

Appendix C

SPECIALIST DECLARATIONS





environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:	(For official use only)
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Mura Solar Photovoltaic and Electronic Grid Infrastructure Development between Loxton and Beaufort West, Western Cape and Northern Cape Provinces

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
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Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Percentage Procurement recognition	
Specialist name:	ROBERT TRUMP LOUW		
Specialist Qualifications:	B ENG (CIVIL) HONS BLOM		
Professional affiliation/registration:	None		
Physical address:	32 PETER PLACE, BRYANSTON		
Postal address:	32 PETER PLACE, BRYANSTON		
Postal code:	2191	Cell:	082 557 8646
Telephone:	082 557 8646	Fax:	
E-mail:	robtr@promethium.com		

2. DECLARATION BY THE SPECIALIST

I, R. T. Louw, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

A. R.
Signature of the Specialist

PROMETHIUM CARBON (PTY) LTD.
Name of Company:

6/2/2023
Date

Details of Specialist, Declaration and Undertaking Under Oath



A. R.
Page 2 of 3

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, R.T. Louw, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

R.T. Louw
Signature of the Specialist

Promethium Carbon (Pty.) Ltd
Name of Company

8/2/2023
Date

I certify that the deponent acknowledged that he/she knows and understands the contents of this declaration which was signed and sworn to before me, under compliance with the regulations contained in Government Notice R1258 dated 21 July 1972, (as amended), at Johannesburg on 08th FEBRUARY 2023.

[Signature]
Signature of the Commissioner of Oaths

08/02/2023
Date

Commissioner of Oaths (RSA)
26 Augrables Road
Waterfall Park,
Off Bekker Road, Midrand, 1685

Signed:.....
Date:..... 08/02/2023

Yuraisha Mari
Non-Practising Attorney

[Signature]
R.T. Louw



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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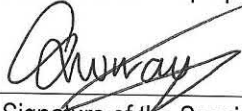
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Arcadia

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Email: EIAAdmin@environment.gov.za

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, SHANNON LEE MURRAY, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



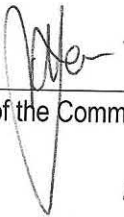
Signature of the Specialist

Promethium Carbon (Pty.) Ltd

Name of Company

27/01/2023

Date

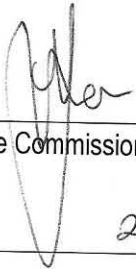


Signature of the Commissioner of Oaths

27/01/2023

Date

I certify that the deponent acknowledged that he/she knows and understands the contents of this declaration which was signed and sworn to before me, under compliance with the regulations contained in Government Notice R1258 dated 21 July 1972, (as amended), at Johannesburg on 27 January 2023.



Signature of the Commissioner of Oaths

27/01/2023

Date

Yuraisha Mari
Non-Practising Attorney

Commissioner of Oaths (RSA)
26 Augrabies Road
Waterfall Park,
Off Bekker Road, Midrand, 1685

Signed: 

Date: 27/01/2023





environmental affairs

Department:
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Email: EIAAdmin@environment.gov.za

I.M

1. SPECIALIST INFORMATION

Specialist Company Name:	PROMETHIUM CARBON (PTY) LTD		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100
Specialist name:	INDIANA Mann		
Specialist Qualifications:	BSc (Hons)		
Professional affiliation/registration:			
Physical address:	The Courtyards, Block 2, 1st floor, 32 Peter Place, Brynerton		
Postal address:			
Postal code:	2021	Cell:	0732552397
Telephone:	011 706 8185	Fax:	
E-mail:	indiana@promethium.co.za		

2. DECLARATION BY THE SPECIALIST

I, INDIANA MANN, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

PROMETHIUM CARBON

Name of Company:

27/01/2023

Date

Details of Specialist, Declaration and Undertaking Under Oath



3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, INDIANA MANN, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



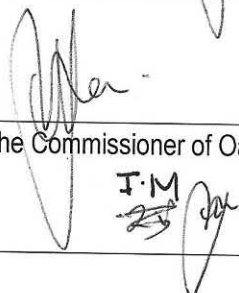
Signature of the Specialist

Promethium Carbon (Pty.) Ltd

Name of Company

^{I.M}
27/01/2023

Date

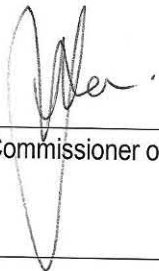


Signature of the Commissioner of Oaths

^{I.M}
27/01/2023

Date

I certify that the deponent acknowledged that he/she knows and understands the contents of this declaration which was signed and sworn to before me, under compliance with the regulations contained in Government Notice R1258 dated 21 July 1972, (as amended), at Johannesburg on 27 January 2023.



Signature of the Commissioner of Oaths

27/01/2023

Date

Yuraisha Mari
Non-Practising Attorney

Commissioner of Oaths (RSA)
26 Augrables Road
Waterfall Park,
Off Bekker Road, Midrand, 1685

Signed:.....^{I.M} 27/01/2023.....

Date:..........



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Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Promethium Carbon (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100
Specialist name:	Shantal Beharie		
Specialist Qualifications:	MSc, BSc(Hons), Bachelors		
Professional affiliation/registration:	None		
Physical address:	The Courtyards, Block 2, 1st Floor, 32 Peter Place Bryanston		
Postal address:	P.O. Box 131, 253 Bryanston		
Postal code:	2021	Cell:	076 318 9332
Telephone:	011 706 8185	Fax:	-
E-mail:	shantal@promethium.co.za		

2. DECLARATION BY THE SPECIALIST

I, Shantal Beharie, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
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- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Beharie

Signature of the Specialist

Promethium Carbon

Name of Company:

27 / 01 / 2023

Date

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Shantal Beharie, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Beharie

Signature of the Specialist

Promethium Carbon (Pty.) Ltd

Name of Company

27 /01 /2023

Date

[Signature]

Signature of the Commissioner of Oaths

27/01/2023

Date

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[Signature]

Signature of the Commissioner of Oaths

27/01/2023

Date

Yuraisha Mari
Non-Practising Attorney

Commissioner of Oaths (RSA)
26 Augrabies Road
Waterfall Park,
Off Bekker Road, Midrand, 1685

Signed:.....[Signature].....

Date:.....27/01/2023.....



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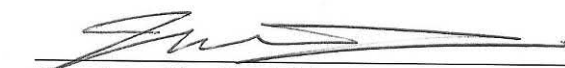
1. SPECIALIST INFORMATION

Specialist Company Name:	PROMETHIUM CARBON (PTY) LTD		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100
Specialist name:	JOSHUA ANTHONY WEISS		
Specialist Qualifications:	MSc ; BSc (HONS)		
Professional affiliation/registration:	SACNASP (REG NO 118208)		
Physical address:	The Courtyards, Block 2, 1 st Floor, 32 Peter Place, Bryanston		
Postal address:	-		
Postal code:	2021	Cell:	0761170160
Telephone:	011 706 8185	Fax:	
E-mail:	joshua@promethium.co.za		

2. DECLARATION BY THE SPECIALIST

I, JOSHUA ANTHONY WEISS, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
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- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



 Signature of the Specialist

PROMETHIUM CARBON

 Name of Company:

24/01/2023 27/01/2023

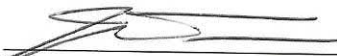
 Date

JW


 Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JOSHUA ANTHONY WEISS, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.


Signature of the Specialist

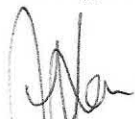
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Name of Company

27/01/2023
Date


Signature of the Commissioner of Oaths

27/01/2023
Date

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Signature of the Commissioner of Oaths

27/01/2023
Date

Yuraisha Mari
Non-Practising Attorney

Commissioner of Oaths (RSA)
26 Augrabies Road
Waterfall Park,
Off Bekker Road, Midrand, 1685

Signed:.....
Date:..... 27/01/2023

JW

CURRICULUM VITAE

Date: 19 January 2022

Name	Robbie Louw			
Date of Birth	06 April 1960			
Gender	Male			
Nationality	South African			
Education	Qualification	Institution	Years	
	Bachelor of Science in Engineering (Chemical)	University of Pretoria	1979 – 1982	
	B Com (Hons) (Economics)	University of South Africa	1984 – 1988	
Language Skills	Competence is indicated on a scale of 1 to 5 (1=excellent 5=basic)			
	Language	Reading	Speaking	Writing
	English	1	1	1
	Afrikaans	1	1	1
Membership of professional bodies	Institute of Directors in South Africa (IoDSA)			
	South African Institute of Mining and Metallurgy (SAIMM)			
Other Memberships	Member of the Technical Working Group of the Climate Disclosure Standards Board			
	Member of the Executive Committee of Renewable Energy Certificates Market Participants Association - Southern Africa (RECSA)			



Career Profile

Robbie Louw is the founder and director of Promethium Carbon. He has over 18 years of experience in the climate change industry. Robbie has significant experience with regards climate change mitigation and adaptation. Robbie's chemical engineering background combined with his extensive experience in climate change has led to him leading a number of projects related to climate change risk and vulnerability, energy development and developing climate change mitigation and adaptation alternatives. His overall experience over a period of 35 years covers the chemical, mining, minerals process and energy fields, in which he was, involved in R&D, project, operational and management levels.



Project Experience

Project Type	Description	Projects and Clients
Benchmarking	The benchmarking work include the calculation of emission and energy intensities on the basis of an agreed on metric. This work involves the gathering of data, selection of calculation methodologies, and the calculation pf the benchmarks.	<ol style="list-style-type: none"> 1. Anglo American PLC: Prepared benchmarks for the Anglo American operating mines. 2. Association of Cementitious Material Producers (ACMP): Prepare a benchmark for the proposed carbon tax Performance allowance for the cement industry in South Africa. 3. Minerals Council of South Africa: Prepare benchmarks for the proposed carbon tax Performance allowance for the gold and platinum industries in South Africa. 4. South African Iron and Steel Institute (SAISI): Prepare a benchmark for the proposed carbon tax Performance allowance for the steel industry in South Africa. 5. Ilmenite industry: Prepare a benchmark for the proposed carbon tax Performance allowance for the ilmenite industry in South Africa. 6. Nitric acid industry: Prepare a benchmark for the proposed carbon tax Performance allowance for the nitric acid industry.
Carbon and Climate Change Strategy	Robbie has worked on the projects listed in relation to the development of carbon reduction and climate change strategies. This work involves extensive consultation with the client to understand the existing strategic frameworks within the company, and then to align the climate change strategies with the overall mission and vision of the company within the constraints of the rapidly changing world environment.	<ol style="list-style-type: none"> 1. AfriSam: Revision of corporate climate change strategy. 2. Anglo American PLC: Inputs into corporate climate change strategy development with respect to scenario planning, renewable energy fact base and development of financing options for energy efficiency initiatives. 3. Business Unity South Africa (BUSA): Participation in the development of BUSA's response to climate change policy development. 4. Clay Brick Association of South Africa: Development of a Sustainability Strategy and reporting template 5. Exxaro Resources: Development of low carbon energy strategy that lead to the formation of Cennergi, the energy company joint venture with Tata with R 8 billion of renewable energy projects under development. 6. Gauteng Province: Development of an implementation plan for the Gauteng Energy Security Strategy 7. Gold Fields Cerro Corona Mine: Development of climate change adaptation strategy, and development of global climate change strategy, integration of strategy into business. The Gold Fields climate change strategy scored 100% in the Dow Jones Sustainability Index in 2012.



Project Type	Description	Projects and Clients
		<ol style="list-style-type: none"> 8. Harmony Gold: Development of a renewable energy strategy per operation, input into the development of an energy risk mitigation plan, and input into, and development of, climate change strategy. 9. Hulamin: Development of an Environmental Sustainability Strategy 10. Impala Platinum: Development of GHG Handbook, containing a greenhouse gas mitigation strategy. 11. Minerals Council of South Africa: Assisted the Chamber of Mines with responses to the National Treasury with respect to the relief mechanisms in the South African carbon tax bill. 12. MTN South Africa: Inputs into the development of MTN South Africa's alternative energy and energy efficiency strategies and assistance with the implementation thereof. 13. Royal Bafokeng Platinum: Development of climate change adaptation strategy 14. Shell: Development of a carbon trading strategy in South Africa. 15. Sibanye Gold: Development of carbon trading strategy, and development of a Low Carbon Transition Plan
Carbon Finance Services	This work involved assistance in the raising of finance for carbon projects, as well as the monetisation of the environmental benefit of emission reduction projects.	<ol style="list-style-type: none"> 1. Anglo American: Drafted Energy Efficiency Finance Note for use in the operations of Anglo with respect to the finance of energy efficiency projects. 2. British High Commission: Prepared toolkit for the development of land based renewable energy projects (available at www.retoolkit.org.za) 3. DBSA: Performed due diligence assessments of projects for the Green Fund. 4. Gaia Consortium: Review of South African activities with respect to the Report on Effectiveness of the Swiss International Cooperation In Climate Change Mitigation and Adaptation Interventions 2000-2012. 5. Gold Fields: Advice on structuring of Emission Reduction Purchase Agreement for the Beatrix Methane Flaring project. This agreement won the Energy Risk Deal of the Year Award in Europe in 2011. 6. GIZ and Department of Environmental Affairs: Evaluation of the Green Economy impacts resulting from projects awarded through South Africa's Green Fund. 7. Gold Fields: Provided financial modelling and analysis at prefeasibility level for the Driefontein Mine renewable energy project. 8. Groupe Eoulee: Prepared business plan and feasibility study for a major landfill gas project in Cote d'Ivoire.



Project Type	Description	Projects and Clients					
		9. Harambe Sustainable Venture: Provided definitive feasibility study for bioenergy project. 10. Harmony Gold: Provided financial modelling and analysis at business case level for the Free State Carbon Sink project. 11. Intrust AG: Technical input in due diligence for investment in carbon capture and storage investment in Europe. 12. MTN South Africa: Preparation of information document and training of personnel with respect to the use of South African tax and other incentives relating to energy efficiency projects. 13. MTN South Africa: Structuring of the Emission Reduction Purchase Agreement (ERPA) for the sale of the emission reduction credits from the 14th Avenue trigeneration plant CDM project. 14. Namakwa Sands: Provided financial modelling services for the furnace offgas to electricity project during the execution of the project feasibility study. 15. Namakwa Sands: Structuring of the ERPA for the sale of the emission reduction credits from the furnace offgas to electricity CDM project. 16. Solid Waste Technologies: Provided financial modelling and analysis at prefeasibility level for the medical waste to energy project. 17. WWF: Review of corporate investment criteria for voluntary investment in renewable energy technologies in South Africa.					
Carbon Footprints	<p>The calculation of carbon footprints using the following standards:</p> <ol style="list-style-type: none"> ISO 14064 Part 1 (2006) ISO 14064 Part 1 (2018)/ SANS 14064 Part 1 (2021) GHG Protocol Corporate Standard GHG Protocol Scope 2 Guidance GHG Protocol Scope 3 Guidance <p>The calculation of carbon footprints generally consist of the following steps:</p> <ol style="list-style-type: none"> Establishment of the footprint boundary Determination of the emission factors 	<ol style="list-style-type: none"> Accor Hotels African Mining Exploration and Finance Company Afrisam's cement product footprint (review) Afrocentric - Medscheme Anglo American Kumba Iron Ore Anglo American Platinum 	<ol style="list-style-type: none"> Dokter and Misses Exxaro Resources Limited Fairview Cheese Company Farm Secure Food and Trees for Africa 	<ol style="list-style-type: none"> Lona Trading Medi-Clinic MTN South Africa Nature's Source Oceana Omnia Oranjerivier Wynkelder PAGE ministerial conference 	<ol style="list-style-type: none"> Sanlam Cape Town Marathon Scaw Metals Sentech Southern Farms Grapes Stellar wineries Sunvalley Biofruit Surgical Innovations Tharisa Minerals 		



