

# CURRICULUM VITAE



## STUART HEATHER-CLARK

TECHNICAL DIRECTOR  
AFRICA POWER SECTOR LEAD

Environmental Management Planning & Approvals,  
Africa

### QUALIFICATIONS

Masters	1996	Environmental Science
BSc (Hons)	1992	Civil Engineering
EAPASA	2019	Registered Environmental Assessment Practitioner SA # 2019/613

### EXPERTISE

- Environmental and Social Impact Assessment
- Environmental Management Plans/Programmes
- Public Participation & Facilitation
- Environmental & Social Due Diligence
- Environmental & Social Screening & Site Selection
- Training and Capacity Building
- Strategic Environmental Assessment

Stuart has over 24 years of environmental and social consulting experience in Africa. Having worked on over 130 development projects in Africa, his key strength is identifying and managing ESG risks for major capital projects from the concept phase through to the pre-feasibility, feasibility and implementation phases.

Through leading Environmental & Social Screening Studies, Environmental & Social Impact Assessments and Environmental & Social Due Diligences for major capital project in over 13 African countries; Stuart has developed a deep appreciation of key sustainability challenges facing development in Africa. He has excellent project management skills with the ability to manage projects from the concept phase through to project completion.

Stuart has worked for and with a number of IFI's, DFI's and PE firms to identify and managing ESG risks of their investments in Africa. He has an integral knowledge of the Equator Principles and IFC Performance Standards and understands the expectations of lenders and financial institutions when it comes to managing ESG risks.

Stuart has worked across various sectors including O&G, mining, infrastructure and power. Over the past ten years he has focussed on the power sector leading projects for wind farms, solar PV plants, hydropower plants and gas to power plants. More recently he has advised various clients on the regulatory challenges for green hydrogen projects in Southern Africa.

### PROJECTS

#### All Sectors

**ESIA for a 2GW solar PV plant and associated Green Hydrogen Project, South Africa, Confidential Client (2021-22)**

Project Director for an ESIA for a Green Hydrogen project including 2GW solar PV generation, transmission, desalination plant, water pipeline, electrolysis and hydrogen storage, ammonia production and storage and associated port facilities.

**ESIA for full scale Hydrogen Production Facility on the Mogalakwena Platinum Mine in South Africa (2022)**

Project Director for an ESIA for the Anglo American's Full Scale Hydrogen Production Plant at Mogalakwena Platinum Mine in South Africa. The project forms part of Anglo American's NuGen™ programme as part of their FutureSmart Mining™ programme in order to develop a hydrogen-powered mining truck fleet in collaboration with leading fuel cell, electrolyser, battery and engineering firms.

