded areas within SPH3 are classified as low sensitivity. There are no high sensitivity areas within SPH3.
Transport	-	No transport sensitivities were identified. There is an existing access road network which allows access to the site.
Groundwater	Low	The site has a low groundwater vulnerability classification.

As can be seen from Figure 8-1 SPH3 avoids all no-go areas.

(a) Alternatives

The following alternatives were assessed for SPH3:

- Two location alternatives for the temporary laydown area
- Technology alternatives for the battery technology for the BESS
- No-go option

No fatal flaws were identified with any of the alternatives proposed.

(i) Temporary laydown areas location alternatives

The majority of specialist studies concluded there is no difference in impact between the two temporary laydown area alternatives.

The Visual Impact Assessment, Terrestrial Biodiversity and Animal Species Assessment and Avifaunal Impact Assessment all expressed a slight preference for the preferred alternative (alternative 1). These studies did however note that either alternative would be acceptable and could therefore be approved.

The Applicant's technically preferred location of the temporary laydown area is Alternative 1, the northern location. As no fatal flaws were identified with either of the locations (and any associated impacts can be mitigated to acceptable levels) it is proposed that Alternative 1 be considered as the preferred for authorisation.

(ii) BESS Battery Technology Alternatives

All of the specialist studies found no difference in the impacts of the battery technology alternatives, with the exception of the risk assessment which identified certain risks associated with redox-flow batteries (noting, however, that these can still be mitigated to acceptable levels). No fatal flaws were identified for either battery technology alternative so either alternative would be acceptable for development. As such, it is recommended that the preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

(iii) No-Go Alternative

When comparing the specialists' assessment of the no-go alternative with the proposed development, the adverse impacts would have similar significance, post mitigation. Adverse impacts associated with the no-go alternative typically range from low to very low, while adverse impacts associated with the proposed development also range from low to very (with mitigation) and there would be positive impacts related to the proposed development that would be foregone.

The no-go alternative is not recommended as the project is needed to contribute to the diversification of South Africa's energy mix. In addition the positive socio-economic impacts which range from very low to moderate would not be realised if the project is not authorised.

(b) EAP Recommendations

As outlined in **Chapter 6** (Impact Assessment) of the draft BAR, all impacts associated with the proposed development of SPH3 can be mitigated to acceptable levels.

The EAP therefore recommends that DFFE grant a positive Environmental Authorisation (EA) for the proposed development of SPH3. The mitigation measures identified in the EMPr must be implemented throughout the project duration to ensure impacts are mitigated to acceptable levels.

It is the opinion of the EAP that the BAR and associated specialist studies have been conducted in an objective manner and the BAR process to date complies with the requirements of the 2014 EIA Regulations.

(c) Specialist Recommendations

All of the specialist are in agreement with the recommendation of the EAP that SPH3 can be authorised. Specialists have provided a set of mitigation measures which have been included in the EMPr (**Appendix I**) for the project.

(d) Assumptions and Limitations

A detailed list of assumptions and limitations associated with the DBAR and specialist studies are included in **Section 1.6.** The information provided in the DBAR is deemed of sufficient quality and relevance for the EAP and specialist team to make an informed decision on the recommendations for the project.

8.1.3 Springhaas Facility 4

All of the negative direct and indirect impacts identified for SPH4 can be mitigation to low or very low significance post mitigation. The positive impacts relate to employment opportunities during construction (moderate positive), employment opportunities during operation (low positive). Two very low positive impacts were identified, the first is the use of infrastructure for nesting by birds and the second is a positive impact related to recovery of fossils from site (should fossils be uncovered and can be collected).

Cumulative impacts were assessed for SPH4. The cumulative impact ratings were done on the assumption that all seven Springhaas Solar PV facilities are authorised and constructed along with the other 13 solar PV facilities located within a 30km radius of the site. In reality it is unlikely that all projects would receive preferred bidder status and move forward to construction. All of the negative cumulative impacts were rated as low or very low significance with the exception of:

- Avifauna the cumulative impact of the loss of avifaunal habitat was rated as moderate negative
- Terrestrial biodiversity and animal species- the cumulative impact of loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity was rated as moderate negative.