Project Type	Description	Projects and Clients			
	3. Collection of the activity data; and 4. Calculation of the footprint. The carbon footprint projects also include recommendations on way to reduce the footprint.	7. Anglo American PLC 8. Backsberg Wines 9. Basil Read 10. Bedrock Mining Support 11. Cape Gate 12. Cape Town Marathon 13. City Lodge 14. Dauphin Office Seating 15. De Grendel Wines 16. Delicious Festival	22. Fraser Alexander 23. Freeworld Coatings 24. Fruits Unlimited 25. Gem Diamonds 26. Gold Fields 27. Group Five 28. Harmony Gold 29. IDC 30. Konika Minolta 31. KWV	40. PepsiCo South Africa (Review) 41. Pilanesburg Platinum Mines 42. Plascon 43. PPC 44. Re-Group 45. Riverside SA 46. Rupert and Rothschild	55. The Times Newspaper 56. Timrite 57. Tshipi Borwa manganese mine 58. Water Research Commission 59. Wescoal 60. WBHO 61. Westfalia Avocados
Carbon neutral status	This work involved assisting climate to attain carbon neutral status. This is achieved through the calculation of the carbon footprint of the company or product, the reduction of emissions where practical, and the subsequent offsetting of the residual emissions.	1. Backsberg Wine Estate 2. Fairview Cheese 3. Konika Minolta 4. The activities of SWITCH Africa's Green SECP in agriculture and waste management project (managed by SANEDI)			
CDM projects	Robbie has worked on the development of CDM methodologies, as well as on the registration and verification of following CDM projects.	Developing and revising CDM methodologies. 1. Successful revision of small scale methodology II D 2. Successful development of new small-scale methodology III.W. 3. Successful development of large-scale methodology AM0064 4. Successful revision of large-scale methodology AM0047 5. Successful development of new small-scale methodology II.K			



Project Type	Description	Projects and Clients
		<p>Registered CDM projects:</p> <ol style="list-style-type: none"> 1. UNFCCC 177: Lawley Fuel Switch Project – verification and post registration changes . 2. UNFCCC 795: Tugela Mill Fuel Switching Project (Tugela CFB10 Conversion from Coal to Bark Fired): Verification 3. UNFCCC 925: EnviroServ Chloorkop Landfill Gas Recovery Project - Post registration changes, renewal of crediting period, and verification 4. UNFCCC 2692: Bethlehem Hydroelectric project – verification, revision, and renewal of crediting period 5. UNFCCC 2975: Olkaria III Phase 2 Geothermal Expansion Project in Kenya – validation, expansion, and verification. 6. UNFCCC 3677: Ekurhuleni Landfill Gas Recovery Project – Post registration changes, renewal of crediting period 7. UNFCCC 3398: Fuel switch project on the Gluten 20 dryer of Tongaat Hulett Starch Pty (Ltd) Germiston Mill – Validation and verification 8. UNFCCC 4728: The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa – Methodology development, registration, revisions to the methodology, post registration changes, validation, and verification. Verification and issuance of pre-CDM VCUs . 9. UNFCCC 5884: Use of waste gas at Namakwa Sands in South Africa – validation. 10. UNFCCC 7535: Methane Recovery and Power generation at the Kuperberg Landfill in Namibia – validation 11. UNFCCC 7816: Hopefield wind energy facility in South Africa – validation 12. UNFCCC 7841: Bokpoort CSP (Concentrating Solar Power) Project, South Africa - validation and verification 13. UNFCCC 9238: Installation of energy efficient ventilation fans at South Deep and Beatrix Gold Mines in South Africa – validation. 14. UNFCCC 9310: Power generation from biogas in Windhoek, Namibia – validation 15. UNFCCC 9412: Trigeneration at Mobile Telephone Networks (MTN), 14th Avenue Commercial Site South Africa - methodology development, validation, and verification. (The verification project is still in process)



Project Type	Description	Projects and Clients
		<ol style="list-style-type: none"> 16. UNFCCC 8404: West Coast 1 Wind Farm in South Africa: Readiness assessment for verification 17. UNFCCC 8535: Kumba Clean Development Mechanism (CDM) verification of the Kathu Solar Park 18. UNFCCC 10005: Fuel Switch at Corobrik's Driefontein Brick Factory in South Africa - validation. 19. UNFCCC 6797: Joburg Landfill Gas to Energy Project - Post registration changes to PDD. 20. UNFCCC 8954: Coega IDZ Windfarm - Post registration changes to PDD and verification 21. UNFCCC 8954: Coega Wind farm renewal of crediting period 22. TASC: 3rd verification Clean Development Mechanism Verification 23. UNFCCC 7887: NuPlanet small scale hydropower PoA – validation. 24. UNFCCC 8535: Solar Energy Programme for South Africa – validation, setting up CME and verification (verification still in progress). 25. UNFCCC 8630: Grid Connected Photovoltaic (PV) Renewable Electricity Generating Facilities – validation and setting up CME. 26. UNFCCC 8742: South African Wind Power Projects – validation and setting up CME. 27. UNFCCC 9437: Trigeneration at Mobile Telephone Networks (MTN), 14th Avenue Commercial Site South Africa – validation and setting up CME. 28. UNFCCC 10004: City of Cape Town Landfill Gas Extraction and Utilisation Programme – validation, verification and all technical, commercial & administrative aspects relating to carbon credits. 29. UNFCCC 9596: Heat Retention Cooking in Less Developed Countries -Transitioning from the CDM to the VCS. 30. UNFCCC 6864: Fuel Efficient Stoves in Zambia - Verification of CPA4 (This project is still in process) 31. VCS 2384: Recipe for Change Grouped Project – Validation (This project is still in process).



Project Type	Description	Projects and Clients
CDP and corporate reporting	<p>This work involves the assistance of companies with respect to reporting climate change related matters to the CDP in the CDP's Climate and Water Programmes. The actions involved include assessment of published reports by the companies, workshops with companies to obtain more information, internal scoring of the CDP submissions, and the uploading of the submission on behalf of clients. In many cases the work also included a post-mortem of the scoring, once the results have been received from the CDP.</p>	<ol style="list-style-type: none"> 1. Altron (CDP Climate Change and Water) 2. Barloworld (CDP Climate Change and Water) 3. Anglo American Platinum (CDP Climate Change) 4. Clicks Group (CDP Climate Change and Water) 5. Exxaro Resources (CDP Climate Change) 6. Gold Fields (CDP Climate Change and Water) 7. Group Five (CDP Climate Change) 8. Growth Point Properties (CDP Climate Change) 9. Harmony Gold (CDP Climate Change and Water) 10. Impala Platinum (CDP Climate Change and Water) 11. Ivanhoe (CDP Climate Change and Water) 12. Kumba Iron Ore (CDP Climate Change and Water) 13. Liberty Life (CDP Climate Change) 14. Medi-Clinic (CDP Climate Change) 15. PicknPay (CDP Climate Change) 16. PPC (CDP Climate Change) 17. Sibanye Gold (CDP Climate Change) 18. Sun International (CDP Climate Change and Water) 19. WBHO (CDP Climate Change) 20. Woolworths (CDP Climate Change)
Clean Energy Projects	<p>Clean energy projects involve the development energy generation projects that have a lower emission intensity than the national grid. Robbie's role in the development of these projects involve the following:</p> <ol style="list-style-type: none"> 1. Technical assessment of the emission reduction that can be achieved by the project 	<ol style="list-style-type: none"> 1. Exxaro Resources/Cennergi: Brand se Baai wind energy project. 2. Gold Fields/Sibanye Gold: Beatrix mine methane to electricity project 3. Gold Fields/Sibanye Gold: Driefontein biomass to energy project. 4. Gold Fields: Base load electricity supply from biomass to energy project. 5. Harmony Gold: Carbon Sink biomass to energy project. 6. MTN South Africa: Trigeration project at 14th Avenue Campus 7. MTN South Africa: Biogas to electricity projects 8. Namakwa Sands: Furnace offgas to electricity project 9. Samancor Manganese: Furnace offgas to electricity project. 10. Solid Waste Technologies: Medical waste to energy project. 11. Document the first project (CPA1) under the Unlimited Energy's South African Solar Water Heater program



Project Type	Description	Projects and Clients
	2. Assessment of the project for carbon credits in terms of the rules of the carbon standards and the markets 3. Assessment of the economic feasibility of the project.	12. Kumba Iron Ore: Kathu Solar carbon credit readiness assessment
Climate Change Specialist Reports	Robbie has managed numerous specialist reports as part of the environmental authorisation process for proposed new projects.	<ol style="list-style-type: none"> 1. Proposed Khanyisa coal fired power plant in eMalahleni in the Mpumalanga Province. 2. Proposed Tshivhaso coal fired power plant near Lephalale in the Limpopo Province. 3. Proposed coal-based power plant near Makhado (Louis Trichardt), in the Limpopo Province. 4. Proposed Richards Bay Combined Cycle Gas Turbine (CCGT) Power Plant and Associated Infrastructure. 5. Proposed coal fired power station near Kwamhlanga in Mpumalanga. 6. Proposed Coal supply project for the proposed Khanyisa power plant. 7. Proposed coal mine in Mpumalanga for Anglo Coal. 8. Proposed Musina-Makhado Special Economic Zone (SEZ) Development within the Vhembe District Municipality, Limpopo Province. 9. Proposed West Wits mining project. 10. Proposed wet mill plant in Gauteng. 11. Proposed solar plant in Zambia. 12. Proposed coal mine situated in the Vhembe District Municipality within the Limpopo Province. 13. Development of three new terrace mines within the Theta Project study area near Pilgrim's Rest. 14. Proposed Gas to Power Project in the Coega SEZ including three power plants and related gas distribution infrastructure. 15. Proposed emergency gas to power project and additional 4000MW gas to power plant in Richards Bay. 16. Climate change assessment for a refinery project at the Gamsberg Zinc Mine Project 17. A specialist opinion on the consideration of climate change on the Basic Assessment for the Environmental Authorisation for the River Club project. 18. Wind farms in the Western Cape and Northern Cape.



Project Type	Description	Projects and Clients
Climate risk management	This work consisted of a variety of actions to mitigate the climate change risk of client with respect to both physical and transitional risks.	<ol style="list-style-type: none"> 1. Anglo American Kumba Iron Ore: Analysis of climate change risk and the management thereof for reporting under the CDP. 2. Anglo American Platinum: Analysis of climate change risk and the management thereof for reporting under the CDP. 3. Barloworld: General support with climate change-related activities; including development and implementation of climate change strategies, greenhouse gas accounting services, assistance with the identification, quantification of the size and general risk assessment of greenhouse gas reduction opportunities and reporting & feedback on climate change, carbon emission and energy regulations. 4. Cape Gate: Assistance with regulatory compliance and risk management with respect to the calculation of carbon footprint and advice on how carbon footprint should be used to draft carbon budgets, as well as assistance with the drafting and submission of Pollution Prevention Plans 5. Clay Brick Association: Regulatory support with climate change and energy-related activities; including carbon budgeting, greenhouse gas reporting, pollution prevention plans and energy management regulation. 6. Consol: Assistance with regulatory compliance and risk management with respect Pollution Prevention Plans 7. Corobrik: Assistance with regulatory compliance and risk management with respect mandatory greenhouse gas reporting 8. Exxaro: Physical risks assessments through the downscaling of global circulation models and analysis of impacts on Exxaro's mining operations and the surrounding communities. Reporting of climate change risk and the management thereof for reporting under the CDP. 9. Gold Fields Ghana: Climate change risk and vulnerability assessments Tarkwa and Damang mines. 10. Gold Fields Peru: Climate change risk and vulnerability assessment Cerro Corona mining operations, and developed a climate change adaptation plan 11. Gold Fields: A climate change risk and vulnerability assessment; including climate modelling to assess local climate change risks and development of risk mitigation interventions (adaptation action plans). Reporting of climate change risk and management of climate change risks for reporting under the CDP.



Project Type	Description	Projects and Clients
		<ol style="list-style-type: none"> 12. Gold Fields South Africa: Development of climate change risk and vulnerability assessments for Gold Fields' South Deep mine in South Africa. 13. Harmony Gold: Development of a climate change risk matrix for use in the internal Harmony Gold risks management processes including the annual risk review. Reporting of climate change risk and the management thereof for reporting under the CDP. 14. Orion Carbons: Assistance with regulatory compliance and risk management with respect to mandatory greenhouse gas reporting 15. Orion Carbons: Assistance with regulatory compliance and risk management with respect with Pollution Prevention Plans 16. Rio Tinto: Climate change and greenhouse gas study report for the development of a port in Guinea (subcontract with LD Biodiversity) 17. Royal Bafokeng Platinum: Climate risk and vulnerability study 18. Sefhaku Cement: Assistance with regulatory compliance and risk management with respect to Pollution Prevention Plans and the carbon budget process 19. Sibanye Gold: Review of climate change risk and the management thereof for reporting under the CDP, Climate Change Scenario Analysis in line with the TCFD recommendations, and support with the National Greenhouse Gas Emission Reporting Regulations. 20. SLR: Carbon Footprint and Pollution Prevention plan for proposed wet mill plant in Vereeniging, and Carbon Footprint and Pollution Prevention plan for a glass bottle manufacturing plant in Vereeniging 21. Tongaat Hullett: Assistance with regulatory compliance and risk management with respect to the submission of Pollution Prevention Plans.
Energy Efficiency Projects	Robbie has managed the following energy efficiency projects:	<ol style="list-style-type: none"> 1. Afrocentric: Energy efficiency identification study. 2. Alweda Boerdery: Energy efficiency study 3. Anglo American Platinum: Energy balance over smelter and base and precious metal refineries. This energy balance was used to identify numerous energy efficiency opportunities including the 20MW waste heat harvesting project that was implemented in 2014. 4. Backsberg Wine Estate: Energy efficiency identification study. 5. BedRock: Energy efficiency study 6. Beekman Group energy efficiency studies in various resorts.



Project Type	Description	Projects and Clients
		<ul style="list-style-type: none"> 7. Berts Bricks: Energy assessment on behalf of the National Cleaner Production Centre 8. Bidvest Bank: Energy efficiency study 9. CESBE energy efficiency study 10. Christo Wiese Portfolio Wines: Energy efficiency identification study. 11. DairyBelle (Cookhouse): Energy efficiency study 12. Department of Transport: Transport energy reduction strategy project. 13. Drakensburg Sun: Energy efficiency study 14. Durban Galvanising: Energy efficiency identification study. 15. Elmir Bricks: Energy assessment on behalf of the National Cleaner Production Centre 16. Eureka: Energy efficiency identification study. 17. Federal Stene: Energy assessment on behalf of the National Cleaner Production Centre 18. Gold Fields: CDM project development for ventilation fan optimisation, auxiliary ventilation fan replacement, compressed air systems and chilling systems for mine ventilation systems. 19. Group Five energy efficiency studies in different business divisions. 20. Harmony Gold: CDM project development for ventilation fan optimisation, auxiliary ventilation fan replacement, compressed air systems and chilling systems for mine ventilation systems.
		<ul style="list-style-type: none"> 21. Hexwal Boerdery: Energy efficiency study 22. Legend Golf and Safari Resort: Energy efficiency study 23. Lourensford Fruit Company: energy efficiency study. 24. Merwida Winery: Energy efficiency study 25. MTN South Africa: CDM project development for a number of trigeneration plants, development of cooling system optimisation project using thermal storage technology.
		<ul style="list-style-type: none"> 26. Muffin Mate: energy efficiency study. 27. Multotec: Energy assessment on behalf of the National Cleaner Production Centre 28. Nestle: energy efficiency study 29. Ocon Bricks: Energy assessment on behalf of the National Cleaner Production Centre 30. Powertech Transformers: Energy efficiency identification study. 31. Re-Made: Energy efficiency identification study. 32. Reunert CBI: energy efficiency study 33. Roma Bricks: Energy assessment on behalf of the National Cleaner Production Centre



Project Type	Description	Projects and Clients
		34. Sibanye Gold energy efficiency and energy strategy. 35. Solid Waste Technologies: Energy efficiency identification study. 36. Vantage Goldfields: Energy efficiency study. 37. Water Research Commission energy efficiency study.
GHG emission reporting structures and systems	This work involved the development of systems and platforms for the integration of carbon reporting into the systems of the client.	1. Anglo American Kumba Iron Ore: Development of GHG and energy reporting templates based on the format required by the Annual- and Sustainability Reports. 2. Anglo American: Development of the ECO ₂ MAN GHG and energy consolidation and reporting tool and the Water Efficiency Target Tool (WETT). Both these tools are web based systems that are used by Anglo's global operations to track and report energy, GHG emissions and water use. 3. Gold Fields: Development of a carbon foot printing system used in-house for the calculation of the GHG inventories. This system is aligned with the GRI reporting system of Gold Fields. 4. Group 5: Development of a GHG Handbook that forms the basis of the company's GHG data consolidation and reporting structures. 5. Impala Platinum: Development of a GHG Handbook that forms the basis of the company's GHG data consolidation and reporting structures. 6. MTN South Africa: Mapping of the system requirements of GHG data capturing, calculation and reporting. 7. Omnia: Development of a group-wide carbon footprint data capturing structure for integration with the company's existing IT systems. 8. Sibanye Gold: Development of the corporate GHG inventory system used in-house for the calculation and reporting of the group's carbon footprint. 9. SmartMatta: Development and updating of a tool to calculate emission reductions from recycling in South Africa.
Land Based Carbon Sequestration Projects	Robbie has managed the following land based carbon sequestration projects:	1. BHP Billiton: Analysis of the terrestrial carbon stock impact for new large-scale open cast mining project in Gabon 2. Exxaro Resources: Assessment of carbon capture potential through improved land management practices on land owned by Exxaro. 3. Exxaro Resources: Analysis of the terrestrial carbon stock impact for new large-scale open cast mining project in Congo Brazzaville.