<p><b>ESIA for a Hybrid Solar PV-BESS-Green Hydrogen Fuel Cell Power Plant in Swakopmund, Namibia (2022)</b></p>	<p>Project Director for an ESIA for the establishment of the Renewstable® Swakopmund project, that will generate consistent, reliable, and clean renewable power from an intermittent source of energy. The Hybrid Power Plant consists of a 85 MW solar PV plant, Battery Energy Storage System, a desalination plant, electrolysis plant, hydrogen storage, a 6MW hydrogen fuel cell, substations and transmission lines.</p>
<p><b>Environmental and Social Alternatives Assessment for a 5GW Green Hydrogen Project, Namibia, Confidential Client (2022)</b></p>	<p>Project Director for an Environmental and Social Alternatives Assessment for a 5GW Green Hydrogen Project, Namibia. The project includes 5GW's of wind and solar PV generation, battery energy storage, transmission, desalination plant, water pipeline, electrolysis and hydrogen storage, ammonia production and storage and associated port facilities.</p>
<p><b>Regulatory Review for the permitting of green hydrogen and ammonia projects in South Africa, Confidential Client (2021)</b></p>	<p>Project Director for the regulatory review for permitting of green hydrogen and ammonia projects in South Africa.</p>
<p><b>Environmental and Social Screening and constraints mapping for a 5GW green hydrogen project, Namibia, Confidential Client (2021)</b></p>	<p>Project Director for an environmental and social screening and constraints mapping for green hydrogen project in response to the Namibian Governments RFP to conduct feasibility activities within the Tsau//Khaeb (Sperrgebiet) National Park for Renewable Wind Energy. NIPDB/RFP/SCDI/2021-001.</p>
<p><b>Position Paper of the green hydrogen market in South Africa, Confidential Client (2021)</b></p>	<p>Researcher and lead author for a position paper on the green hydrogen market in South Africa including global trends and South African environmental regulatory requirements.</p>
<p><b>ESIA for four 250MW wind energy facilities and associated transmission lines, Red Cap (2021)</b></p>	<p>Project Director for the ESIA for 4 x 250MW wind energy facilities and associated transmission line. The ESIA includes terrestrial and aquatic biodiversity, avifauna and bat monitoring, visual, social and heritage baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP.</p>
<p><b>Environmental and Social Screening Study for a Wind Energy Facility to provide power to a green hydrogen facility, Confidential Client (2021)</b></p>	<p>Project Director for an Environmental and Social Screening Study for a Wind Energy Facility to provide power to a green hydrogen facility on the east coast of South Africa.</p>
<p><b>E&amp;S Advisory (RMIPPPP) for the establishment of a 450MW OCGT Power Plant in Richards Bay, Confidential Client, (2020)</b></p>	<p>Project Director for advisory services for the development of a 450MW LPG OCGT Power Plant in Richards Bay. Advisory services included the review of the Final Scoping Report and all associated documents.</p>
<p><b>Environmental Authorisation Amendment (RMIPPPP) for a 1500MW OCGT/CCGT Power Plant in Atlantis, Confidential Client, South Africa (2020)</b></p>	<p>Project Director for the Amendment of the Environmental Authorisation for the change of the project from an 1500MW OCGT/CCGT Power Plant using LNG as a fuel source, to a 400MW OCGT power plant using LPG as a fuel source. EA Amendment includes undertaking revised air quality, noise, risk assessment, climate change, flora and heritage studies. Process includes stakeholder engagement.</p>