No fatal flaws were identified for SPH4 during the impact assessment phase and all impacts can be mitigated to acceptable limits.

The fenceline of SPH4 encompasses a large pan which is rated as a high sensitivity feature in terms of aquatic, avifauna bats and terrestrial biodiversity themes. The pan has been excluded from the infrastructure layout and no infrastructure encroaches on pan or its 250m ecological buffer. The presence of the pan has raised the sensitivity rating of the site in some of the themes identified in the DFFE screening tool (refer to Table 8-3). The site sensitivity for SPH4 can be summarised as follows:

Table 8-3: SPH4 site sensitivity overview

Theme	Site sensitivity verification	Comment
Agricultural	Low - Medium	The majority of the site comprises of low sensitivity agricultural land. There is one small section of medium sensitivity land on the western edge of the facility footprint,
Animal species	High	The majority of the footprint of SPH4 comprises of natural grassland which is classified as medium sensitivity. There are also large areas of land which has been disturbed by grazing of livestock. There is a pan at the centre of SPH4 which is classified as high sensitivity. No infrastructure encroaches on the pan or its 250m buffer.
Aquatic biodiversity	High	SPH4 is classified as high sensitivity due to the presence of a pan within the facility boundary. No infrastructure encroaches on the pan or its 250m buffer.
Archaeological and cultural heritage theme	Low	No sensitive archaeological resources were identified in the footprint of SPH4.
Avian	Low - Medium	All high sensitivity areas (pans and wetlands) and their respective ecological buffers have been avoided by the layout.

Theme	Site sensitivity	Comment
meme	verification	
Bats	Low	Low sensitivity rating identified by the Screening Tool is accurate. The fenced area of SPH4 does contain a large pan which is classified as high sensitivity feature. However, as no infrastructure encroach on the pan or its 250m buffer the specialist has rated the facility as low sensitivity.
Floodline	-	All of the infrastructure for SPH4 is located outside of the 1:100 year floodline.
Geotechnical	-	The site is suitable for the development of a solar PV facility if the recommendation in the geotechnical investigation are implemented.
Landscape/ Visual	Medium	The greater site/study area was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity). There are no high sensitivity areas in SPH4. There is a strip of medium sensitivity land along the western boundary of SPH4. The collector substation and electrical infrastructure compound (which contains the substation) which are the tallest component of SPH4 is located in a low sensitivity area.
Palaeontology	Low	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low sensitivity.
Plant species	Low	Low sensitivity rating identified by the Screening Tool is accurate.
Risk assessment	-	No off-site risks would be present with the development of SPH 4.
Socio-economic	-	No socio-economic sensitivities were identified which would preclude the development of SPH4.
Terrestrial biodiversity	High	The majority of the site is natural grassland which is ascribed medium sensitivity. There is pan at the centre of SPH4 which is classified as high sensitivity. This pan and its 250m buffer have been avoided in the infrastructure layout. There are also degraded areas which are classified as low sensitivity.
Transport	-	No transport sensitivities were identified. There is an existing access road network which allows access to the site. A slight re-alignment of the eastern access road is required to allow safe access to the site for heavy vehicles during the construction phase.
Groundwater	Low	The site has a low groundwater vulnerability classification.

As can be seen from Figure 8-1 the infrastructure for SPH4 avoids all no-go areas.

(a) Alternatives

The following alternatives were assessed for SPH4:

- Technology alternatives for the battery technology for the BESS
- No-go option

(i) BESS Battery Technology Alternatives

All of the specialist studies found no difference in the impacts of the battery technology alternatives, with the exception of the risk assessment which identified certain risks associated with redox-flow batteries (noting, however, that these can still be mitigated to acceptable levels). No fatal flaws were identified for either battery technology alternative so either alternative would be acceptable for development. As such, it is recommended that the

preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

(ii) No-Go Alternative

When comparing the specialists' assessment of the no-go alternative with the proposed development, the adverse impacts would have similar significance, post mitigation. Adverse impacts associated with the no-go alternative typically range from low to very low, while adverse impacts associated with the proposed development also range from low to very (with mitigation) and there would be positive impacts related to the proposed development that would be foregone.