Project Type	Description	Projects and Clients
		<ol style="list-style-type: none"> 4. Food and Trees for Africa: Development of calculators to assess carbon impacts and carbon sequestration. 5. Gold Fields/Sibanye Gold: A project to quantify the opportunity to grow energy crop on mining impacted land that is unsuitable for food production at the Driefontein Mine. 6. Harmony Gold: Study on the use of energy and carbon sequestration plants to achieve phyto remediation of mining impacted land in the Free State. 7. Nedbank: Carbon assessment for a REDD+ project in Uganda. 8. Omnia: Analysis of impacts of planned land use change activities in a project based in Zambia. 9. Renencom: Development and registration of VCS Grouped Project for bamboo planting.
Life Cycle Assessments	Robbie has managed the following life cycle assessment projects. This work is based on ISO 14040 and PAS 2060.	<ol style="list-style-type: none"> 1. Anglo American Platinum: Platinum based fuels cells – comparative assessment with conventional power generation methods. 2. Corobrik: Comparative life cycle assessment for clay and cement bricks. 3. Hulamin: GHG emission life cycle assessment for target setting for rolled aluminium products. 4. Sibanye-Stillwater: Life cycle assessments for gold production, as basis for science based target setting.
Low Carbon Business Development	This work involved the development of business cases and business plans for low carbon projects.	<ol style="list-style-type: none"> 1. Amathole District Municipality: Identification of business opportunities related to renewable energy and the development of business plans for the identified opportunities. 2. Anglo American: Production of Marginal Abatement Cost (MAC) curves for Anglo based on internal project costs and energy/GHG emission savings. 3. Department of Trade and Industry: Development of a low carbon community employment programme focussed on the creation of green jobs in previously disadvantaged areas. 4. Gold Fields Ghana: Analysis of power generation project to utilise solid biomass fuel to supply the Tarkwa Mine with base load power. 5. Gold Fields South Africa/Sibanye Gold: Development of a project to use solid waste and cultivated biomass to generate power to supply base load power to the Driefontein Mine. 6. Harmony Gold: Development of a business case to integrate mine rehabilitation activities with biomass production for power generation as an alternative post mine life land use scenario.

Project Type	Description	Projects and Clients
		<ol style="list-style-type: none"> 7. MTN South Africa: Development of renewable energy opportunities including trigeneration, biogas and other technologies. 8. Solid Waste Technologies: Development of a medical waste to energy project. 9. British High Commission: Community based renewable energy projects to alleviate the current South African energy crisis and increase the amount of renewable energy on the grid. This project was funded by the British High Commission in Pretoria. 10. Chamber of Mines: Inclusion of mitigation projects as Component Project Activities in the Carbon Protocol Programme of Activities 11. Gold Fields: Performed an eligibility assessment for carbon credits of the Genser gas fired power generation project in Ghana 12. Food and Trees for Africa: Development of a new Carbon Standard (This project is still under development) 13. Finpro Southern Africa: Development of a market entry strategy for Finnish business into the South African economy in the Waste to Energy, Biomass to Energy and Smart Grid industries.
Policy and Policy Development	Robbie has manage the following projects related to policy development on local, provincial and national level.	<ol style="list-style-type: none"> 1. Amathole District Municipality: Strategic planning and GHG inventory assessment for both off-grid and commercial grid connected renewable energy project rollout. 2. Department of Energy: Reference Energy System (RES) for the Integrated Energy Plan (IEP) for South Africa. 3. Department of Environmental Affairs: Content manager for the 2014 South African National Climate Change Conference. 4. Department of Environmental Affairs: Roadmap to Monitoring Reporting and Verification (MRV) in preparation for COP17 in Durban in 2011. 5. Department of Environmental Affairs: Technical reviewer of the 2050 Pathways Calculator. This project was funded by the British High Commission in Pretoria 6. Japanese Department of Environment: Model MRV project on energy efficient mine ventilation system as a case study for the Joint Crediting Mechanism (JCM). 7. NBI: Developing a reporting framework for the energy efficiency leadership network (EELN). 8. South African Carbon Tax: Drafting a framework for the establishment of a carbon trading scheme to be used as offset mechanism in the announced carbon tax regime for South Africa. This project was funded by the British High Commission in Pretoria.



Project Type	Description	Projects and Clients
		9. Swaziland: Preparation of Intended Nationally Determined Contributions (INDC) 10. UNFCCC Regional Collaboration Centre, Kampala: Grid emission factor for the electricity system in Kenya. 11. World Resources Institute (WRI): Pilot project to evaluate the 2003 Energy Efficiency Accord under the proposed GHG Standard ‘Policies and Actions Accounting and Reporting Standard’. 12. WWF: Project to identify and evaluate the drivers in Corporate South Africa for investment in renewable energy, outside the government renewable energy procurement program. 13. Department of Environmental Affairs: Compilation, review and publication of South Africa’s 1st Biennial Update Report (BUR). 14. Department of Energy and Designated National Authority: Develop and implement the administrative system for assessing and approving South Africa’s offset scheme under the proposed Carbon Tax 15. World Bank Partnership for Market Readiness: Assist South Africa in the preparation of the technical guidelines for monitoring, reporting and verification of greenhouse gas emissions by industry 16. Department of Environmental Affairs: Compile Chapters 1 and 4 of the Third National Communication (TNC) report to the United Nations Framework Convention on Climate Change (UNFCCC) Swaziland: Develop a Monitoring, Reporting and Verification (MRV) framework for the Swaziland INDC.
		17. Swaziland: Compile Swaziland’s Third National Communication (TNC) report to the Conference of Parties of the UNFCCC 18. South African National Energy Development Institute (SANEDI): Develop a business case for the continued investigation of Carbon Capture and Storage in South Africa
		19. South African National Energy Development Institute (SANEDI): Appraisal of implementation of fossil fuel and renewable energy hybrid technologies in South Africa 20. South African National Energy Development Institute (SANEDI): Information technology services for 12L tax incentive online system upgrade and development (This project is still in progress) 21. International Emissions Trading Association (IETA): Develop an emission trading case study for South Africa (2016).



Project Type	Description	Projects and Clients
		<ul style="list-style-type: none"> 22. Aurora Wind Power: Assessment of carbon offset opportunities for projects develop under the South African Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) 23. Department of Science and Technology: Preparation of hydrogen technology parameter datasheets to be used in the Integrated Resource Plan 24. Chile: Provide international experience on monitoring, Reporting and Verification (MRV) systems that have been implemented in South Africa, as inputs into the Chilean National Greenhouse Gas MRV system. 25. KZN Department of Economic Development, Tourism and Environmental Affairs: Draft the Energy Chapter and review the Climate Change chapter of the KwaZulu-Natal Environment Outlook Report 26. North-West University: Descriptions of the IEP and IRP modelling systems and comparison of assumptions made in IEP and IRP reports gazetted in November 2016 27. Proposal for a South African Renewable Energy Carbon Offset Standard to be tradable under the Proposed Carbon Tax 28. Initiative for Climate Action Transparency (ICAT): Formed part of the technical working groups under the international ICAT: Took part in the Role of Non-State Actors guidance technical working group and also the technical working group developing the Transformational Change guidance documents. 29. Designated National Authority: Climate change adaptation can be assisted through implementation of mitigation projects, especially in poor areas. Executed a socio-economic study to identify the areas in South Africa where such projects can be implemented and applied to the UNFCCC to have the rules of the CDM adapted in order to fast-track such projects. 30. National Cleaner Production Centre (NCPC): Developed a position paper on effects of carbon tax, in its proposed form, on industry and ways to adapt to it.
Target setting	Robbie has managed the following projects in the space of the setting of GHG end energy reduction targets:	<ul style="list-style-type: none"> 1. Clicks Group: Development of new GHG mitigation goals 2. Harmony Gold: Assistance in the setting of a net-zero target 3. Hulamin: Assistance in the setting of a science based target. 4. PPC Cement: Pilot testing of the Equity Method for Science Based Target setting 5. Sanlam and Santam: Development of new GHG mitigation goals 6. Sibanye-Stillwater: Assistance in the setting of a science based target



Project Type	Description	Projects and Clients
		7. Standard Bank: Pilot testing of the Equity Method for Science Based Target setting, and setting targets for the property portfolio of Standard Bank. 8. Sun International: Pilot testing of the Equity Method for Science Based Target setting, setting a science and context based water target. 9. World Resources Institute (WRI): Pilot project on sectoral target setting under the proposed GHG Standard 'Mitigation Goals Accounting and Reporting Standard' in 2013.

Employment History

Dates	Company	Position	Description
2003 - present	Promethium Carbon (Pty) Ltd	Founder and Director	Climate change and carbon management specialist advisory firm
2015 - present	Promethium Two Degrees NPC	Co-founder and director	NPC with a focus on high impact social projects in climate change adaptation and mitigation
2010 – 2016	Steenkampskraal Thorium Ltd	Co-founder and non-executive director Chairman of the Remuneration Committee	Focussed on commercialising low carbon energy alternatives base on the utilisation of thorium as fuel
2015 - present	Steenkampskraal Holdings Ltd (previously Rare Earth Extraction Company Ltd)	Non-executive director	Mining industry holding company with interests in rare earths
2015 - present	Steenkampskraal Monazite Mine (Pty) Ltd	Non-executive director	Mining company with interests in rare earths
1995 - 2003	Rare Earth Extraction Company Ltd	Managing director	Mining company listed on venture capital board of the JSE
2003 – 2010	Rare Earth Extraction Company Ltd	Non-executive director	Mining company listed on venture capital board of the JSE
1992 - 1995	Chromachem (Pty) Ltd	Founder and Managing Director	Pigment manufacturing business
1989 – 1992	Process and Mining Consultants (Pty) Ltd	R&D Manager	Manager of R&D laboratory focussed on the development of mineral separation processes.
1984 – 1989	National Chemical Products Ltd	Development Manager	New business development for a large chemical company
1983 - 1984	Atomic Energy Corporation of South Africa	Engineer in Training	R&D in the nuclear fuels industry



I, the undersigned, certify that to the best of my knowledge and belief, that this data correctly describes my qualifications, my experiences, and other relevant information about myself. I will be available for the duration of this project.

A. Ram

19 January 2022



SAIMM
THE SOUTHERN AFRICAN INSTITUTE
OF MINING AND METALLURGY

Our ref: 705676

17 July 2017

This letter serves to confirm that **Robert Truter Louw** is a member of the Southern African Institute of Mining & Metallurgy.

Date of Election: 20 April 2012

Current Grade: Associate

Membership Number: 705676

Regards

Kea Shumba

Membership and Branch Liaison Administrator



CURRICULUM VITAE

Date: 19 January 2022

Name	Indiana Mann			
Date of Birth	15 December 1995			
Gender	Female			
Nationality	South African			
Education	Qualification	Institution	Years	
	Bachelor of Science in Environmental and Geographical Science	University of Cape Town	2016-2019	
	Bachelor of Science (Honours) in Atmospheric Science	University of Cape Town	2020	
	National Diploma	Payroll Administration, Payroll Education	2019	
Language Skills	Competence is indicated on a scale of 1 to 5 (1=excellent 5=basic)			
	Language	Reading	Speaking	Writing
	English	1	1	2
	Afrikaans	3	4	5
Membership of professional bodies	None			
Other Memberships	None			



Career Profile

Indiana Mann is a Climate Change Advisor at Promethium Carbon who holds an honours degree in Atmospheric Science from University of Cape Town. Her postgraduate thesis focused on the impact meteorological conditions have on pollen distribution in Cape Town. With her background in Environmental and Geographical Science and Atmospheric Science, Indiana has knowledge in climate modelling, climate change risk and vulnerability assessments and climate change policies. The projects in which she has been active include:

- Climate Change Risk and Vulnerability Assessment (CCRVA);
- Climate Change Impact Assessments (CCIA);
- The Task Force on Climate-Related Financial Disclosures (TCFD) reports; and
- Handling of weather data for necessary reports.

Project Experience

Project Type	Description	Clients/ Projects
Climate Change Risk and Vulnerability Assessment (CCRVA)	Assisting on the Climate change risk and vulnerability assessment report, specifically in terms of historical and projected weather data.	<ul style="list-style-type: none"> • Gold Fields South Deep • Gold Fields Cerro Corona
Climate Change Impact Assessments (CCIA)	Assisting in CCIA reports, specifically in terms of historical and projected climate change.	<ul style="list-style-type: none"> • GIZ CCIA for 5 tourist sites • Red – Cap Wind Farms • WSP DNG Gas-to-Power Plant • MCM – Water Use License
The Task Force on Climate-Related Financial Disclosures (TCFD) reports	Developed climate-related financial risk disclosures	<ul style="list-style-type: none"> • Ivanhoe Mine
Carbon Footprint, Reporting and Disclosure	The calculation of carbon footprints using the following standards: <ul style="list-style-type: none"> • ISO 14064 Part 1 (2006) • ISO 14064 Part 1 (2018)/ SANS 14064 Part 1 (2021) • GHG Protocol Corporate Standard 	<ul style="list-style-type: none"> • AngloGold Ashanti • Red – Cap Wind Farms • Fuch’s Lubricants • Kenmare Resources PLC • Sanlam’s Group • Avis
Carbon Management	Update records and data to measure changes in emissions at landfill sites. Furthermore, updating PoA.	<ul style="list-style-type: none"> • City of Cape Town Bellville South and Coastal Park Landfill Sites • Interwaste Landfill Site

Project Type	Description	Clients/ Projects
Carbon standard	Development of the South African Inclusive Carbon Standard (in development)	<ul style="list-style-type: none"> • Development of the South African Inclusive Carbon Standard, in partnership with Food and Trees for Africa
Carbon Credits	Eligibility study carbon credits	<ul style="list-style-type: none"> • TASC
Target Setting	Indiana worked on Beatrix project emissions calculations for the quarterly updates for 2021.	<ul style="list-style-type: none"> • Sibanye Stillwater



Key Projects

Project	Client	Year	Description
Development of the South African Inclusive Carbon Standard (in development)	-	2021 – current	Development of the South African Inclusive Carbon Standard, in partnership with Food and Trees for Africa



Employment History

Dates	Company	Position	Description
Feb 2021-Apr 2021	One Community (USA)	Volunteer	Assisting and researching sustainability projects and alternatives
Aug 2021-present	Promethium Carbon	Climate Change Advisor	Climate change and carbon management specialist advisory firm

I, the undersigned, certify that to the best of my knowledge and belief, that this data correctly describes my qualifications, my experiences, and other relevant information about myself. I will be available for the duration of this project.