<p><b>Environmental Authorisation Review (RMIPPPPP) for a 1507MW OCGT/CCGT Power Plant in Saldanha Bay, Confidential Client, South Africa (2020)</b></p>	<p>Project Director for the review of the Environmental Authorisation for the change of Phase 1 of the project from OCGT Power Plant using LNG as a fuel source, to a OCGT power plant using LPG as a fuel source. EA Amendment includes undertaking revised air quality, noise, risk assessment, climate change, flora and heritage studies. Process includes stakeholder engagement.</p>
<p><b>ESIA for 4 x 100MW solar PV plants and associated transmission lines, Freestate, South Africa, Confidential client, (2020 - 21)</b></p>	<p>Project Director for the ESIA for 4 x 100MW solar PV Plants associated transmission line. The ESIA includes terrestrial and aquatic biodiversity, avifauna, visual, social and heritage baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP.</p>
<p><b>Environmental and Social Impact Assessment for a 20MW solar PV plant and transmission line, Gigawatt Global, Liberia, (2020)</b></p>	<p>Project Director for the ESIA a 20MW solar PV plant and associated transmission line. The ESIA includes biodiversity, social and heritage baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP. The ESIA will be aligned with the IFC Performance Standards.</p>
<p><b>ESIA for an 80-200 MW wind farm development, Mphepo Power, Zambia (2019-20)</b></p>	<p>Project Director for the ESIA for the development of a wind farm in Zambia. The ESIA included terrestrial and aquatic, social, heritage, noise and visual baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP. The ESIA was aligned with the IFC Performance Standards.</p>
<p><b>Environmental and Social Impact Assessment for a Road Upgrade, QGMI, Ghana, (2019-20)</b></p>	<p>Project Director for the Scoping Phase of the Environmental and Social Impact Assessment process for the proposed Winneba Obetsebi-Lamptey Flyover (Phase 2) project in Accra, Ghana in collaboration with local consultants. The project included additional visual impact assessment, air quality modelling and noise modelling. All work undertaken to IFC Performance Standards.</p>
<p><b>Environmental and Social Impact Assessment (ESIA) for the Gamsberg Mine Zinc Smelter, Black Mountain Mine (Vedanta), South Africa (2019-20)</b></p>	<p>Project Director for the ESIA for a new zinc smelter and associated infrastructure to beneficiate the 250 000 to 300 000 tpa of zinc concentrate produced at the Gamsberg Zinc Mine Phase-1 concentrator plant. The ESIA included extensive baseline studies including biodiversity, social, air quality, noise, visual, hydrology, geohydrology, and climate change. The process included extensive stakeholder engagement during the scoping and impact assessment phase.</p>
<p><b>ESIA Scoping Phase for the desalination plant and water carrier system, NamWater, Windhoek Namibia (2019-20)</b></p>	<p>Team member for the ESIA Scoping Phase for the proposed desalination plant and water carriage system to secure water supply to the central coast, Windhoek and en-route users. The Scoping Process included extensive stakeholder engagement and the Scoping Report was aligned with the KfW Sustainability Guidelines and World Bank Environmental and Social Standards.</p>
<p><b>Environmental &amp; Social Due Diligence for 5MW solar PV plant, Confidential Client, Namibia (2019)</b></p>	<p>Project Director for an Environmental and Social (E&amp;S) Due Diligence (Red Flags only) of a 5 MW solar PV facility located near Outapi, Namibia.</p>
<p><b>Environmental &amp; Social Screening Study for 20MW solar PV plant, CIGenCo, Eswatini (2019)</b></p>	<p>Project Director for an Environmental and Social (E&amp;S) Screening Study of two potential sites for development of solar PV projects as part of CIGenCo's bid as part of the Eswatini Independent Power Producers Policy (ESIPPP).</p>

<p><b>Permitting Strategy and Planning for the Rovuma LNG Project in Mozambique, ExxonMobil, Mozambique (2018-2019)</b></p>	<p>Team member supporting Exxon with the permitting strategy and plans for the Rovuma LNG Project in northern Mozambique.</p>
<p><b>Environmental and Social Impact Assessment (ESIA) Gap Analysis for a 50MW solar PV Plant, Volt Renewable, Zimbabwe (2018)</b></p>	<p>Environmental lead for the review of the locally approved EIA against the IFC Performance Standards. Gaps were identified and an Environmental and Social Action Plan (ESAP) developed to close the gaps.</p>
<p><b>Environmental and Social Impact Assessment (ESIA) Gap Analysis for a 5-star hotel development, Motal-Engil, Zimbabwe (2018)</b></p>	<p>Environmental lead for the review of the locally approved EIA against the IFC Performance Standards. Gaps were identified and an Environmental and Social Action Plan (ESAP) developed to close the gaps.</p>
<p><b>Environmental and Social Screening Study for a 100MW hybrid HFO and Solar PV Power Plant for a mine in Mali, Confidential client (2018)</b></p>	<p>Environmental lead for the screening of environmental and social risks for the development of a solar PV plant on a mine in Mali.</p>
<p><b>Environmental and Social Screening Study for 3 x 40MW solar PV plants, Confidential Client, GETFIT Zambia (2018)</b></p>	<p>Project Manager for an environmental and social screening study for 3 x solar PV sites in Zambia. The Screening Study included the review of desk top information and site visits to assess environmental and social risks. A comparative analysis was undertaken to select the site with the least environmental and social risks. This was combined with the technical analysis to select the preferred site to be taken into more detailed studies.</p>
<p><b>Environmental and Social Impact Assessment for a 40MW solar PV farm for Goldfield's South Deep Mine, Enel Green Power, South Africa (2017)</b></p>	<p>Project Director for an Environmental and Social Impact Assessment for a 40MW solar PV plant for Goldfield's South Deep Mine in South Africa. The study included scoping and stakeholder engagement, various specialist studies and the compilation of an ESIA Report and ESMP.</p>
<p><b>Environmental and Social Impact Assessment for 2 run-of-river Hydropower Plants and associated transmission lines in Northern Zambia, Globeleq, Zambia (2017)</b></p>	<p>Project Director for an Environmental and Social Impact Assessment for 2 run-of-river hydropower plants and associated transmission lines on the Kalungwishi River in Northern Zambia. The study included scoping and stakeholder engagement, various specialist studies including environmental flow, heritage, social, biodiversity, visual, noise and other studies. All work was undertaken to IFC Performance Standards. The project was put on hold after the baseline and Scoping Phase.</p>
<p><b>Environmental and Social Screening Study for an 212MW HFO Power Plant, Confidential Client, Angola (2017)</b></p>	<p>Project Director for an Environmental and Social Screening Study for a 212MW HFO Power Plant in Angola. The study included noise and air quality baseline sampling, soil and groundwater baseline sampling, community health screening, and the compilation of a detail legal register and compliance road map.</p>