The no-go alternative is not recommended as the project is needed to contribute to the diversification of South Africa's energy mix. In addition the positive socio-economic impacts which range from very low to moderate would not be realised if the project is not authorised.

(b) EAP Recommendations

As outlined in **Chapter 6** (Impact Assessment) of the draft BAR, all impacts associated with the proposed development of SPH4 can be mitigated to acceptable levels provided that the pan and its 250m ecological buffer remain are excluded from the infrastructure layout (as is currently proposed).

The EAP therefore recommends that DFFE grant a positive Environmental Authorisation (EA) for the proposed development of SPH4. The mitigation measures identified in the EMPr must be implemented throughout the project duration to ensure impacts are mitigated to acceptable levels.

It is the opinion of the EAP that the BAR and associated specialist studies have been conducted in an objective manner and the BAR process to date complies with the requirements of the 2014 EIA Regulations.

(c) Specialist Recommendations

All of the specialist are in agreement with the recommendation of the EAP that SPH4 can be authorised. Specialists have provided a set of mitigation measures which have been included in the EMPr (**Appendix I**) for the project.

(d) Assumptions and Limitations

A detailed list of assumptions and limitations associated with the DBAR and specialist studies are included in **Section 1.6.** The information provided in the DBAR is deemed of sufficient quality and relevance for the EAP and specialist team to make an informed decision on the recommendations for the project.

8.1.4 Springhaas Facility 5

All of the negative direct and indirect impacts identified for SPH5 can be mitigation to low or very low significance post mitigation. The positive impacts relate to employment opportunities during construction (moderate positive), employment opportunities during operation (low positive). Two very low positive impacts were identified, the first is the use of infrastructure for nesting by birds and the second is a positive impact related to recovery of fossils from site (should fossils be uncovered and can be collected).

Cumulative impacts were assessed for SPH5. The cumulative impact ratings were done on the assumption that all seven Springhaas Solar PV facilities are authorised and constructed along with the other 13 solar PV facilities located within a 30km radius of the site. In reality it is unlikely that all projects would receive preferred bidder status and move forward to construction. All of the negative cumulative impacts were rated as low or very low significance with the exception of:

- **Avifauna** the cumulative impact of the loss of avifaunal habitat was rated as moderate negative
- Terrestrial biodiversity and animal species- the cumulative impact of loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity was rated as moderate negative.

No fatal flaws were identified for SPH5 during the impact assessment phase and all impacts can be mitigated to acceptable limits.

The boundary of SPH5 was amended at the recommendation of Terrestrial Ecologist to avoid two rocky outcrops which are classified as high sensitivity areas in terms of terrestrial biodiversity.

The site sensitivity for SPH5 can be summarised as follows:

Table 8-4: SPH5 site sensitivity overview

Theme	Site sensitivity verification	Comment
Agricultural	Low - Medium	The majority of the site comprises of low sensitivity agricultural land. There are smalls of medium sensitivity land on the edge of the facility footprint,
Animal species	Medium	The majority of the footprint of SPH5 comprises of natural grassland with a highly disturbed area where the vegetation has been disturbed by livestock grazing.
Aquatic biodiversity	High	SPH5 is a relatively dry site. There are no pans, wetlands or drainage regions within the boundary of the facility.
Archaeological and cultural heritage theme	Low	No sensitive archaeological resources were identified in the footprint of SPH5.
Avian	Low - Medium	All high sensitivity areas (pans and wetlands) and their respective ecological buffers have been avoided by the layout.
Bats	Low	Low sensitivity rating identified by the Screening Tool is accurate. SPH5 does not overlap any area which are classified as medium or high sensitivity for bats.
Floodline	=	SPH5 is located outside of the 1:100 year floodline.