19 January 2022

CURRICULUM VITAE

Date: 19 January 2022

Name	Shantal Beharie			
Date of Birth	21 February 1987			
Gender	Female			
Nationality	South African			
Education	Qualification	Institution	Years	
	Bachelor of Social Science: Geography and Environmental Management	University of KwaZulu-Natal	2006-2010	
	Bachelor of Science (Honours), Geography and Environmental Science	University of the Witwatersrand	2013-2014	
	Master of Science : Geography and Environmental Science	University of the Witwatersrand	2016-2019	
Language Skills	Competence is indicated on a scale of 1 to 5 (1=excellent 5=basic)			
	Language	Reading	Speaking	Writing
	English	1	1	1
	Afrikaans	4	3	3
	Hindi	4	4	4
Membership of professional bodies	None			
Other Memberships/courses	<ul style="list-style-type: none"> • Certified Carbon Footprint Master Class: GCX Africa, 2014 • GRI G4 Certified: SME Training Course, 2015 • Integrating Climate Risk Information into National Adaptation Plans, United Nations Institute for Training and Research, 2020 • Introduction to Sustainable Finance, Partnership for Action on Green Economy and GIZ, 2020 • Green Fiscal Policy, United Nations Institute for Training and Research and Partnership for Action on Green Economy, 2020 • Greenhouse Gas Accounting 101, World Bank Group, 2020 • Monitoring and Evaluation of Climate Change Mitigation Initiatives, World Bank Group, 2020 • Introduction to the World Bank Environmental and Social Framework, World Bank Group, 2020 • Introduction to climate-related disclosures: Starting the climate journey, Climate Disclosure Standards Board, 2021 • Introduction to scenario analysis, Climate Disclosure Standards Board, 2022 			



Career Profile

Shantal specialises in climate change adaptation, mitigation, sustainability, and policy development. She has 8 years of work experience in the field of climate change and sustainability. She has a master's degree which specifically focused on historical climate change during the 19th century by using established climate chronologies to map out climate impacts, vulnerability, coping and consequences on past societies within Southern Africa specifically within the Karoo, KwaZulu-Natal, Namaqualand, Kalahari, and Lesotho regions.

Her work experience on climate risk and vulnerability relates to assessing climate resilience on water, food security and transportation in three cities within South Africa. She has also recently worked on a climate risk and vulnerability assessment for five tourist sites in South Africa. Shantal has also gained experience in the corporate sustainability space with specific focus on ESG reporting, GRI, CDP, TCFD analysis, science-based targets, and net-zero standards for corporate companies. In addition, she has years of experience within strategic environmental projects such as compiling state of environment reports, strategic environmental assessments, and environmental management frameworks.

Her international work experience relates to UNFCCC reporting, such as compiling/reviewing Biennial Update Reports and her involvement in the National Adaptation Strategy for South Africa. Shantal has also gained regional work experience within Africa on climate change related projects, specifically across Ghana, Botswana, Zimbabwe, Lesotho and Mozambique and working with the SADC- Food Agriculture and Resource unit as a client for developing the SADC climate change yearbook in 2016 which has been published. She has also worked with the SADC Parliamentary Forum with support from the United Nations Development Programme (UNDP) on a project relating to mobilising domestic climate finance for adaptation within the SADC member states. The work involved conducting climate change adaptation finance training for SADC member states and where to access climate finance.

The key industries/projects that she had exposure to are mining, infrastructure related projects such as dam developments, pipeline projects, road upgrades, bulk supply points, transmission lines and water treatment works. She has also worked with the following clients: coal mining companies, parastatals, state-owned entities, cities, real estate (Gateway Delta), research foundations (SACN), intergovernmental organisations (SADC Secretariat and SADC Parliamentary Forum), private sector, public sector (national, provincial and local government), and development agencies such as the GIZ.

Shantal also has an established public relations profile, having contributed towards various media articles which covered best practice experiences and lessons learnt through working on projects. Her other involvement was through conference talks/presentations. Her key involvement included presenting at the South African National Committee on Large Dams and the International Association for Impact Assessment water conference in 2014, where she spoke and delivered a paper on *Addressing Social Insecurity and Involuntary Resettlement as a Result of Large Dam Projects through the Development of an Applicable Sustainability Model*. The paper was based on work undertaken for Lesotho Millennium Development Agency and lessons learnt. She has also participated in the International Association for Impact Assessment in 2015 where she spoke about climate resilience and the need to include this as part of the municipal IDP planning process.

Project Experience

Project Type	Description	Clients/ Projects
CDM/Carbon projects	The registration and verification of following CDM projects	<ul style="list-style-type: none"> • Client-Ekurhuleni Metropolitan Municipality: the Development of carbon credit documentation for two verification periods of the registered city of Ekurhuleni Landfill gas recovery project • Client-Anglo: Development of a suite of projects with carbon/socio-economic benefits
CDP, ESG, TCFD, corporate reporting, Science-based targets and Net-Zero	This involves the assistance offered to companies with respect to reporting climate change related matters to the CDP in the CDP's Climate and Water Programmes and other relevant corporate reporting such as ESG, TCFD and SBTs/Net-Zero.	<ul style="list-style-type: none"> • Gateway Delta - Development of an ESG Charter • Barrick Gold CDP (2021) • Review of the 2020 sustainability report for Centamin • GIBB Corporate sustainability report data collection and report writing • Royal Bafokeng Platinum Climate change roadmap and Science-based target • Harmony Gold Science Based Target and Net-Zero • Sun International TCFD Gap Analysis • Harmony Gold Net-Zero Approach
Policy Development	Drafting and supporting various policy development within national and provincial government.	<ul style="list-style-type: none"> • Integrated Urban Development Framework (IUDF) • Gauteng non-motorised transport masterplan • NEMA Chapter 3-Non compliance study • South Africa's National Climate Change Adaptation Strategy
UNFCCC Reporting	This involves the mandatory reporting implemented through national communications and biennial update reports for national planning and policymakers.	<ul style="list-style-type: none"> • Client-DFFE: Biennial Update Report (BUR-1) Organization Development Plan and Skills Development Plan: Establishing a BUR Management Unit

Project Type	Description	Clients/ Projects
		<ul style="list-style-type: none"> • Client-DFFE: Independent Review of South Africa's 2nd Biennial Update Report (BUR) to the United Nations Framework Convention on Climate Change (UNFCCC) • Client-DFFE: South Africa's National Climate Change Adaptation Strategy for submission to the UNFCCC
Climate Change Impact Assessments	Development of a Climate Change Impact Assessment as part of the EIA process and other larger infrastructure projects.	<ul style="list-style-type: none"> • Climate change assessment for the Implementation of Output and Performance Based Road Contracts For Upgrading Of Tatale-Xabuzugu-Yengi-Tamale Road (Section R201) • Client-Hitachi: Climate Change Impact Assessment of the Proposed Advanced Water Treatment Demonstration Project, at the existing Central Wastewater Treatment Works, Bluff, Ethekewini Municipality • Client SAPP_ Southern African Power Pool climate change impact study for Mozambique • Client-WSP- Climate change impact assessment (CCIA) for the proposed Gas-to-Power Project for Khensani based in Komatipoort, • MC Mining climate change impact assessment for the water-use licence appeal process
Climate change risk and vulnerability assessments	Assessing the exposure, vulnerability, and risk of climate change on sectors such as tourism, water, food security and transportation and prioritisation of adaptation interventions.	<ul style="list-style-type: none"> • Client-South African Cities Network: Case Studies on Cities' Climate Change Resilience on Food Security, Water Provision and Transportation

Project Type	Description	Clients/ Projects
		<ul style="list-style-type: none"> • Client-GIZ/DFFE: Climate change risk and vulnerability assessment of five tourism sites in South Africa
Strategic Projects	These are projects which are developed from policies and used to determine and evaluate environmental implications of development and inform decision-making at the project level.	<ul style="list-style-type: none"> • Client-Southern African Development Community (SADC)- Development and Publication of the SADC Climate Change Yearbook • Client-Southern African Development Community Parliamentary Forum (SADC PF) and the United Nations Development Programme -Mobilising Domestic Climate Finance for Climate Change Adaptation in SADC member states • Client-Government of Ghana: Greater Accra Spatial Development Framework-Climate Change inputs for the SEA. • Client-Department of Forestry, Fisheries and Environment (DFFE): Compilation of the third South African Environment Outlook Report- Author for the Drivers and Outlook Chapters • Client-Mpumalanga Agriculture, Rural Development, Land and Environmental Affairs: Mpumalanga State of Environment Outlook report (2019)- Author for the Climate Change Chapter • Client-Zululand District Municipality : Environmental Management Framework • Client-Transnet: Development of a

Project Type	Description	Clients/ Projects
		Strategic Environment Assessment for the Port of Cape Town • KwaZulu-Natal Aerotropolis Strategy Framework • Client-Ekurhuleni Metropolitan Municipality: Sustainability Framework for the Regional Spatial Development Framework

Key Projects

Project	Client	Year	Description
Climate Change Risk and Vulnerability Assessment for five tourist sites in South Africa	GIZ/ Department of Fisheries, Forestry and the Environment (DFFE) and the Department of Tourism	2021	Conducting climate change risk and vulnerability assessment for five tourism sites within South Africa. The sites included iSimangaliso Wetland Park, Kruger National Park, Drakensberg, Table Mountain and Robben Island.
Development of a menu of projects with a carbon/socio-economic benefit	Anglo	2021	The project entailed identifying a menu of generic local socio-economic development interventions in Anglo American's host communities that could be funded in whole or in part by carbon credits.
Harmony's Climate Change targets and Net-Zero Approach	Harmony Gold	2021	Assisting Harmony with the formulation of their decarbonisation strategy in the context of the current global drive towards Net-Zero emissions.
Analysis of Sun International's Climate Change Practices and Policies to Assess TCFD Readiness	Sun International	2021	Development of a diagnostic gap analysis report which identifies the current status of Sun International's reporting in relation to the recommendations of the Task Force on Climate-related financial Disclosures.
Preparation of RBPlat Climate Change Roadmap and Board Presentation	Royal Bafokeng Platinum	2021	Preparation of a high level climate change roadmap document indicating progress and targets for achieving climate change goals within the company.
South Africa's National Climate Change Adaptation Strategy (NAS)	Department of Fisheries, Forestry and the Environment (DFFE)	2018	Drafting and facilitating local government input into the NAS for the DFFE.
Compilation of the 3 rd South African Environment Outlook (SAEO) Synthesis Report	Department of Fisheries, Forestry and the Environment (DFFE)	2018	Compilation of the SAEO by applying the drivers-pressures-states-impact and response (DPSIR) model. My involvement in the project included drafting the chapter on drivers and inputs to responses and outlook chapters.
Southern African Development Community Climate change yearbook	SADC Secretariat	2016	Development of a yearbook focused on the progress made by the SADC



Project	Client	Year	Description
	(Food Agriculture and Natural Resources Unit)		member states in addressing climate change, specifically around climate change mitigation and adaptation in the SADC region.

Employment History

Dates	Company	Position	Description
September 2021-Current	Promethium Carbon	Climate Change Advisor	Shantal joined Promethium in September 2021, as a climate change advisor. Since joining she has worked on various projects relating to carbon, corporate reporting, climate change impact assessments, and science-based targets, Shantal's responsibility includes conducting climate change impact assessments, and drafting of carbon footprint reports, climate change vulnerability and risk assessments, CDP submissions, carbon reduction strategies and project design and monitoring.
April 2021-August 2021	Digby Wells Environmental	Social and Sustainability Consultant	As a social and sustainability consultant, Shantal was involved with various EIA/Social closure projects undertaking fieldwork and conducting social impact assessments for mining clients. Her experience also involved developing social closure plans and social baselines for mines and designing social sustainability scorecards for post mine closure processes. She has also developed skills within sustainability reporting, having worked on developing an ESG charter for Gateway Delta, CDP submissions and sustainability reporting for mining clients such as Centamin and Barrick Gold.
July 2020-April 2021	Independent researcher/consultant	Climate change researcher	Shantal spent time researching and collecting data for historical climate change impacts in the Caribbean islands for a potential PhD assignment. Additional research work included working on and structuring academic articles related to her master's project.
March 2014-July 2020	GIBB (Pty) Ltd	Sustainability Consultant	Shantal was part of the sustainability and strategic projects team conducting various projects related to climate change, strategic environmental assessments, and policy development. Her broader



			involvement within the business also included business development, marketing, proposal writing, tender sourcing and preparation, client engagements, and quality management.
June 2013- March 2014	GIBB Engineering and Architecture	Environmental Intern	Shantal Started at GIBB as an intern within the EIA unit, working on Eskom's Nuclear-1 EIA and public participation comments. She also assisted with miscellaneous tasks around tenders preparation and writing proposals.

I, the undersigned, certify that to the best of my knowledge and belief, that this data correctly describes my qualifications, my experiences, and other relevant information about myself. I will be available for the duration of this project.

Behara

19 January 2022

CURRICULUM VITAE

Date: 12 December 2022

Name	Joshua Weiss			
Date of Birth	27 October 1991			
Gender	Male			
Nationality	South African			
Education	Qualification	Institution	Years	
	Master of Science: Conservation Biology	University of Cape Town	2018-2019	
	Bachelor of Science (Honours): Ecology, Environment & Conservation	University of the Witwatersrand	2013	
	Bachelor of Science: Geography and Ecology, Environment & Conservation	University of the Witwatersrand	2010-2012	
Language Skills	Competence is indicated on a scale of 1 to 5 (1=excellent 5=basic)			
	Language	Reading	Speaking	Writing
	English	1	1	1
	Afrikaans	3	3	3
Membership of professional bodies	Professional Natural Scientist (118208), South African Council for Natural Science Professionals (SACNASP)			
Other Memberships/courses				



Career Profile

Joshua holds an MSc in Conservation Biology and a BSc Hons in Ecology, Environment and Conservation. His MSc focused on his primary interests in regional- and landscape-scale biodiversity conservation and planning by undertaking a historical analysis of spatio-temporal riparian woodland change and its drivers, in South Africa's Kruger National Park. He has cumulatively over six years of experience using GIS to conduct ecological analyses, developing sensitivity maps and cartographic design; producing several other maps for various reports in suitable and meaningful ways. As part of his role as an environmental consultant combines his technical expertise in mapping and spatial analyses and his educational background in conservation and geography.

In his previous role he was primarily responsible for the geospatial aspects and assisting with the reporting aspects of projects involving National Capital Accounting (land, ecosystem, protected area and urban accounts), natural resource mapping and ecosystem service modelling & mapping for which he used both novel desktop- and increasingly cloud-based approaches, and *InVEST* modelling software. His work also included developing scenario maps of degradation, alien invasive plant spread and general spatio-temporal vegetation change. He also has experience in utilising and displaying up-to-date modelled climate data as part of the team that reviewed South Africa's Climate Change Adaptation Plans for South African Biomes and the Biodiversity Sector Climate Change Response Strategy. For that project he led the review of previous plans and the vulnerability assessment within that project. Since working on the draft revision of the climate change adaptation plans for South Africa's biomes and biodiversity sector, he has increasingly been involved in accessing, analysing and interpreting historical and the latest projected climate data.

Joshua has also previously been involved in avifaunal monitoring and reporting, particularly in the renewable energy space, as well as scoping and EIA reporting. He has substantial field-experience in ecology and eco-tourism, working in a variety of ecosystems in South Africa, Namibia, Zambia, Zimbabwe and Finland. In his spare time he works on a mobile application providing digital solutions for recreational activities using geospatial technologies and aligning these to sustainability and enhancing land management.