<b>Environmental and Social Screening Study for a Hydropower Plant in Gabon, Confidential Client, Gabon (2017)</b>	Environmental and Social Screening Study for a Hydropower Plant in Gabon, Confidential Client, Gabon, 2017
<b>Environmental and Social Due Diligence (ESDD) for two Solar PV and two Wind Farm Projects South Africa, Confidential Client, South Africa (2017)</b>	Project Director for the ESDD for two Solar PV and two Wind Farm Projects in South Africa.
<b>Environmental, Health and Safety Risk assessment of four Solar PV sites in South Africa, Enel Green Power, South Africa (2017)</b>	Project Director for the EHS Risk Assessments.
<b>Environmental and Social Impact Assessment for a 100MW to 250MW solar PV Plant, Globeleq, Zambia (2016-17)</b>	Project Director for an Environmental and Social Impact Assessment for a 100MW to 250MW solar PV plant in Zambia. The study included the analysis of key environmental and social impacts, compilation of an ESIA and ESMP reports and stakeholder engagement.
<b>Environmental and Social Screening Study for a solar PV Plant, Confidential client, Zambia (2016)</b>	Project Director for an Environmental and Social Screening Study for the establishment of solar PV power plant in Zambia. The study included the analysis of key environmental and social risks including regulatory, biodiversity and social risks.
<b>Environmental and Social Due Diligence, Six Solar PV Farms, Confidential Client, South Africa (2016)</b>	Project Director for an ESDD for six solar pv farms in South Africa. The ESDD was undertaken against SA Legislation and Regulations and IFC Performance Standards.
<b>Environmental and Social Impact Assessment for a CCGT Power Plant, ArcelorMittal, South Africa (2016)</b>	Project Director for an Environmental and Social Impact Assessment study for the establishment of a 1500MW CCGT power plant for ArcelorMittal in Saldanha Bay, South Africa. The ESIA includes detailed specialist studies including air emissions modelling, noise modelling, biodiversity and heritage assessment. Full stakeholder engagement is also part of the scope of work.
<b>Environmental and Social Management Plans, Wind Farm Development, Confidential Client, Kenya (2016)</b>	Project Director and involved in advising the client on various strategies including vantage point bird monitoring and management plan development.
<b>Environmental and Social Screening Study of potential solar PV sites, Confidential Client, Ivory Coast (2016)</b>	Environmental and Social Screening Study of potential solar PV sites, Confidential Client, Ivory Coast, 2016
<b>Environmental and Social Impact Assessment for the Tete-Macuse Railway Line and Macuse Power Development, Italthai, Mozambique (2015-17)</b>	Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Tete-Macuse railway line and Macuse Port development for the export of coal from Tete Province in Mozambique. The project included the development of over 700km of railway line and a new port development.