Theme	Site sensitivity verification	Comment
Geotechnical	-	The site is suitable for the development of a solar PV facility if the recommendation in the geotechnical investigation are implemented.
Landscape/ Visual	Medium	The greater site/study area was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity). There are no high sensitivity areas in SPH5. There are areas of medium sensitivity land on the eastern and western boundaries of the facility. The collector substation which is the tallest component of SPH5 is located in a low sensitivity area.
Palaeontology	Low	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low sensitivity.
Plant species	Low	Low sensitivity rating identified by the Screening Tool is accurate.
Risk assessment	-	No off-site risks would be present with the development of SPH 5.
Socio-economic	-	No socio-economic sensitivities were identified which would preclude the development of SPH5.
Terrestrial biodiversity	High	The majority of the site is natural grassland which is ascribed medium sensitivity. Degraded areas within SPH5 are classified as low sensitivity. There are no high sensitivity areas within SPH5.
Transport	-	No transport sensitivities were identified. There is an existing access road network which allows access to the site.
Groundwater	Low	The site has a low groundwater vulnerability classification.

As can be seen from **Figure 8-1** the infrastructure for SPH5 avoids all no-go areas.

(a) Alternatives

The following alternatives were assessed for SPH5:

- Technology alternatives for the battery technology for the BESS
- No-go option

(i) BESS Battery Technology Alternatives

All of the specialist studies found no difference in the impacts of the battery technology alternatives, with the exception of the risk assessment which identified certain risks associated with redox-flow batteries (noting, however, that these can still be mitigated to acceptable levels). No fatal flaws were identified for either battery technology alternative so either alternative would be acceptable for development. As such, it is recommended that the preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

(ii) No-Go Alternative

When comparing the specialists' assessment of the no-go alternative with the proposed development, the adverse impacts would have similar significance, post mitigation. Adverse impacts associated with the no-go alternative typically range from low to very low, while

adverse impacts associated with the proposed development also range from low to very (with mitigation) and there would be positive impacts related to the proposed development that would be foregone.

The no-go alternative is not recommended as the project is needed to contribute to the diversification of South Africa's energy mix. In addition the positive socio-economic impacts which range from very low to moderate would not be realised if the project is not authorised.

(b) EAP Recommendations

As outlined in **Chapter 6** (Impact Assessment) of the draft BAR, all impacts associated with the proposed development of SPH5 can be mitigated to acceptable levels.

The EAP therefore recommends that DFFE grant a positive Environmental Authorisation (EA) for the proposed development of SPH5. The mitigation measures identified in the EMPr must be implemented throughout the project duration to ensure impacts are mitigated to acceptable levels.

It is the opinion of the EAP that the BAR and associated specialist studies have been conducted in an objective manner and the BAR process to date complies with the requirements of the 2014 EIA Regulations.

(c) Specialist Recommendations

All of the specialist are in agreement with the recommendation of the EAP that SPH5 can be authorised. Specialists have provided a set of mitigation measures which have been included in the EMPr (**Appendix I**) for the project.

(d) Assumptions and Limitations

A detailed list of assumptions and limitations associated with the DBAR and specialist studies are included in **Section 1.6.** The information provided in the DBAR is deemed of sufficient quality and relevance for the EAP and specialist team to make an informed decision on the recommendations for the project.

8.1.5 Springhaas Facility 6

All of the negative direct and indirect impacts identified for SPH6 can be mitigation to low or very low significance post mitigation. The positive impacts relate to employment opportunities during construction (moderate positive), employment opportunities during operation (low positive). Two very low positive impacts were identified, the first is the use of infrastructure for nesting by birds and the second is a positive impact related to recovery of fossils from site (should fossils be uncovered and can be collected).