Project Experience

Project Type	Description	Clients/ Projects
Climate change strategy	Compiling climate change strategies including scenario analyses usually in accordance with TCFD guidance	<ul style="list-style-type: none"> ● Mr Price Seasonal timing and length shift analysis
Climate change reports	Compiling reports detailing various components of entities' climate change strategies, projects and/or disclosures	<ul style="list-style-type: none"> ● Implats
Spatial analyses	Spatial analyses and GIS support	<ul style="list-style-type: none"> ● N'Zi River Lodge on land use change and forest dynamics for REDD+ or similar carbon credit eligibility projects ● Kenmare Resources Ecosystem carbon calculations ● Cato Ridge Development Company Ecosystem carbon calculations
CDP	Assisting organisations in assistance to companies with respect to reporting climate change-related matters to the CDP in the CDP's Climate and Water Programmes	<ul style="list-style-type: none"> ● Sibanye-Stillwater ● Pick n Pay ● Oceana ● Implats ● Clicks
Carbon Footprints	<p>The review and calculation of carbon footprints using the following standards:</p> <ul style="list-style-type: none"> ● ISO 14064 Part 1 (2006) ● ISO 14064 Part 1 (2018)/ SANS 14064 Part 1 (2021) ● GHG Protocol Corporate Standard ● GHG Protocol Scope 2 Guidance ● GHG Protocol Scope 3 Guidance 	<ul style="list-style-type: none"> ● City Lodge Hotel Group ● Front Runner
Climate Change Physical Risk Assessment	Assessment of physical climate change risks to operations	<ul style="list-style-type: none"> ● Anglo American Platinum: Physical risk assessment ● MPAMot Assessment for the Durban Logistics Hub Programme: Port of Richards Bay ● Elgin Free-range Chickens Physical risk assessment
Climate Change Impact Assessments	Compiling climate change impact assessments as part of EIA processes in accordance with NEMA	<ul style="list-style-type: none"> ● Triplo4 Karpowerships Gas-to-Power appeal ● Red Cap Mura Solar PV Plant ● ECA Coega Zone 10 Gas-to-Power

Project Type	Description	Clients/ Projects
		Plant Maydon Wharf widening <ul style="list-style-type: none"> ● Alta van Dyk Environmental Mogalakwena Platinum Mine
Climate Change Adaptation Plans	Assessing the exposure, vulnerability, and risk of climate change on sectors such as tourism, water, food security and transportation and prioritisation of adaptation interventions.	<ul style="list-style-type: none"> ● GIZ and Department of Forestry, Fisheries and the Environment (DFFE): Review of the Climate Change Adaptation Plans for South African Biomes and the Biodiversity Sector Climate Change Response Strategy
Natural Resource Management	The sustainable use of natural resources and development plans to ensure this in a feasible manner.	<ul style="list-style-type: none"> ● uMzikhulu Local Municipality: Natural resource mapping and economic valuation
Payments for Ecosystem Services (PES) / Ecosystem Services Valuation / Water Funds	Determining the economic/monetary value of ecosystem services and natural assets and determining payment mechanisms for ensuring the provisioning and sustainable supply of ecosystem services. Water funds are such a mechanism to ensure the conservation of water resources.	<ul style="list-style-type: none"> ● The World Bank: Mapping and Valuing Ecosystem Services, and Prioritising Areas for Sustainable Landscape Management in Zimbabwe ● Agence Française de Développement (AFD) and The Nature Conservancy (TNC): Design study for the creation of a Water Fund for Mombasa City ● Orange-Senqu Basin Commission: Potential feasibility for PES projects ● CRS and TNC: Business case development for the Western Area Peninsula Water Fund, Sierra Leone ● ICLEI: Economic valuation of ecosystem services for the City of Johannesburg (CoJ) ● TNC: Economic analysis of returns to investing in Resilient Development interventions in the Angolan catchment areas of the Okavango Delta
Natural Capital Accounting / Natural Capital Assessments	The development and use of accounting frameworks to provide systematic, reliable and comparable ways to measure and report of stocks and flows of natural capital.	<ul style="list-style-type: none"> ● United Nations Environment Programme (UNEP): Pilot ecosystem service accounts for South Africa

Project Type	Description	Clients/ Projects
		<ul style="list-style-type: none"> ● Stats South Africa and South African National Biodiversity Institute (SANBI): South Africa National Ecosystem Accounting ● USAID and Environmental Incentives: Natural capital assessment for selected transboundary landscapes in East Africa



Key Projects

Project	Client	Year	Description
Review of the Climate Change Adaptation Plans for South African Biomes and the Biodiversity and Ecosystems Sector Climate Change Response Strategy	GIZ and Department of Fisheries, Forestry and the Environment (DFFE)	2020-2021	Reviewing the previous Biodiversity Sector Response Plan and Climate Change Adaptation Plan for South Africa's Biomes and compiling a revised Climate Change Vulnerability Assessment and adaptation plan for the Biodiversity and Ecosystems Sector.
Natural capital assessment for selected transboundary landscapes of conservation importance in East Africa	USAID and Economic Incentives	2019-2020	
South Africa National Ecosystem Accounting	Stats South Africa and South African National Biodiversity Institute (SANBI)	2020-2022	

Employment History

Dates	Company	Position	Description
June 2022-current	Promethium Carbon	Climate Change Advisor	Joshua is primarily responsible for spatial analyses; sourcing, compiling and analysing climate data; compiling physical risk assessments and providing input into carbon footprint calculations.
August 2017-current	Forge	Director and Lead: Research and Development	Forge is a geospatial start-up that focuses on mobile- and web-based map applications. Responsible for mapping, research, client liaison and finances.
July 2019-May 2022	Anchor Environmental Consultants	Consultant: Spatial ecology and ecosystem services	Consulting as a spatial ecologist and geospatial analyst on a variety of issues dealing with ecosystem services, natural resource management and ecosystem accounting primarily in Southern Africa but also in East and Central Africa.
July 2015-December 2017	Inkululeko Wildlife Services	Junior Zoologist	GIS, mapping and spatial-analyses, field-based work and report writing.
February 2015-June 2015	GIBB (Pty) Ltd	Environmental Assistant	Environmental impact assessment report contributions

Publications

- Turpie, J.K., Letley, G.K., **Weiss, J.** And Schmidt K. 2022. Accounting for ecosystem services and asset value: pilot accounts for KwaZulu-Natal, South Africa. *One Ecosystem* 7: e86392. <https://doi.org/10.3897/oneeco.7.e86392>.
- Turpie, J.K., Letley, G., Schmidt, K., **Weiss, J.**, O'Farrell, P. And Jewitt, D. 2021. The potential costs and benefits of addressing land degradation in the Thukela catchment, KwaZulu-Natal, South Africa: NCAVES project report. <https://seea.un.org/file/19642/download?token=LBvtuR7e>.
- Turpie, J.K., Letley, G. , Schmidt, K., **Weiss, J.**, O'Farrell, P. and Jewitt, D. 2021. Towards a method for accounting for ecosystem services and asset value: Pilot accounts for KwaZulu-Natal, South Africa, 2005-2011. <https://seea.un.org/content/towards-method-accounting-ecosystem-services-and-asset-value-pilot-accounts-kwazulu-natal>.
- **Weiss, J.** 2014. Karoo thrush and frogs: Potential food source or opportunistic attack? *Ornithological Observations*, Online (http://oo.adu.org.za/pdf/OO_2014_05_101-102.pdf)
- Weiss, R., **Weiss, J.** and Weiss, A. 2013. In the Shadow of Everest, Porcupine Press, Randburg, South Africa

I, the undersigned, certify that to the best of my knowledge and belief, that this data correctly describes my qualifications, my experiences, and other relevant information about myself. I will be available for the duration of this project.

6 December 2022

SACNASP

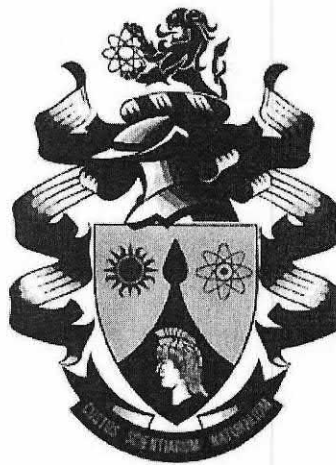
South African Council for Natural Scientific Professions

herewith certifies that
Joshua Anthony Weiss
Registration Number: 118208
is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)
Ecological Science (Professional Natural Scientist)

Effective 15 November 2017

Expires 31 March 2023



Batha

Chairperson

M. J. ...

Chief Executive Officer





CURRICULUM VITAE

Date: 19 January 2022

Name	Shannon Lee Murray			
Date of Birth	01 October 1988			
Gender	Female			
Nationality	South African			
Education	Qualification	Institution	Years	
	BA (LLB)	The University of the Witwatersrand	2007 – 2010	
	LLB	The University of the Witwatersrand	2010 – 2013	
Language Skills	Competence is indicated on a scale of 1 to 5 (1=excellent 5=basic)			
	Language	Reading	Speaking	Writing
	English	1	1	1
	Sign Language	1	3	1
	French	4	5	5
	Afrikaans	4	4	5
Membership of professional bodies	Attorney of the High Court of South Africa – Law Society of the Northern Provinces			
Other Memberships	None			

Career Profile

Shannon Murray is a climate change advisor who commenced her employment with Promethium Carbon in 2021. She completed her BA Degree in Sign Language, as well as her LLB degree through the University of the Witwatersrand. Furthermore, Shannon obtained course certificates through the Wits Mandela Institute in Energy Law, Environmental and Sustainable Development Law, Land and Water Law and International Environmental Law. Shannon was admitted as an attorney in November 2019 and practised as such for a small commercial litigation firm until September 2021. In the time that Shannon has been employed with Promethium Carbon, she has done extensive research in relation to the climate change field and has formed part of various teams within the company. She has gained experience in:

- The legal aspects of carbon credit purchase agreements;
- developing a socio-economic development project list, with climate change project funding benefits, for a global mining company;
- developing a climate change target for a listed pharmaceutical company;
- performing an eligibility assessment for a carbon credit project, including the legal aspects of the carbon credit transaction

Project Experience

Project Type	Description	Clients/ Projects
Energy Efficiency	Summarising of the S12L tax incentive in terms of the Income Tax Act	<ul style="list-style-type: none"> • SANEDI
Climate Change Impact Assessments (CCIA)	Shannon has worked on a CCIA report, specifically in terms of the legal regulatory framework.	<ul style="list-style-type: none"> • MC Mining – Water Use License
Policy Development	Updating of the Carbon and Energy Policy Statement	<ul style="list-style-type: none"> • Vedanta
ERPA interpretation	Reviewing and interpreting various ERPAs	<ul style="list-style-type: none"> • Wonderbag
Data collection	Collection and compilation of data for the Scope 3 Supplier Emissions screening	<ul style="list-style-type: none"> • Clicks Group LTD
Menu of Projects	Development of a menu of projects with a carbon/socio-economic benefit	<ul style="list-style-type: none"> • Anglo American
Eligibility Assessment Report	Eligibility Assessment of a Large scale CDM Programme of Activities: Waste-Energy-Recovery	<ul style="list-style-type: none"> • Swedish Stirling

Key Projects

Project	Client	Year	Description
Development of a menu of projects with a carbon/socio-economic benefit	Anglo American	2021	Development of a menu of projects with a carbon/socio-economic benefit
Climate Change Impact Assessment	MC Mining	2021	MC Mining climate change impact assessment for the water-use licence appeal process
Emission Reduction Purchase Agreements (ERPA)	Wonderbag	2021	Interpretation of ERPAs
Standard Operating Procedures in terms of the section 12L Tax Incentive on the online system	SANEDI	2021	Setting out the relevant regulatory framework for the section 12L tax incentive
Carbon and Energy Policy Statement	Vedanta	2021	Updating the Policy in accordance with the company's TCFD
Eligibility Assessment Report	Swedish Stirling	2021	Eligibility Assessment of a Large scale CDM Programme of Activities: Waste-Energy-Recovery
Science Based Target	Clicks Group LTD	2021	Collection and compilation of data for the Scope 3 Supplier Emissions screening

Employment History

Dates	Company	Position	Description
Oct 2021 – present	Promethium Carbon	Climate Change Advisor	
Feb 2018 – Sept 2021	Nowitz Attorneys	Candidate Attorney to Legal Practitioner / Attorney	<ul style="list-style-type: none"> • Commenced Articles in February 2018; • Admitted as an attorney in November 2019; • Practised law in the following areas: • Divorce and Family law; • Commercial litigation; • Wills, Estates and Insolvency; • Contract drafting;
Nov 2011 – Sept 2016	South African National Paralympic Rowing	Athlete	Trained with the National Squad from 2011 to 2016, while simultaneously studying an LLB and having a part-time job with a property law firm.
Oct 2014 – June 2015	Vermaak and Partners	Part-time employee fulfilling role of candidate attorney. (One cannot register articles for part-time employment).	Court process, mainly in respect of the eviction process.

I, the undersigned, certify that to the best of my knowledge and belief, that this data correctly describes my qualifications, my experiences, and other relevant information about myself. I will be available for the duration of this project.



19 January 2022



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

(For official use only)

File Reference Number:
NEAS Reference Number:
Date Received:

DEA/EIA/

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Mura Solar Photovoltaic and Electronic Grid Infrastructure Development between Loxton and Beaufort West, Western Cape and Northern Cape Provinces

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Email: EIAAdmin@environment.gov.za

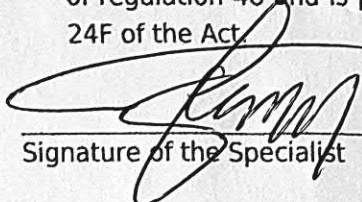
1. SPECIALIST INFORMATION

Specialist Company Name:	Johann Lanz – Soil Scientist		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100%
Specialist name:	Johann Lanz		
Specialist Qualifications:	M.Sc. (Environmental Geochemistry)		
Professional affiliation/registration:	Registered Professional Natural Scientist (Pr.Sci.Nat.) Reg. no. 400268/12		
	Member of the Soil Science Society of South Africa		
Physical address:	1a Wolfe Street, Wynberg, Cape Town, 7800		
Postal address:	1a Wolfe Street, Wynberg, Cape Town, 7800		
Postal code:	7800	Cell:	082 927 9018
Telephone:	082 927 9018	Fax:	Who still uses a fax? I don't
E-mail:	johann@johannlanz.co.za		

2. DECLARATION BY THE SPECIALIST

I, **Johann Lanz**, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

Johann Lanz - Soil Scientist (sole proprietor)

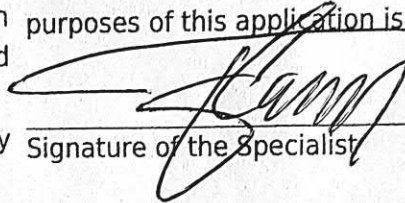
Name of Company:

Date 13/01/2023

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Johann Lanz**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



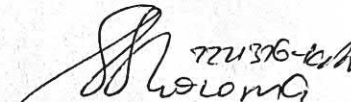
Signature of the Specialist

Johann Lanz - Soil Scientist (sole proprietor)

Name of Company

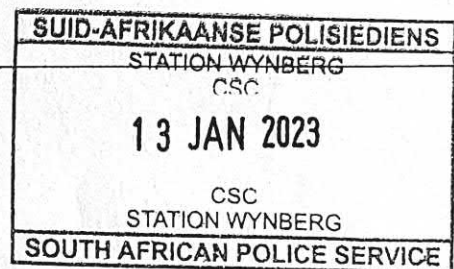
Date 13/01/2023

Date



Signature of the Commissioner of Oaths

Date





herewith certifies that

Johan Lanz

Registration Number: 400268/12

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Soil Science (Professional Natural Scientist)

Effective **15 August 2012**

Expires **31 March 2023**



A handwritten signature in black ink, appearing to read 'Botha', written over a horizontal line.

Chairperson

A handwritten signature in black ink, appearing to read 'M. Prinsloo', written over a horizontal line.