<b>Strategic Environmental Assessment for the supporting infrastructure for the Baynes Hydropower Project, Baynes PJTC, Namibia/Angola (2014-15)</b>	Project Director for the Strategic Environmental Assessment of the associated infrastructure for the Baynes hydropower project. The SEA covered the assessment of access roads for construction, transmission lines routing in Angola and Namibia and locations of an airfield.
<b>Cumulative Impact Assessment of the development of numerous hydropower plants on the Kwanza River, Odebrecht, Angola (2014-15)</b>	Project Director for the Cumulative Impact Assessment of the development of a number of hydropower plants on the Cuanza River in Angola.
<b>Environmental and Social Impact Assessment for the Batoka Gorge Hydropower Project, ZRA, Zambia/Zimbabwe (2014-15)</b>	Advisor to the ESIA team undertaking the Environmental and Social Impact Assessment (ESIA) for the proposed Batoka Gorge Hydropower Plant on the Zambezi River below the Victoria Falls. The project includes the construction of a dam wall, hydropower plants, transmission lines and associated infrastructure. The ESIA is being conducted in alignment with the IFC Performance Standards and the World Bank Safeguard Policies.
<b>Environmental and Social Impact Assessment for the Rehabilitation of the Kariba Dam Wall, ZRA, Zambia/Zimbabwe (2014-15)</b>	Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Kariba Dam Rehabilitation Project. The project includes the rehabilitation of the plunge pool and spillway of the dam wall. The project is being funded by the World Bank, African Development Bank and the EU.
<b>Environmental and Social Due Diligence (ESDD) for a 98 MW wind farm in South Africa, Confidential Client, South Africa (2015)</b>	Project Director for the ESDD.
<b>Environmental and Social Due Diligence (ESDD) for a 2 x 75 MW solar pv farm in South Africa, Confidential Client, South Africa (2015)</b>	Project Director for the ESDD.
<b>Environmental and Social Due Diligence (ESDD) for a 74 MW wind farm in South Africa, Confidential Client (2015)</b>	Project Director for the ESDD.
<b>Environmental and Social Screening Study for a CCGT Power Plant, Confidential Client, South Africa (2015)</b>	Project Director for an Environmental and Social Screening study for the establishment of a gas power plant in Saldanha Bay, South Africa. The screening study outputs included a permitting strategy, environmental opportunities and constraints maps, and input into the site selection process.
<b>Environmental and Social Impact Assessment for Floating Power Plants in the Port of Richards Bay, Department of Energy IPP Office, South Africa (2015-16)</b>	Project Director for the ESIA for the establishment of Floating Power Plants in the Ports of Richards Bay in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.
<b>Environmental and Social Impact Assessment for Floating Power Plants in the Port of Richards Bay, Department of Energy IPP Office, South Africa, (2015-16)</b>	Project Director for the ESIA for the establishment of Floating Power Plants in the Ports of Saldanha in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.