Cumulative impacts were assessed for SPH6. The cumulative impact ratings were done on the assumption that all seven Springhaas Solar PV facilities are authorised and constructed along with the other 13 solar PV facilities located within a 30km radius of the site. In reality it is unlikely that all projects would receive preferred bidder status and move forward to construction. All of the negative cumulative impacts were rated as low or very low significance with the exception of:

- Avifauna the cumulative impact of the loss of avifaunal habitat was rated as moderate negative
- Terrestrial biodiversity and animal species- the cumulative impact of loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity was rated as moderate negative.

No fatal flaws were identified for SPH6 during the impact assessment phase and all impacts can be mitigated to acceptable limits.

The site sensitivity for SPH6 can be summarised as follows:

Table 8-5: SPH6 site sensitivity overview

Theme	Site sensitivity verification	Comment
Agricultural	Low	SPH6 is wholly located in an area of low agricultural sensitivity.
Animal species	Medium/ High	The majority of the footprint of SPH6 comprises of natural grassland (medium sensitivity) with two highly disturbed areas where the vegetation has been disturbed by livestock grazing. There is one small pan near the centre of the facility which is classified as high sensitivity.
Aquatic biodiversity	Low	There are no high or medium sensitivity areas in SPH6. A drainage region traverses the site from north to south, this feature is classified as low sensitivity.
Archaeological and cultural heritage theme	Low	No sensitive archaeological resources were identified in the footprint of SPH6.
Avian	Low - Medium	All high sensitivity areas (pans and wetlands) and their respective ecological buffers have been avoided by the layout.
Bats	Low	Low sensitivity rating identified by the Screening Tool is accurate. SPH6 overlaps one small area of medium sensitivity for bats.
Floodline	-	SPH6 is located outside of the 1:100 year floodline.
Geotechnical	-	The site is suitable for the development of a solar PV facility if the recommendation in the geotechnical investigation are implemented.
Landscape/ Visual	Medium	The greater site/study area was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity). There are no high sensitivity areas in SPH6. A ridgeline (medium sensitivity) runs north to south through SPH6. The Electrical Infrastructure Compound which is the tallest component of SPH3 is located in this medium sensitivity area.
Palaeontology	Low	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low sensitivity.
Plant species	Low	Low sensitivity rating identified by the Screening Tool is accurate.
Risk assessment	-	No off-site risks would be present with the development of

		SPH 6.
Socio-economic	-	No socio-economic sensitivities were identified which would preclude the development of SPH6.
Terrestrial biodiversity	Medium/ High	The majority of the site is natural grassland which is ascribed medium sensitivity. There are degraded areas within SPH6 which are classified as low sensitivity. One small pan (high sensitivity) is located within SPH6.
Transport	-	No transport sensitivities were identified. There is an existing access road network which allows access to the site.
Groundwater	Low	The site has a low groundwater vulnerability classification.

As can be seen from Figure 8-1 the infrastructure for SPH6 avoids all no-go areas.

(a) Alternatives

The following alternatives were assessed for SPH6:

- Technology alternatives for the battery technology for the BESS
- No-go option

(i) BESS Battery Technology Alternatives

All of the specialist studies found no difference in the impacts of the battery technology alternatives, with the exception of the risk assessment which identified certain risks associated with redox-flow batteries (noting, however, that these can still be mitigated to acceptable levels). No fatal flaws were identified for either battery technology alternative so either alternative would be acceptable for development. As such, it is recommended that the preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

(ii) No-Go Alternative

When comparing the specialists' assessment of the no-go alternative with the proposed development, the adverse impacts would have similar significance, post mitigation. Adverse impacts associated with the no-go alternative typically range from low to very low, while adverse impacts associated with the proposed development also range from low to very (with mitigation) and there would be positive impacts related to the proposed development that would be foregone.

The no-go alternative is not recommended as the project is needed to contribute to the diversification of South Africa's energy mix. In addition the positive socio-economic impacts which range from very low to moderate would not be realised if the project is not authorised.

(b) EAP Recommendations

As outlined in **Chapter 6** (Impact Assessment) of the draft BAR, all impacts associated with the proposed development of SPH6 can be mitigated to acceptable levels.