Chief Executive Officer



Johann Lanz
Curriculum Vitae

Education

M.Sc. (Environmental Geochemistry)	University of Cape Town	1996 - 1997
B.Sc. Agriculture (Soil Science, Chemistry)	University of Stellenbosch	1992 - 1995
BA (English, Environmental & Geographical Science)	University of Cape Town	1989 - 1991
Matric Exemption	Wynberg Boy's High School	1983

Professional work experience

I have been registered as a Professional Natural Scientist (Pr.Sci.Nat.) in the field of soil science since 2012 (registration number 400268/12) and am a member of the Soil Science Society of South Africa.

Soil & Agricultural Consulting Self employed 2002 - present

Within the past 5 years of running my soil and agricultural consulting business, I have completed more than 170 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, electrical grid infrastructure, urban, and agricultural developments. I was the appointed agricultural specialist for the nation-wide SEAs for wind and solar PV developments, electrical grid infrastructure, and gas pipelines. My regular clients include: Zutari; CSIR; SiVEST; SLR; WSP; Arcus; SRK; Environamics; Royal Haskoning DHV; ABO; Enertrag; WKN-Windcurrent; JG Afrika; Mainstream; Redcap; G7; Mulilo; and Tiptrans. Recent agricultural clients for soil resource evaluations and mapping include Cederberg Wines; Western Cape Department of Agriculture; Vogelfontein Citrus; De Grendel Estate; Zewenwacht Wine Estate; and Goedgedacht Olives.

In 2018 I completed a ground-breaking case study that measured the agricultural impact of existing wind farms in the Eastern Cape.

Soil Science Consultant Agricultural Consultants International (Tinie du Preez) 1998 - 2001

Responsible for providing all aspects of a soil science technical consulting service directly to clients in the wine, fruit and environmental industries all over South Africa, and in Chile, South America.

Contracting Soil Scientist De Beers Namaqualand Mines July 1997 - Jan 1998

Completed a contract to advise soil rehabilitation and re-vegetation of mined areas.

Publications

- Lanz, J. 2012. Soil health: sustaining Stellenbosch's roots. In: M Swilling, B Sebitosi & R Loots (eds). *Sustainable Stellenbosch: opening dialogues*. Stellenbosch: SunMedia.
- Lanz, J. 2010. Soil health indicators: physical and chemical. *South African Fruit Journal*, April / May 2010 issue.
- Lanz, J. 2009. Soil health constraints. *South African Fruit Journal*, August / September 2009 issue.
- Lanz, J. 2009. Soil carbon research. *AgriProbe*, Department of Agriculture.
- Lanz, J. 2005. Special Report: Soils and wine quality. *Wineland Magazine*.

I am a reviewing scientist for the *South African Journal of Plant and Soil*.



environmental affairs

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Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Mura 2 PV Project

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Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	3Foxes Biodiversity Solutions			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Simon Todd			
Specialist Qualifications:	BSc. (Zool. & Bot.), BSc Hons (Zool.), MSc (Cons. Biol.)			
Professional affiliation/registration:	SACNASP 400425/11			
Physical address:	23 De Villiers Road, Kommetjie 7975			
Postal address:	23 De Villiers Road, Kommetjie			
Postal code:	7975	Cell:	082 3326502	
Telephone:		Fax:		
E-mail:	Simon.Todd@3foxes.co.za			

2. DECLARATION BY THE SPECIALIST

I, Simon Todd, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

3Foxes Biodiversity Solutions

Name of Company:

25 October 2022

Date:

Mura 2 (PTY) LTD
Mura 2 Solar PV Facility Terrestrial Biodiversity Compliance Statement
Revision No. 1

Prepared by: 3Foxes Biodiversity Solutions

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Simon Todd, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

3Foxes Biodiversity Solutions

Name of Company

25 October 2022

Date

Signature of the Commissioner of Oaths

Date

SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

 <p>3Foxes Biodiversity Solutions ECOLOGICAL SPECIALIST SERVICES Assessment/Management/Research</p>	<p>Simon Todd Pr.Sci.Nat Director & Principle Scientist C: 082 3326502 Simon.Todd@3foxes.co.za</p> <p>23 De Villiers Road Kommetjie 7975</p>	<p>Ecological Solutions for People & the Environment</p>
--	--	--

Simon Todd is Director and principal scientist at 3Foxes Biodiversity Solutions and has over 20 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 200 different developments distributed widely across the country, but with a focus on the three Cape provinces. This includes input on the Wind and Solar SEA (REDZ) as well as the Eskom Grid Infrastructure (EGI) SEA and Karoo Shale Gas SEA. He is on the National Vegetation Map Committee as representative of the Nama and Succulent Karoo Biomes. Simon Todd is a recognised ecological expert and is a past chairman and current deputy chair of the Arid-Zone Ecology Forum. He is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

Skills & Primary Competencies

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

Tertiary Education:

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

Employment History

- 2009 – Present – Sole Proprietor of Simon Todd Consulting, providing specialist ecological services for development and research.

- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.
- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town
- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.

Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.

Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.

Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

Relevant Studies Related to the Current Project

- Nuweveld North, East and West WEFs. Fauna & Flora Specialist Study for EIA. Zutari 2021.
- Beaufort West PV Facility. Fauna & Flora Assessment. SiVest Environmental 2022.
- San Solar PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2022.
- Soventix Phase 3 PV Facility, De Aar. Fauna & Flora Assessment. Ecologes Environmental Consultants, 2022.
- Sadawa PV Facilities, Tankwa Karoo. Fauna & Flora Assessment. Savannah Environmental 2021.
- Kotulo Tsatsi PV 1 Facility near Kenhardt. Fauna & Flora Assessment. Savannah Environmental 2021.
- Hyperion 2 PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2021.



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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Email: EIAAdmin@environment.gov.za

SPECIALIST INFORMATION

Specialist Company Name:	BlueScience (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Level 4 EME	Percentage Procurement recognition
Specialist name:	Toni Belcher		
Specialist Qualifications:	M.Sc		
Professional affiliation/registration:	400040/10		
Physical address:	Unit 13 Technostell Building 9 Quantum Street Technopark Stellenbosch 7600		
Postal address:	PO Box 455, Somerset Mall		
Postal code:	7137	Cell:	082 883 8055
Telephone:	021 851 0555	Fax:	-
E-mail:	toni@bluescience.co.za		

1. DECLARATION BY THE SPECIALIST

I, Antonia Belcher, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



 Signature of the Specialist

BlueScience (Pty) Ltd

 Name of Company:

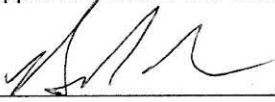
25 January 2023

 Date

Details of Specialist, Declaration and Undertaking Under Oath

2. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Antonia Belcher, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



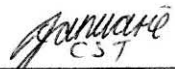
Signature of the Specialist

BlueScience (Pty) Ltd

Name of Company

25 January 2023

Date

 72460067
A. JANUARIE
CST

Signature of the Commissioner of Oaths

2023 - 01 - 25

Date



SPECIALIST EXPERTISE: ANTONIA BELCHER

Name:	Antonia (Toni) Belcher (<i>Pr. Sci. Nat</i>)
Profession:	Aquatic scientist
Nationality:	South African
Years experience:	30+ years
Professional Registration:	Professional Environmental Scientist (Pr. Sci. Nat 400040/10) Professional Ecological Science (Pr. Sci. Nat 400040/10)
Accreditation:	SASS5 (Macro-invertebrate assessment method)
Academic Qualifications:	1998 - M.Sc. in Environmental Management, Potchefstroom University (<i>cum laude</i>) 1989 - B.Sc. (Hons) in Oceanography, University of Port Elizabeth 1987 - B.Sc. – Mathematics, Applied Mathematics, University of Port Elizabeth 1984 – Matriculation, Lawson Brown High School, Port Elizabeth
Areas of specialisation:	Environmental water requirement studies River maintenance and management plans (MMP) Aquatic ecosystem monitoring and assessments Design of water quality and monitoring programmes for aquatic ecosystems Compilation of State of River reports (aquatic data collection, interpretation, presentation, graphic layout and design and preparation of technical and glossy print ready copies) Environmental Impact Assessments River classification and environmental water requirements (Ecological Reserve determinations) Integrated Water Resource Management River, Wetlands and Estuary management Water quality assessment and management reporting Water resource legislation Water resource institutions Water education
Countries Worked in:	South Africa, Namibia, Swaziland, Lesotho, Rwanda
Employment Record:	2020 – present Self-employed 2013 -2020 BlueScience (Pty) Ltd (Principal Specialist Scientist) 2007 – 2012 Self-employed 1999 – 2007 Assistant and Deputy Director, Water Resource Protection, Western Cape Regional Office, Department of Water Affairs, Cape Town 1995 – 1999 Institute for Water Quality Studies, Department of Water Affairs 1991 – 1995 Water Pollution Control Officer, Water Quality Management, Department of Water Affairs, Pretoria 1989 – 1990 Mathematics tutor and administrator, Master maths, Randburg and Braamfontein Colleges, Johannesburg 1987 – 1988 Part-time field researcher, Department of Oceanography, University of Port Elizabeth

SPECIALIST DECLARATION

I, **Antonia Belcher**, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:



Name of Specialist: Antonia Belcher

Date: 11 November 2022



environmental affairs

Department:
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REPUBLIC OF SOUTH AFRICA

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Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	WILDSKIES ECOLOGICAL SERVICES PTY LTD			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100
Specialist name:	JON SMALLIE			
Specialist Qualifications:	BSC MSC			
Professional affiliation/registration:	SACNASP 400020/07			
Physical address:	36 UTRECHT AVENUE, EATS LONDON			
Postal address:				
Postal code:	5241	Cell:	082 444 8919	
Telephone:		Fax:		
E-mail:	JON@WILDSKIES.CO.ZA			

2. DECLARATION BY THE SPECIALIST

I, J SMALLIE, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

WILDSKIES ECOLOGICAL SERVICES PTY LTD


Name of Company:

Date

18/1/2023

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, J. Smallie, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



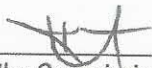
Signature of the Specialist

WILDSKIPS BIOLOGICAL SERVICES

Name of Company

18/1/2023

Date



Signature of the Commissioner of Oaths

18 JAN 2023

Date



KIM SMALLIE
Commissioner of Oaths
HR Professional (HRP)
Member number: 6404
3 Pearce Street
Berea, East London
5201



herewith certifies that
Jonathan James Smallie
Registration Number: 400020/06
is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)
Ecological Science (Professional Natural Scientist)

Effective **7 February 2006**

Expires **31 March 2023**



A handwritten signature in black ink, appearing to read 'S. Neph', is written over a horizontal line.

Chairperson

A handwritten signature in black ink, appearing to read 'N. S. ...', is written over a horizontal line.

Chief Executive Officer



JONATHAN JAMES SMALLIE

WildSkies Ecological Services (2011/131435/07)

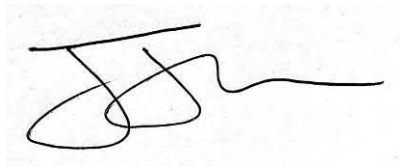
Curriculum Vitae

Background

Date of birth: 20 October 1975
Qualifications: BSC – Agriculture (Hons) (completed 1998)
University of Natal – Pietermaritzburg
MSC – Environmental Science (completed 2011)
University of Witwaterstrand
Occupation: Specialist avifaunal consultant
Profession registration: South African Council for Natural Scientific Professions

Contact details

Cell number: 082 444 8919
Fax: 086 615 5654
Email: jon@wildskies.co.za
Postal: 36 Utrecht Avenue, Bonnie Doon, East London, 5210
ID #: 7510205119085



Professional experience

IFC PS6 experience:

Amakhala Emoyeni Wind Farm – in collaboration with Simon Hulka (IFC) designed and implemented an operational phase monitoring programme and Biodiversity Monitoring & Mitigation Plan; **Golden Valley Wind Farm** – in collaboration with Leon Bennun (The Biodiversity Consultancy - TBC) compiled a Critical Habitat Assessment and Biodiversity Action Plan for the wind farm; **Jeffrey's Bay Wind Farm** – in collaboration with TBC compiled a Biodiversity Management Plan for the wind farm.

Renewable energy:

Post construction bird monitoring for wind energy facilities:

Dassieklip (Caledon) –initiated in April 2014 (2yrs); Dorper Wind Farm (Molteno) – initiated in July 2014 (5yrs); Jeffreys Bay Wind Farm – initiated in August 2014 (4yrs); Kouga Wind Farm – started Feb 2015 (2yrs); Cookhouse Wind Farm – started March 2015 (1yr); Grassridge Wind Farm – initiated in April 2015 (2yrs); Chaba Wind Farm – initiated December 2015 (1yr); **Amakhala Emoyeni 01 Wind Farm initiated August 2016 (5yrs) – IFC funded project**; Gibson Bay Wind Farm – initiated March 2017 (4yrs); Nojoli Wind Farm initiated March 2017 (4yrs); Sere Wind Farm (2yrs); Golden Valley Wind Farm (started Sep 2021 – 1 yr).

Pre-construction bird monitoring & EIA for wind energy facilities:

Golden Valley 1; Middleton; Dorper; Qumbu; Ncora; Nqamakhwe; Ndakana; Thomas River; Peddie; Mossel Bay; Hluhluwe; Richards Bay; Garob; Outeniqua; Castle; Wolf; Inyanda-Roodeplaat; Dassiesridge; Great Kei; Bayview; Grahamstown; Bakenskop; Umsobomvu; Stormberg; Zingesele; Oasis; Gunstfontein; Naumanii; Golden Valley Phase 2; Ngxwabangu; Hlobo; Woodstock; Scarlet Ibis; Albany; Golden Valley 1 2nd monitoring; Umtathi Emoyeni; **Serenje Zambia; Unika 1 Zambia;** Impofu East, West, and North; Nuweveld East, West and North; Elands Wind Farm; Ingwe Wind Farm; Hoogland Wind Farm; Cradock Wind Farm Cluster; Canyon Springs Wind Farm; Loxton Wind Farm; Taaibos Wind Farm; Aberdeen Wind Farm.

Screening studies for wind energy facilities:

Tarkastad Wind Farm; Quanti Wind Farm; Ruitjies Wind Farm; Beaufort West Wind Farm; Success Wind Farm; Cradock Wind Farm; Britstown Wind Farm; Clanwilliam Wind Farm; Ebenhezer Wind Farm.

Avifaunal walk through for wind energy facilities:

Garob Wind Farm; Golden Valley 1 wind farm; Nxuba Wind Farm.

Pre-construction bird monitoring and EIA for Solar energy facilities:

Bonnievale Solar Energy Facility; Dealesville Solar Energy Facility; Rooipunt Solar Energy Facility; De Aar Solar Energy Facility; Noupoot Solar Energy Facility, Aggeneys Solar Energy Facility; Eskom Concentrated Solar Power Plant; Bronkhorstspuit Solar Photovoltaic Plant; De Aar Solar Energy Facility; Paulputs Solar Energy Facility; Kenhardt Solar Energy Facility; Wheatlands Solar Energy Facility; Nampower CSP project; Dwaalboom PV; Slurry PV; De Hoek PV; Suikerbekkie PV; Springhaas PV.

Other Electricity Generation:

Port of Nqura Power Barge EIA; Tugela Hydro-Electric Scheme; Mmamabula West Coal Power Station (Botswana).