<p><b>Environmental and Social Impact Assessment (Scoping Phase) for LNG Import Terminal in the Port Richards Bay for the Gas to Power Programme, Department of Energy IPP Office, South Africa (2015-16)</b></p>	<p>Project Director for the ESIA for the establishment of LNG Import Terminals as part of the DoE's Gas to Power Programme in South Africa. The ESIA (Scoping Phase) included scoping of detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.</p>
<p><b>Environmental and Social Impact Assessment (Scoping Phase) for LNG Import Terminal in the Port Saldanha for the Gas to Power Programme, Department of Energy IPP Office, South Africa, (2015-16)</b></p>	<p>Project Director for the ESIA for the establishment of LNG Import Terminals as part of the DoE's Gas to Power Programme in South Africa. The ESIA (Scoping Phase) included detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.</p>
<p><b>Environmental and Social Screening study for the establishment of an CCGT power plant in the Ports of Richards Bay, Confidential client, South Africa (2015)</b></p>	<p>Project Director for an Environmental and Social Screening Study for the establishment of a CCGT power plant in Richards Bay, South Africa. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing and compares the opportunities and constraints associated with the two locations.</p>
<p><b>Environmental and Social Screening study for the establishment of an CCGT power plant in the Port of Saldanha, Confidential client, South Africa (2015)</b></p>	<p>Project Director for an Environmental and Social Screening Study for the establishment of a CCGT power plant in Saldanha Bay, South Africa. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing and compares the opportunities and constraints associated with the two locations.</p>
<p><b>Environmental and Social Screening study for the establishment of an SCGT power plant in the Ports of Saldanha, Confidential client, South Africa (2015)</b></p>	<p>Project Director for an Environmental and Social Screening Study for the establishment of an SCGT power plant in the Port of Saldanha. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing.</p>
<p><b>Environmental and Social Impact Assessment for the Burgan Oil Fuel Storage Depot in the Port of Cape Town, Burgan Oil, South Africa (2014-15)</b></p>	<p>Project Director for the ESIA for the Burgan Oil Fuel Storage Depot in the Port of Cape Town.</p>
<p><b>Millennium Challenge Account – Malawi: Infrastructure Development Project – Energy Sector (hydropower plants, transmission and distribution lines and substations), MCC, Malawi (2014-15)</b></p>	<p>Environmental Lead for the Independent Engineer to review all the Contracting Engineers environmental and social studies associated with the Infrastructure Development Project. The project includes the upgrade and development of new power infrastructure including hydropower plants, transmission lines, distribution lines and substations.</p>
<p><b>Strategic Environmental Assessment of the New Town Integrated Development Zone, TFM Mining, Katanga Province, DRC (2014)</b></p>	<p>Project Director for the Strategic Environmental Assessment of the New Town Integrated Development Zone undertaken for Tenke Fungurume Mining (TFM) in Katanga Province, DRC.</p>

<p><b>Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine, South Africa, Black Mountain Mine (Vedanta) (2012-13)</b></p>	<p>Project Director for the Environmental and Social Impact Assessment for a new Zinc Mine in the Northern Cape Province in South Africa. The ESIA includes the assessment of the mine and all associated infrastructure including waste rock dumps, tailing dams, processing plant, transmission lines, a new township development, upgrade of a water pipeline and associated water treatment facilities, and transport options to the Port of Saldanha via both road and rail. The ESIA is being undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act. The process includes various specialist studies, full stakeholder engagement as well as integration with a Biodiversity Off-sets process.</p>
<p><b>Environmental and Social Impact Assessment for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure, South Africa (2012)</b></p>	<p>Project Director for the ESIA for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure in the Northern and Eastern Cape, South Africa.</p>
<p><b>Ore Line Expansion Project for the Sishen-Saldanha Ore Line and Port of Saldanha, various Mining Companies and Transnet, South Africa (2011-2012)</b></p>	<p>Project Director for the Environmental and Social Screening Study for the Pre-feasibility Phase of the Ore Line Expansion Project. This included compiling a detail Environmental and Social Design Criteria Report together with initial Stakeholder Engagement. A detailed multi-criteria assessment for various port and stockpile options was undertaken. The project included upgrading over a 1000 km of railway line and upgrading the port facilities including stockpiles, stacker-reclaimers, conveyors and ship loading facilities. The stakeholder engagement process was specifically designed to obtain buy-in from stakeholder who were strongly opposed some components of the port and rail expansion.</p>
<p><b>Strategic Environmental Assessment for the Mozambican Regional Gateway Programme, MRGP, Mozambique, Malawi, Zambia, Zimbabwe (2012)</b></p>	<p>Project Director for the SEA of the MRGP. The MRGP aims to support the improvement of the Southern African transport (roads, rail and ports), regional infrastructure network, which uses Mozambique as a gateway for international trade. The MRGP geographic scope encompasses the Beira and Nacala Transport Corridors and the respective links to the Maputo and Limpopo Corridors. The SEA identified environmental and social issues that need to be considered in the long terms planning an implementation of the rail and port infrastructure that makes up the Beira and Nacala Transport Corridors.</p>
<p><b>Strategic Environmental Assessment (SEA) for the coastline of Mozambique, MICOA, Mozambique (2012)</b></p>	<p>Adviser on the SEA for the coast of Mozambique. The SEA aims to identify potential conflicts between various uses of the coastal zone and to recommend strategic interventions to facilitate sustainable development within the coastal zone. Various users of the coastal zone that are being considered include off-shore oil and gas operations, coastal mining, tourism, conservation and artisanal and industrial fishing.</p>
<p><b>Environmental and Social Screening Study for port options in Pemba Bay, Anadarko, Mozambique (2012)</b></p>	<p>Project Lead for an Environmental and Social Screening Study for various port options in Pemba Bay. The screening study includes a multi-criteria assessment of various port locations taking into account marine and terrestrial ecology, social issues, land ownership, legal aspects and physical marine conditions.</p>
<p><b>Environmental and Social Impact Assessment for a LPG import and distribution facility, Sunrise Energy, South Africa (2011-2012)</b></p>	<p>Project Director for the Scoping/EIA for a LPG importation, storage and distribution facility which includes a marine offloading facility in Saldanha Bay, a pipeline and a storage facility. The environmental permitting process required the liaison with local and provincial environmental authorities, co-ordination of specialist studies, public participation and impact assessment.</p>