The EAP therefore recommends that DFFE grant a positive Environmental Authorisation (EA) for the proposed development of SPH6. The mitigation measures identified in the EMPr must be implemented throughout the project duration to ensure impacts are mitigated to acceptable levels.

It is the opinion of the EAP that the BAR and associated specialist studies have been conducted in an objective manner and the BAR process to date complies with the requirements of the 2014 EIA Regulations.

(c) Specialist Recommendations

All of the specialist are in agreement with the recommendation of the EAP that SPH6 can be authorised. Specialists have provided a set of mitigation measures which have been included in the EMPr (**Appendix I**) for the project.

(d) Assumptions and Limitations

A detailed list of assumptions and limitations associated with the DBAR and specialist studies are included in **Section 1.6.** The information provided in the DBAR is deemed of sufficient quality and relevance for the EAP and specialist team to make an informed decision on the recommendations for the project.

8.1.6 Springhaas Facility 8

All of the negative direct and indirect impacts identified for SPH8 can be mitigation to low or very low significance post mitigation. The positive impacts relate to employment opportunities during construction (moderate positive), employment opportunities during operation (low positive). Two very low positive impacts were identified, the first is the use of infrastructure for nesting by birds and the second is a positive impact related to recovery of fossils from site (should fossils be uncovered and can be collected).

Cumulative impacts were assessed for SPH8. The cumulative impact ratings were done on the assumption that all seven Springhaas Solar PV facilities are authorised and constructed along with the other 13 solar PV facilities located within a 30km radius of the site. In reality it is unlikely that all projects would receive preferred bidder status and move forward to construction. All of the negative cumulative impacts were rated as low or very low significance with the exception of:

- Avifauna the cumulative impact of the loss of avifaunal habitat was rated as moderate negative
- **Terrestrial biodiversity and animal species-** the cumulative impact of loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity was rated as moderate negative.

No fatal flaws were identified for SPH8 during the impact assessment phase and all impacts can be mitigated to acceptable limits.

The site sensitivity for SPH8 can be summarised as follows:

Table 8-6: SPH8 site sensitivity overview

Theme	Site sensitivity verification	Comment
Agricultural	Low - Medium	SPH8 is wholly located in an area of low agricultural sensitivity with the exception of a small area of medium sensitivity on the eastern edge of the site.
Animal species	Medium	The majority of the footprint of SPH8 comprises of natural grassland (medium sensitivity), there is one small area of low sensitivity (degraded) land in the north of the facility. The facility has been designed to avoid a pan to the west of the facility which is rated as high sensitivity.
Aquatic biodiversity	Low	There are no high or medium sensitivity areas in SPH8. Three drainage regions overlap the site. These features are classified as low sensitivity.
Archaeological and cultural heritage theme	Low	No sensitive archaeological resources were identified in the footprint of SPH8.
Avian	Low - Medium	All high sensitivity areas (pans and wetlands) and their respective ecological buffers have been avoided by the layout.
Bats	Low	The low sensitivity rating identified by the Screening Tool is accurate. SPH8 overlaps one small area of medium sensitivity for bats.
Floodline	-	SPH8 is located outside of the 1:100 year floodline.
Geotechnical	-	The site is suitable for the development of a solar PV facility if the recommendation in the geotechnical investigation are implemented.
Landscape/ Visual	Medium	The greater site/study area was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity). There are no high sensitivity areas in SPH8. There are medium sensitivity areas within SPH8. The collector substation which is the tallest component has been sited to avoid the medium sensitivity area. The electrical infrastructure compound which contains the substation does however encroach slightly on the medium sensitivity area.
Palaeontology	Low	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low sensitivity.
Plant species	Low	Low sensitivity rating identified by the Screening Tool is accurate.
Risk assessment	-	No off-site risks would be present with the development of SPH 8.
Socio-economic	-	No socio-economic sensitivities were identified which would preclude the development of SPH8.
Terrestrial biodiversity	Medium	The majority of the site is natural grassland which is ascribed medium sensitivity. There are degraded areas within SPH8 which are classified as low sensitivity. One small pan (high sensitivity) is located within SPH8.
Transport	-	No transport sensitivities were identified. There is an existing access road network which allows access to the site.
Groundwater	Low	The site has a low groundwater vulnerability classification.