Electricity transmission & distribution:

Overhead transmission power lines (>132 000 kilovolts):

Oranjemund Gromis 220kv; Perseus Gamma 765kv; Aries Kronos 765kv; Aries Helios 765kv; Perseus Kronos 765kv; Helios Juno 765kv; Borutho Nzelele 400kv; Foskor Merensky 275kv; Kimberley Strengthening; Mercury Perseus 400kv; Eros Neptune Grassridge 400kv; Kudu Juno 400kv; Garona Aries 400kv; Perseus Hydra 765Kv; Tabor Witkop 275kv; Tabor Spencer 400kv; Moropule Orapa 220kv (Botswana); Coega Electrification; Majuba Venus 765kv; Gamma Grassridge 765kv; Gourikwa Proteus 400KV; Koeberg Strengthening 400kv; Ariadne Eros 400kv; Hydra Gamma 765kv; Zizabona transmission – Botswana; Maphutha Witkop 400kv; Makala B 400kv; Aggeneys Paulputs 400kv; Northern Alignment 765kv; Kappa Omega 765kv; Isundu 400kv and Substation; Senakangwedi B Integration; Oranjemund Gromis;

Overhead distribution power lines (<132 000 kilovolts):

Kanoneiland 22KV; Hydra Gamma 765kv; Komani Manzana 132kv; Rockdale Middelburg 132kv; Irenedale 132 kV; Zandfontein 132kv; Venulu Makonde 132 kV; Spencer Makonde 132 kV; Dalkeith Jackal Creek 132Kv; Glen Austin 88kv; Bulgerivier 132kv; Ottawa Tongaat 132kv; Disselfontein 132kv; Voorspoed Mine 132kv; Wonderfontein 132kv; Kabokweni Hlau Hlau 132kv; Hazyview Kiepersol 132kv; Mayfern Delta 132kv; VAAL Vresap 88kv; Arthursview Modderkuil 88kv; Orapa, AK6, Lethakane substations and 66kV lines (Botswana); Dagbreek Hermon 66kv; Uitkoms Majuba 88kv; Pilaesberg Spitskop 132kv; Qumbu PG Bison 132kv; Louis Trichardt Venetia 132kv; Rockdale Middelburg Ferrochrome 132kv; New Continental Cement 132KV; Hillside 88kv; Marathon Delta 132kv; Malelane Boulder 132kv; Nondela Strengthening 132kv; Spitskop Northern Plats 132kv; West Acres Mataffin 132kv; Westgate Tarlton Kromdraai 132kv; Sappi Elliot Ugie 132kv; Melkhout Thyspunt 132kv; St Francis Bay 66kv; Etna Ennerdale 88kv; Kroonstad 66kv; Firham Platrand; Paradise Fondwe 132kv; Kraal Mafube 132kv; Loeriesfontein 132kv; Albany Mimosa 66kv; Zimanga 132kv; Grootpan Brakfontein; Mandini Mangethe;

Valkfontein Substation; Sishen Saldanha; Corinth Mzongwana 132kv; Franklin Vlei 22kv; Simmerpan Strengthening; Ilanga Lethemba 132kv; Cuprum Burchell Moodraai 132; Oliphantskop Grassridge 132;

Risk Assessments on existing power lines:

Hydra-Droerivier 1,2 & 3 400kV; Hydra-Poseidon 1,2 400kV; Butterworth Ncora 66kV; Nieu-Bethesda 22kV; Maclear 22kV (Joelshoek Valley Project); Wodehouse 22kV (Dordrecht district); Burgersdorp Aliwal North Jamestown 22kV; Cradock 22kV; Colesberg area 22kV; Loxton self build 11kV; Kanoneiland 22kV; Stutterheim Municipality 22kV; Majuba-Venus 400kV; Chivelston-Mersey 400kV; Marathon-Prairie 275kV; Delphi-Neptune 400kV; Ingagane – Bloukrans 275kV; Ingagane – Danskraal 275kV; Danskraal – Bloukrans 275kV

Avifaunal “walk through” (EMP’s):

Kappa Omega 765kv; Rockdale Marble Hall 400kv; Beta Delphi 400kV; Mercury Perseus 765kV; Perseus 765kV Substation; Beta Turn 765kV in lines; Spencer Tabor 400kV line; Kabokweni Hlau Hlau 132kV; Mayfern Delta 132kV; Eros Mtata 400kV; Cennergi Grid connect 132kV; Melkhout Thyspunt 132kV; Imvubu Theta 400kV; Outeniqua Oudshoorn 132kV; Clocolan Ficksburg 88kV.

Strategic Environmental Assessments for Master Electrification Plans:

Northern Johannesburg area; Southern KZN and Northern Eastern Cape; Northern Pretoria; Western Cape Peninsula

Other electrical infrastructure work

Investigation into rotating Bird Flapper saga – Aberdeen 22kV; Special investigation into faulting on Ariadne-Eros 132kV; Special investigation into Bald Ibis faulting on Tutuka Pegasus 275kV; Special investigation into bird related faulting on 22kV Geluk Hendrina line; Special investigation into bird related faulting on Camden Chivelston 400kV line

Water sector:

Umkhomazi Dam and associated tunnel and pipelines; Rosedale Waste Water Treatment Works; Lanseria Outfall Sewer; Lanseria Wastewater Treatment Works;

Wildlife airport hazards:

Kigali International Airport – Rwanda; Port Elizabeth Airport – specialist study as part of the EIA for the proposed Madiba Bay Leisure Park; Manzini International Airport (Swaziland); Polokwane International Airport; Mafekeng International Airport; Lanseria Airport. Namibia Airports Company – wildlife hazard management plans for three airports.

Conservation planning:

East Cape Biodiversity Strategy & Action Plan – avifaunal input; City of Ekurhuleni Biodiversity Plan – avifaunal input.

Other sectors:

Submarine telecommunications cables project; Lizzard Point Golf Estate – Vaaldam; Lever Creek Estates housing development; East Cape Biodiversity Strategy and Action Plan 2017; Cathedral Peak Road diversion; Dube Tradeport; East London Transnet Ports Authority Biodiversity Management Plan; Leazonia Feedlot; Carisbrooke Quarry; Senekal Sugar Development; Frankfort Paper Mill;

Employment positions held to date:

- August 1999 to May 2004: Eastern Cape field officer for the South African Crane Working Group of the Endangered Wildlife Trust
- May 2004 to November 2007: National Field officer for Eskom-EWT Strategic Partnership and Airports Company SA – EWT Strategic Partnership (both programmes of Endangered Wildlife Trust)
- November 2007 to August 2011: Programme Manager – Wildlife & Energy Programme – Endangered Wildlife Trust
- **August 2011 to present: Independent avifaunal specialist – Director at WildSkies Ecological Services (Pty) Ltd**

Relevant achievements:

- Recipient of BirdLife South Africa's Giant Eagle Owl in 2011 for outstanding contribution to bird conservation in SA
- Founded and chaired for first two years – the Birds and Wind Energy Specialist Group (BAWESG) of the Endangered Wildlife Trust & BirdLife South Africa.

Conferences attended & presented at:

- 2021. African Conference on Linear Infrastructure and Environment
- 2018. Raptor Research Foundation conference, Kruger National Park.
- 2019. Conference on Wind Energy and Wildlife, Stirling, Scotland.
- 2017. Conference on Wind Energy and Wildlife, Estoril, Portugal.
- 2012-2020. Windaba Conference. Various attendance.
- May 2011. Conference of Wind Energy and Wildlife, Trondheim, Norway.
- March 2011. Chair and facilitator at Endangered Wildlife Trust – Wildlife & Energy Programme – “2011 Wildlife & Energy Symposium”, Howick, SA
- September 2010 – Raptor Research Foundation conference, Fort Collins, Colorado. Presented on the use of camera traps to investigate Cape Vulture roosting behaviour on transmission lines
- May 2010 - Wind Power Africa 2010. Presented on wind energy and birds
- October 2008. Session chair at Pan-African Ornithological Conference, Cape Town, South Africa
- March 27 – 30 2006: International Conference on Overhead Lines, Design, Construction, Inspection & Maintenance, Fort Collins Colorado USA. Presented a paper entitled “Assessing the power line network in the Kwa-Zulu Natal Province of South Africa from a vulture interaction perspective”.
- June 2005: IASTED Conference at Benalmadena, Spain – presented a paper entitled “Impact of bird streamers on quality of supply on transmission lines: a case study”
- May 2005: International Bird Strike Committee 27th meeting – Athens, Greece. Presented a paper entitled Bird Strike Data analysis at SA airports 1999 to 2004.
- 2003: Presented a talk on “Birds & Power lines” at the 2003 AGM of the Amalgamated Municipal Electrical Unions – in Stutterheim - Eastern Cape
- September 2000: 5th World Conference on Birds of Prey in Seville, Spain.

Papers & publications:

- Jenkins, A.R., Van Rooyen, C.S., Smallie, J., Harrison, J.A., Diamond, M., Smit-Robbinson, H.A. & Ralston, S. 2015. “Best practice guidelines for assessing and monitoring the impact of wind energy facilities on birds in southern Africa” Unpublished guidelines
- Ralston-Paton, S., Smallie, J., Pearson, A., & Ramalho, R. 2017. Wind energy's impacts on birds in South Africa: a preliminary review of the results of operational monitoring at the first wind farms of the Renewable Energy

Independent Power Producer Procurement Programme Wind Farms in South Africa. BirdLife South Africa Occasional Report Series No. 2. BirdLife South Africa, Johannesburg, South Africa.

- Prinsen, H.A.M., J.J. Smallie, G.C. Boere, & N. Pires. (compilers), 2011. Guidelines on how to avoid or mitigate impacts of electricity power grids on migratory birds in the African-Eurasian Region. CMS Technical Series Number XX. Bonn, Germany.
- Prinsen, H.A.M., J.J. Smallie, G.C. Boere, & N. Pires. (compilers), 2011. Review of the conflict between migratory birds and electricity power grids in the African-Eurasian region. CMS Technical Series Number XX, Bonn, Germany.
- Jenkins, A.R., van Rooyen, C.S, Smallie, J.J, Harrison, J.A., Diamond, M.D., Smit-Robinson, H.A & Ralston, S. 2014. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa
- Jenkins, A.R., Shaw, J.M., Smallie, J.J., Gibbons, B., Visagie, R. & Ryan, P.G. 2011. Estimating the impacts of power line collisions on Ludwig's Bustards *Neotis ludwigii*. Bird Conservation International.
- Jordan, M., & Smallie, J. 2010. A briefing document on best practice for pre-construction assessment of the impacts of onshore wind farms on birds. Endangered Wildlife Trust, Unpublished report
- Smallie, J., & Virani, M.Z. 2010. A preliminary assessment of the potential risks from electrical infrastructure to large birds in Kenya. Scopus 30: p32-39
- Shaw, J.M., Jenkins, A.R., Ryan, P.G., & Smallie, J.J. 2010. A preliminary survey of avian mortality on power lines in the Overberg, South Africa. Ostrich 2010. 81 (2) p109-113
- Jenkins, A.R., Smallie, J.J., & Diamond, M. 2010. Avian collisions with power lines: a global review of causes and mitigation with a South African perspective. Bird Conservation International 2010. 20: 263-278.
- Shaw, J.M., Jenkins, A.R., Ryan, P.G., & Smallie, J.J. 2010. Modelling power line collision risk for the Blue Crane *Anthropoides paradiseus* in South Africa. Ibis 2010 (152) p590-599.
- Jenkins, A.R., Allan, D.G., & Smallie, J.J. 2009. Does electrification of the Lesotho Highlands pose a threat to that countries unique montane raptor fauna? Dubious evidence from surveys of three existing power lines. Gabar 20 (2).
- Smallie, J.J., Diamond, M., & Jenkins, A.R. 2008. Lighting up the African continent – what does this mean for our birds? Pp 38-43. In Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakotomanana, H., & Muchai. (eds). Proceedings of the 12th Pan-african Ornithological Congress. 2008. Cape Town. Animal Demography Unit. ISBN (978-0-7992-2361-3)
- Van Rooyen, C., & Smallie, J.J. 2006. The Eskom –EWT Strategic Partnership in South Africa: a brief summary. Nature & Fauna Vol 21: Issue 2, p25
- Smallie, J. & Froneman, A. 2005. Bird Strike data analysis at South African Airports 1999 to 2004. Proceedings of the 27th Conference of the International Bird Strike Committee, Athens Greece.
- Smallie, J. & Van Rooyen, C. 2005. Impact of bird streamers on quality of supply on transmission lines: a case study. Proceedings of the Fifth IASTED International Conference on Power and Energy Systems, Benalmadena, Spain.
- Smallie, J. & Van Rooyen, C. 2003. Risk assessment of bird interaction on the Hydra-Droërivier 1 and 2 400kV. Unpublished report to Eskom Transmission Group. Endangered Wildlife Trust. Johannesburg. South Africa
- Van Rooyen, C. Jenkins, A. De Goede, J. & Smallie J. 2003. Environmentally acceptable ways to minimise the incidence of power outages associated with large raptor nests on Eskom pylons in the Karoo: Lessons learnt to date. Project number 9RE-00005 / R1127 Technology Services International. Johannesburg. South Africa
- Smallie, J. J. & O'Connor, T. G. (2000) Elephant utilization of *Colophospermum mopane*: possible benefits of hedging. African Journal of Ecology 38 (4), 352-359.

Courses & training:

- Successfully completed a 5 day course in High Voltage Regulations (modules 1 to 10) conducted by Eskom – Southern Region
- Successfully completed training on, and obtained authorization for, live line installation of Bird Flappers



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:	(For official use only)
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Mura Solar Photovoltaic and Electrical Grid Infrastructure Development between Loxton and Beaufort West, Western Cape and Northern Cape Provinces

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed, emailed, delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	ASHA Consulting (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 6 or non-compliant)	4	Percentage Procurement recognition
			0
Specialist name:	Dr Jayson Orton		
Specialist Qualifications:	D.Phil (Archaeology, Oxford, UK) MA (Archaeology, UCT)		
Professional affiliation/registration:	ASAPA CRM member No. 233 APHP member No. 043		
Physical address:	40 Brassie Street, Lakeside, 7945		
Postal address:	40 Brassie Street, Lakeside		
Postal code:	7945	Cell:	083 272 3225
Telephone:	021 788 1025	Fax:	n/a
E-mail:	jayson@asha-consulting.co.za		

2. DECLARATION BY THE SPECIALIST

I, JAYSON ORTON, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

ASHA CONSULTING (PTY) LTD

Name of Company:

18-01-2023

Date

Details of Specialist, Declaration and Undertaking Under Oath

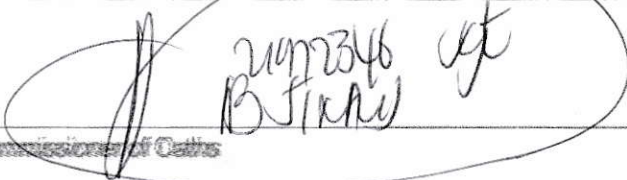
3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JAYSON ORTON, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist 

Name of Company ASHA CONSULTING (PTY) LTD

Date 18-01-2023

Signature of the Commissioner of Oaths 

Date 2023 .01.18

SOUTH AFRICAN POLICE SERVICE
KIRSTENHOF SAPS
18 JAN 2023
CSC
SUID-AFRIKAANSE POLISIEDIENS

APPENDIX 1 – Curriculum Vitae



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science) 1997	
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233

CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➤ **Memberships and affiliations:**

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 – 2017
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name: B-BBEE	NATURA VIVA CC		
	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100
Specialist name:	Dr John Edward Almond		
Specialist Qualifications:	PhD (palaeontology)		
Professional affiliation/registration:	Palaeontological Society of Southern Africa, Association of Professional Heritage Practitioners (W Cape)		
Physical address:	76 Breda Park, Breda Street, Oranjezicht, CAPE TOWN		
Postal address:	76 Breda Park, Breda Street, Oranjezicht, CAPE TOWN		
Postal code:	8001	Cell:	n/a
Telephone:	021 462 3622	Fax:	n/a
E-mail:	naturaviva@universe.co.za		

2. DECLARATION BY THE SPECIALIST

I, **Dr John Edward Almond**, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

John E Almond

Signature of the Specialist

NATURA VIVA CC

Name of Company

24 Feb 2024

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Dr John Edward Almond, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

John E Almond

Signature of the Specialist

NATURA VIVA CC

Name of Company

44 February 2023

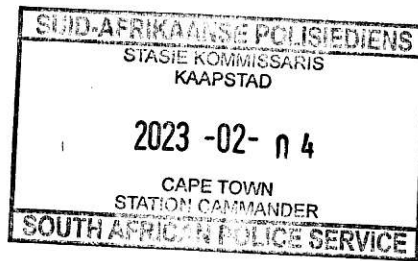
Date

L. Snyalweka

Signature of the Commissioner of Oaths

2023-02-04

Date





environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Mura Solar Photovoltaic and Electronic Grid Infrastructure Development between Loxton and Beaufort West, Western Cape and Northern Cape Provinces

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Email: EIAAdmin@environment.gov.za

1. **SPECIALIST INFORMATION**

Specialist Company Name:	qarc		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100%
Specialist name:	Quinton Lawson		
Specialist Qualifications:	BArch (Natal)		
Professional affiliation/ registration:	SACAP 3686		
Scientific Organisation Registration / Member Number	-		
Status of Registration / Membership	Current		
Physical address:	8 Blackwood Drive, Hout Bay, Cape Town		
Postal address:	As above		
Postal code:	7806	Cell:	083 309 3338
Telephone:	021 790 5119	Fax:	-
E-mail:	quinton@openmail.co.za		

2. **DECLARATION BY THE SPECIALIST**

I, **Quinton Lawson**, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Quinton Lawson

Signature of the Specialist

qarc

Name of Company:

26 / 01 / 2023

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Quinton Lawson**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Quinton Lawson

Signature of the Specialist

qarc

Name of Company

26 / 01 / 2023

Date

[Signature]

Signature of the Commissioner of Oaths

26 / 01 / 2023

Date

I certify that the DEPARTMENT has acknowledged that he / she knows and understands the contents of this affidavit, that he / she does not have any objection to taking the oath, and that he / she considers it to be binding on his / her conscience, and which was sworn to and signed before me, and that the administering oath complied with regulations contained in Government Gazette No. R 1258 of 21 July 1972, as amended.