<b>Environmental and Social Screening Study for a Mine development in Angola, Confidential Client, Angola (2011-2012)</b>	Project Director for the Environmental and Social Screening Study for the Concept Phase for a new mine development in Angola. The study included identifying environmental and social risks to the project and costing a full ESIA according to IFC Performance Standards and Equator Principles.
<b>Equator Principles and IFC Performance Standards Training, Vedanta Resources Plc, Zambia (2012)</b>	Lead facilitator of a 5-day training course on the implementation of the Equator Principles and IFC Performance Standards for a number of Vedanta's mining operations across Southern Africa, Europe and Australia.
<b>Environmental and Social Impact Assessment for the upgrade of the Principe Airport, HBD, Principe (2011-2012)</b>	Project Director for the Environmental and Social Impact Assessment for the upgrade of the airport in Principe.
<b>EIA for a 380MW renewable energy facility north of Touwsrivier in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 170MW renewable energy facility east of Touwsrivier in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 670MW renewable energy facility south of Sutherland in the Western and Northern Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 500MW renewable energy facility south of Beaufort West in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 120MW renewable energy facility south east of Victoria West in the Northern Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 225MW wind farm in the Richtersveld, Western Cape (2011)</b>	Project Director for the Scoping/EIA for a proposed wind farm. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 750MW wind farm in the Roggeveld, Western Cape and Northern Cape (2011) Director</b>	Project Director for the Scoping/EIA for a proposed wind farm. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.