As can be seen from **Figure 8-1** the infrastructure for SPH8 avoids all no-go areas.

(a) Alternatives

The following alternatives were assessed for SPH8:

- Technology alternatives for the battery technology for the BESS
- No-go option

(i) BESS Battery Technology Alternatives

All of the specialist studies found no difference in the impacts of the battery technology alternatives, with the exception of the risk assessment which identified certain risks associated with redox-flow batteries (noting, however, that these can still be mitigated to acceptable levels). No fatal flaws were identified for either battery technology alternative so either alternative would be acceptable for development. As such, it is recommended that the preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

(ii) No-Go Alternative

When comparing the specialists' assessment of the no-go alternative with the proposed development, the adverse impacts would have similar significance, post mitigation. Adverse impacts associated with the no-go alternative typically range from low to very low, while adverse impacts associated with the proposed development also range from low to very (with mitigation) and there would be positive impacts related to the proposed development that would be foregone.

The no-go alternative is not recommended as the project is needed to contribute to the diversification of South Africa's energy mix. In addition the positive socio-economic impacts which range from very low to moderate would not be realised if the project is not authorised.

(b) EAP Recommendations

As outlined in **Chapter 6** (Impact Assessment) of the draft BAR, all impacts associated with the proposed development of SPH8 can be mitigated to acceptable levels.

The EAP therefore recommends that DFFE grant a positive Environmental Authorisation (EA) for the proposed development of SPH8. The mitigation measures identified in the EMPr must be implemented throughout the project duration to ensure impacts are mitigated to acceptable levels.

It is the opinion of the EAP that the BAR and associated specialist studies have been conducted in an objective manner and the BAR process to date complies with the requirements of the 2014 EIA Regulations.

(c) Specialist Recommendations

All of the specialist are in agreement with the recommendation of the EAP that SPH8 can be authorised. Specialists have provided a set of mitigation measures which have been included in the EMPr (**Appendix I**) for the project.

(d) Assumptions and Limitations

A detailed list of assumptions and limitations associated with the DBAR and specialist studies are included in **Section 1.6.** The information provided in the DBAR is deemed of sufficient quality and relevance for the EAP and specialist team to make an informed decision on the recommendations for the project.

8.1.7 Springhaas Facility 9

All of the negative direct and indirect impacts identified for SPH9 can be mitigation to low or very low significance post mitigation. The positive impacts relate to employment opportunities during construction (moderate positive), employment opportunities during operation (low positive). Two very low positive impacts were identified, the first is the use of infrastructure for nesting by birds and the second is a positive impact related to recovery of fossils from site (should fossils be uncovered and can be collected).

Cumulative impacts were assessed for SPH9. The cumulative impact ratings were done on the assumption that all seven Springhaas Solar PV facilities are authorised and constructed along with the other 13 solar PV facilities located within a 30km radius of the site. In reality it is unlikely that all projects would receive preferred bidder status and move forward to construction. All of the negative cumulative impacts were rated as low or very low significance with the exception of:

- Avifauna the cumulative impact of the loss of avifaunal habitat was rated as moderate negative
- Terrestrial biodiversity and animal species- the cumulative impact of loss of large natural area, increased disturbance to natural areas, environmental degradation, and loss of habitat connectivity was rated as moderate negative.

No fatal flaws were identified for SPH9 during the impact assessment phase and all impacts can be mitigated to acceptable limits.