SIGNATURE
Commissioner of Oaths
Designation: BRANCH MANAGER ex officio Republic of South Africa
Date: 26/01/23
Place: SPO HOUTBAAI
Business Address: SPO HOUTBAAI

HOUTBAAI 7872
Post Office
26 JAN 2023
FOLIO 3



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
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Email: EIAAdmin@environment.gov.za


1. SPECIALIST INFORMATION

Specialist Company Name:	Independent Economic Researchers		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
Specialist name:	Hugo van Zyl		
Specialist Qualifications:	PhD Economics		
Professional affiliation/registration:	None (N/A for socio-economic specialists)		
Physical address:	304 Commerce House, 55 Shortmarket Street, Cape Town, 8001		
Postal address:	Same as above		
Postal code:	8001	Cell:	082 578 4148
Telephone:		Fax:	
E-mail:	hugo@independentecon.co.za		

2. DECLARATION BY THE SPECIALIST

I, Hugo van Zyl, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
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- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



 Signature of the Specialist

Independent Economic Researchers


 Name of Company:

 16-01-2023

 Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Hugo van Zyl, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



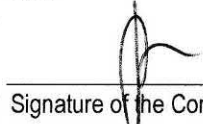
 Signature of the Specialist

Independent Economic Researchers

 Name of Company

16-01-2023

 Date



 Signature of the Commissioner of Oaths

16/01/2023

 Date

Commissioner of Oaths
Jane Dearman CA (SA)
 Membership number: 07673472
 85B Tunnery Park
 23A Belmont road
 Rondebosch 7700



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:
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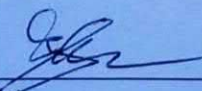
1. SPECIALIST INFORMATION

Specialist Company Name:	N/A – Independent Consultant		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100%
Specialist name:	James Kinghorn		
Specialist Qualifications:	Mecon Environmental Economics		
Professional affiliation/registration:	N/A		
Physical address:	175 Main Rd. Muizenberg, Cape Town		
Postal address:	Same as above		
Postal code:	7945	Cell:	+27740963207
Telephone:	+27740963207	Fax:	N/A
E-mail:	jameswkinghorn@gmail.com		

2. DECLARATION BY THE SPECIALIST

I, James Kinghorn, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



 Signature of the Specialist

N/A - Independent Consultant

 Name of Company:

24 Jan 2023

 Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, James Kinghorn swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

[Signature]
Signature of the Specialist

N/A - Independent consultant
Name of Company

24 - 01 - 2023
Date

MR 90435768
[Signature] Sgt
Signature of the Commissioner of Oaths

2023-01-24
Date



CV - Dr Hugo van Zyl

Tel: +27 (21) 422 3194
Mobile: +27 82 578 4148
E-mail: hugo@independentecon.co.za

Office 304, Commerce House
55 Shortmarket Street
Cape Town, 8001

Date of birth: 03-03-1972
Citizenship: South African / Canadian



INDEPENDENT
ECONOMIC RESEARCHERS

Profile and Key Expertise

Hugo Van Zyl holds a PhD in economics and has over twenty years' experience in socio-economic impact assessment and environmental resource economics. He has conducted over 70 economic and socio-economic appraisals of complex infrastructure, industrial, agricultural, mixed use, mining, energy, tourism and conservation projects in order to inform decision-making. In the process, he has built deep experience in techniques such as cost-benefit analysis and economic modelling whilst having to engage with diverse stakeholders. He has conducted, co-ordinated and published research in ecosystem services assessment and valuation, biodiversity finance and offsets, payments for ecosystem services, environmental policy reform, strategic assessment and protected area financing. In the process, he has made significant contributions to international initiatives including TEEB (The Economics of Ecosystems and Biodiversity), BIOFIN (Biodiversity Finance Initiative) and ValuES. His contributions to policy process have been relatively wide ranging and have included economic inputs and guidance to national water tariff, air pollution, biodiversity conservation and finance, biofuels, mine closure funding and climate change policy. He has also benefited from broad exposure to options for local economic development and their successful implementation. Country experience includes: South Africa, Namibia, Ethiopia, Russia, Botswana, Mauritius, Cape Verde, Seychelles, Georgia, Kazakhstan, Armenia and Nigeria.

Selected Project Experience Details in EIA and SEA

Economic and socio-economic impact assessments forming part of Environmental Impact Assessments (EIAs)

- Renewable energy:
 - Wind – Nuweveld near Beaufort West, Western Cape (2020); Ishwati Emoyeni near Murraysburg, Western Cape (2015); SWE near Vleesbaai, Western Cape (2013); SAGIT Energy Ventures near Bot River and Wolesley, Western Cape (2012). Windcurrent Banna ba Pifhu near Jeffrey's Bay, Eastern Cape (2011); InnoWind near Mossel Bay, Western Cape (2011); Mainstream near Jeffrey's Bay, Eastern Cape (2010).
 - Solar – Paulputs near Pofadder, Northern Cape (2019); Mainstream Kentani near Dealesville, Free State (2014); Mainstream near Douglas and Keimoes, Northern Cape (2012); Thupela Energy near Vaalwater, Limpopo (2011).
- Industrial developments:
 - Vedanta zinc smelter near Aggeneys, Northern Cape (2020); Oil and gas exploration drilling in PEL 34 off Luderitz coast, Namibia (2017); Upgrade and expansion of the Tsumeb copper smelter, Namibia (2017); Burgan Oil fuel storage and distribution facility at Cape Town Harbour, Western Cape (2015), Frankfort Kraft Paper Mill, Free State (2015); Expansion of the PPC cement plant at Riebeek West, Western Cape (2009); Tata Steel ferrochrome smelter in Richards Bay, KZN (2003); Conversion of the Sasol Chemical Industries plant in Sasolburg from a coal based to a natural gas based plant, Free State (2002).
- Mining:
 - Kamiesberg mineral sands mine, Northern Cape (2015); AfriSam limestone mine and plant at Saldanha Bay, Western Cape (2012); Vedanta zinc mine near Aggeneys, Northern Cape (2013); Burnstone gold mine expansion (2009); Valencia uranium mine in Namibia (2008).
- Mixed-use and residential developments:

Malmesbury Mall, Western Cape (2020); Granger Bay extension of V&A Waterfront, Cape Town (2014); Ladysmith mixed-use development, Kwa-Zulu Natal (2014); Barinor and Richmond park developments in greater Cape Town (2011); De Plaat residential estate near Velddrif, Western Cape (2009); Langezand leisure development in Struisbaai, Western Cape (2011); Garden Route Dam mixed use development in George, Western Cape (2008); Anandale mixed use development in Cape Town (2008); Schalkenbosch Golf Estate, Le Grand Golf Estate and Ceres Golf Estates (2006); Carpe Diem Eco Estate near Port Alfred, Eastern Cape (2006); Altona mixed use development in Worcester, Western Cape (2007).

➤ Roads:

N2 bypasses at Butterworth and iDutywa (2016); R44 upgrading between Stellenbosch and Somerset West (2014); Musina Ring Road, Limpopo (2011); Bloubos local road in Somerset West, Western Cape (2010); N1/N9 intersection upgrade at Colesberg, Free State (2009); tolling of the N1, N2 and R300 roads in the vicinity of Cape Town (2005); Changing road configurations on Hospital Bend in Cape Town (2001)

➤ Other infrastructure:

Langkloof Dam near Worcester, Western Cape (2022); Saldanha Regional Marine Outfall Project in Danger Bay near Saldanha Bay, Western Cape (2014); Desalination plant for West Coast District Municipality, Western Cape (2012); Green Point World Cup Stadium, Cape Town (2008); Petroline petrol pipeline between Maputo and Gauteng (2008); Muldersvlei water treatment plant and reservoir near Klappmuts, Western Cape (2007); Iron ore terminal expansion at Saldanha port, Western Cape (2000); Wastewater treatment plan for East London, Eastern Cape (1996); Vissershok landfill expansion, Cape Town (2002); Regional landfill to service Cape Town (2006 and 2012); Helderberg waste transfer station in Somerset West, Western Cape (2008).

➤ Agricultural expansion:

Farm dams and production expansion for Habata Agri in the Robertson area, Western Cape (2017); Kleinberg Dam in the Hex River Valley, Western Cape (2014).

➤ Lead author of the Western Cape Provincial Government guidelines on economic specialist inputs into Environmental Impact Assessments. (2005)

Inputs to Strategic Environmental Assessments (SEAs)

- Lead economic specialist making inputs to the Strategic Environmental Assessment for shale gas development (fracking) in South Africa (2016).
- Economic specialist inputs to form part of the Strategic Environmental Assessment for the roll-out of electricity transmission infrastructure throughout South Africa. (2015)
- Environmental resource economic and socio-economic specialist study to form part of the Strategic Environmental Assessment and accompanying management plan for the Port of Saldanha, Western Cape. (2013)
- Lead author of a Strategic Environmental Assessment (SEA) of the potential production of biofuels based on Jatropha in the Kavango and Caprivi regions of Namibia. (2010)
- Environmental resource economics specialist study to form part of the Strategic Environmental Assessment and accompanying Environmental Management Framework for the Pixley ka Seme municipality in Mpumalanga. (2010)
- Environmental resource economics specialist study to form part of the Strategic Environmental Assessment and accompanying Environmental Management Framework for the Albert Luthuli and Msukaligwa municipalities in Mpumalanga. (2008)

James Kinghorn

Environmental Economics Researcher

175 Main Rd, Muizenberg, South Africa

(+27) 74 096 3207

jameswkinghorn@gmail.com

[linkedin.com/in/james-kinghorn-62b4b63/](https://www.linkedin.com/in/james-kinghorn-62b4b63/)



I have contributed economic and socio-economic specialist inputs to a total of seventeen environmental and social impact assessments (ESIAs); conducted economic and financial analysis in support of eight Green Climate Fund (GCF) and Global Environment Facility (GEF) funding proposals and projects; and provided strategic research and analysis to inform environmental policy and natural resource management, primarily in African countries.

My education and employment history are provided below, followed by more detailed information on previous and ongoing Environmental Impact Assessments.

Education

Rhodes University, South Africa

MEcon Environmental Economics (awarded with distinction), 2011 – 2012

BSc(hons) Economics & Geography (joint), 2007 – 2010

Telford College, Scotland

Scottish Higher Mathematics, 2006

Various online

Short courses in econometrics, regional science, behavioural economics

Employment history

Freelance Researcher [2021 – present](#)

- Economic cost-benefit analysis in support of Protected Area planning and financing
- Research into community-based natural resource management, governance, livelihoods and wellbeing
- Agriculture and wildlife sector market research and value-chain analysis

Researcher [Independent Economic Researchers, 2015 – present](#)

- Municipal and national-level project appraisal for renewable energy, fisheries, mining and agriculture projects
- Planning and implementation of biodiversity finance solutions
- Valuation of ecosystem services to inform land-use decisions
- Economic analysis of climate change mitigation policy

Environmental Economist [C4 EcoSolutions, Jan 2020–Dec 2020](#)

- Economic and financial analysis in support of projects developing funding proposals and feasibility studies for Green Climate Fund (GCF) and Global Environment Facility (GEF)-funded projects.

Programme Manager [Samaritan's Purse International Relief, 2013 – 2019](#)

- Spent two years in South Sudan, where I managed South Sudan's largest general food distribution contract under the World Food Programme (WFP) and led one of the first Mobile Food Distribution Teams in response to conflict-disrupted food supply chains.
- Deployed as part of Disaster Assistance Response Teams (DARTs) in response to crises in Dominica, Greece, Mozambique and Nepal. Experienced in food and non-food item distribution, nutrition programming, water, sanitation and hygiene programmes, ocean freight and air service logistics, fleet management, warehousing and medical logistics support programmes.

- Oversaw programme implementation and reporting for projects funded by UNHCR, WFP, USAID/OFDA, Start Network, in collaboration with ICRC, MSF and other partners

Other roles include Intern at [South African National Parks](#); Research Assistant at the [Southern African Institute for Aquatic Biodiversity](#); Research Assistant at the [Rhodes University Rural Fisheries Programme](#); Processing Clerk at [HSBC Plc](#).

Economics specialist inputs to environmental processes

Renewable energy and powerline Environmental Impact Assessments (EIAs)

- Wind – Ezelsjacht, Winelands, Western Cape (ongoing), Hoogland, Karoo Highlands, Western Cape (ongoing) Nuweveld, Karoo Highlands, Western Cape (2021); Bann aba Pifhu, Eastern Cape (2019)
- Solar – Padloper, Central Karoo, Western Cape (ongoing); Nuweveld Mura, Karoo Highlands, Western Cape (ongoing); Paulputs PV, near Pofadder, Northern Cape (2018)
- Green hydrogen – Taaibosch energy cluster, Northern Cape (ongoing)
- Powerlines – Hoogland Grid Connection, Western Cape (ongoing); Nuweveld Grid Connection, de Jager's Pass, Western Cape (2021); Impofu Grid Connection, near Gqeberha, Eastern Cape (2019); Paulputs Grid Connection, Northern Cape (2018)

Infrastructure, agricultural and mixed-use development EIAs

- Farm dams and production expansion in Langkloof, near Worcester, Western Cape (2019); Assessment of economic benefits for the TAHAL Integrated Agriculture Projects, Angola (2019); Malmesbury Shopping Mall and Private Hospital, Western Cape (2019); Farm dams and production expansion for Habata Agri in the Robertson area, Western Cape (2017); N2 bypasses at Butterworth and iDutywa, Eastern Cape (2016)

Industrial development and mining EIAs

- Vedanta zinc Smelter-Refinery Complex near Aggeneys, Northern Cape (2018); Oil and gas exploration drilling in PEL 34 off Luderitz coast, Namibia (2017); Upgrade and expansion of the Tsumeb copper smelter, Namibia (2017)

Shale gas development Strategic Environmental Assessment: Economics specialist study (2016)

- Provided inputs to the SEA through a consideration of the potential positive impacts in terms of the growth and development of local and regional economies,
- Considered potential negative impacts in terms of pressure on public finances at the municipal level, as well as environmental externalities as reflected in property values