The site sensitivity for SPH9 can be summarised as follows:

Table 8-7: SPH9 site sensitivity overview

Theme	Site sensitivity verification	Comment
Agricultural	Low	SPH9 is wholly located in an area of low agricultural sensitivity.
Animal species	Medium	The majority of the footprint of SPH9 comprises of natural grassland (medium sensitivity), there is one small area of

		low sensitivity (degraded) land in the south of the facility.
		The facility has been designed to avoid pans to the west of
		the facility which are rated as high sensitivity.
Aquatic biodiversity	Low	There are no high or medium sensitivity areas in SPH9. Drainage regions cover large section of SPH9. These
Archanalagical		features are classified as low sensitivity.
Archaeological and cultural heritage theme	Low	No sensitive archaeological resources were identified in the footprint of SPH9.
Avian	Low - Medium	All high sensitivity areas (pans and wetlands) and their respective ecological buffers have been avoided by the layout.
Bats	Low	The low sensitivity rating identified by the Screening Tool is accurate. SPH9 does not overlap any medium or high sensitivity areas for bats.
Floodline	-	SPH9 is located outside of the 1:100 year floodline.
Geotechnical	-	The site is suitable for the development of a solar PV facility if the recommendation in the geotechnical investigation are implemented.
Landscape/ Visual	Low	The greater site/study area was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity). SPH9 is wholly located in an area of low visual sensitivity.
Palaeontology	Low	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low sensitivity.
Plant species	Low	Low sensitivity rating identified by the Screening Tool is accurate.
Risk assessment	-	No off-site risks would be present with the development of SPH 9.
Socio-economic	-	No socio-economic sensitivities were identified which would preclude the development of SPH9.
Terrestrial biodiversity	Medium	The majority of the footprint of SPH9 comprises of natural grassland (medium sensitivity), there is one small area of low sensitivity (degraded) land in the south of the facility. The facility has been designed to avoid pans to the east and west of the facility which are rated as high sensitivity.
Transport	-	No transport sensitivities were identified. There is an existing access road network which allows access to the site.
Groundwater	Low	The site has a low groundwater vulnerability classification.

As can be seen from **Figure 8-1** the infrastructure for SPH9 avoids all no-go areas.

(a) Alternatives

The following alternatives were assessed for SPH9:

- Technology alternatives for the battery technology for the BESS
- No-go option

(i) BESS Battery Technology Alternatives

All of the specialist studies found no difference in the impacts of the battery technology alternatives, with the exception of the risk assessment which identified certain risks associated with redox-flow batteries (noting, however, that these can still be mitigated to acceptable levels). No fatal flaws were identified for either battery technology alternative so either alternative would be acceptable for development. As such, it is recommended that the

preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

(ii) No-Go Alternative

When comparing the specialists' assessment of the no-go alternative with the proposed development, the adverse impacts would have similar significance, post mitigation. Adverse impacts associated with the no-go alternative typically range from low to very low, while adverse impacts associated with the proposed development also range from low to very (with mitigation) and there would be positive impacts related to the proposed development that would be foregone.

The no-go alternative is not recommended as the project is needed to contribute to the diversification of South Africa's energy mix. In addition the positive socio-economic impacts which range from very low to moderate would not be realised if the project is not authorised.

(b) EAP Recommendations

As outlined in **Chapter 6** (Impact Assessment) of the draft BAR, all impacts associated with the proposed development of SPH9 can be mitigated to acceptable levels.

The EAP therefore recommends that DFFE grant a positive Environmental Authorisation (EA) for the proposed development of SPH9. The mitigation measures identified in the EMPr must be implemented throughout the project duration to ensure impacts are mitigated to acceptable levels.

It is the opinion of the EAP that the BAR and associated specialist studies have been conducted in an objective manner and the BAR process to date complies with the requirements of the 2014 EIA Regulations.

(c) Specialist Recommendations

All of the specialist are in agreement with the recommendation of the EAP that SPH9 can be authorised. Specialists have provided a set of mitigation measures which have been included in the EMPr (**Appendix I**) for the project.

(d) Assumptions and Limitations

A detailed list of assumptions and limitations associated with the DBAR and specialist studies are included in **Section 1.6.** The information provided in the DBAR is deemed of sufficient quality and relevance for the EAP and specialist team to make an informed decision on the recommendations for the project.