<b>EIA for a 225MW renewable energy facility between Vredenburg and Velddrif in the in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>Environmental and Social Impact Assessment for the Lesotho Highland 150 MW Wind Power Project, Breeze Power, Lesotho (2011)</b>	Project Director for the Scoping Phase of the Environmental and Social Impact Assessment for a 150MW wind farm development in Lesotho. The Scoping Phase included the analysis of available information to identify key environmental and social risks associated with the siting of the wind farm.
<b>Environmental Screening Study for a Wind Farm Development in the Southern Cape, South Africa (2011)</b>	Project Director for the Environmental Screening Study for a wind farm development in the Southern Cape.
<b>Environmental and Social Due Diligence for a Wind Farm Development in Coega, Electrawinds, South Africa (2011)</b>	Project Director for the Environmental and Social Due Diligence for a wind farm development in the Coega.
<b>Environmental and Social Impact Assessment for Venetia Diamond Mine, De Beers, South Africa (2011)</b>	Project Director for the Scoping and ESIA for the proposed new underground mine and EMP consolidation for existing mining activities. The ESIA was undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act.
<b>Environmental and Social Impact Assessment for a river barging project on the Zambezi River, Riversdale Mining, Mozambique (2010-2011)</b>	Project Director for the project which includes the assessment of environmental and social impacts associated with dredging over 500km of the Zambezi River. The project includes full stakeholder engagement, coordination of various specialist studies with extensive field work and the integration of all information into an ESIA report and ESMP.
<b>EIA for two solar PV plant development, South Africa (2010)</b>	Project Director of the EIA for the development of two solar PV plants in the Northern Cape and Free State Provinces of South Africa. ERM undertook the required studies to obtain environmental approval for these developments, including specialist studies such as landscape and visual and cultural heritage assessments, and stakeholder engagement.
<b>Basic Assessment for the installation of wind measuring masts on six sites in the Western Cape and two sites in the Northern Cape (2010)</b>	Project Director for the Basic Assessments to install wind measuring masts at eight sites in South Africa. The scope of work included the submission of the application, public participation, preparation of an EMP and submission of the Basic Assessment report.
<b>EIA for a 100MW renewable energy facility north of Velddrif in the in the Western Cape (2010)</b>	Project Director for the Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.
<b>EIA for a 300MW renewable energy facility east of Lambert's Bay in the Western Cape (2010)</b>	Project Director for the Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.



<b>External adviser and reviewer for an ESIA for a wind farm development in the Eastern Cape, Confidential Client, South Africa (2010)</b>	Adviser and reviewer for an EIA for the development of a wind farm in the Eastern Cape.
<b>Environmental Advisor Environmental and Social Impact Assessment for the Mphanda Nkuwa Hydropower Project in Mozambique (2010)</b>	Adviser for the ESIA for the Mphanda Nkuwa Hydropower Project in Mozambique. The core service was to advise the project team on international standards such as the IFC Performance Standards and World Commission on Dams.
<b>Environmental Sensitivity Study of the Durban Airport Site Expansion Project , South Africa, Transnet (2010)</b>	Project Director for the Environmental Sensitivity Study for the proposed dig-out port currently being considered by Transnet at the Durban International Airport Site. The aim of this assessment was to determine the biophysical, natural and social opportunities and constraints to the development of the dig-out port, as well as provide a strategic overview of the environmental context of the site. In addition, the sensitivity study provided strategic guidance in terms of the environmental due process and licensing requirements with respect to the National Environmental Management Act, and associated legislation.
<b>ESIA for a new high voltage overhead transmission power line in Cameroon, AES Sonel, Cameroon (2007- 2009)</b>	Project Director for the Environmental and Social Impact Assessment and a full Resettlement Action Plan for a new electricity distribution project, comprising a 113km overhead power line, for AES Sonel. As Project Director, Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports.
<b>Advisor to the Environmental and Social Impact Assessment for the Baynes Hydropower Project in Namibia and Angola (2009)</b>	Project Advisor for the Environmental and Social Impact Assessment for the proposed Baynes Hydropower Project on the Kunene River. The ESHIA process is being conducted in accordance to the Angolan EIA Regulations, the Namibian EIA Regulations, the World Bank Safeguard Policies and the IFC performance standards.
<b>Environmental and Social Impact Assessment for the upgrade of a 1100 km railway line in South Africa, Transnet (2008- 2009)</b>	Project Director for the Environmental and Social Impact Assessment for the upgrade of a commodities railway line across South Africa. The project included a number of specialist studies, managing subcontractors, interfacing with the railway engineering team, report writing, managing an extensive stakeholder consultation process, client liaison and management of project finances.
<b>Environmental and Social Impact Assessment for the services corridor associated with the development of a greenfield CTL Plant, Sasol, South Africa (2009)</b>	Project Director for an ESIA of a services corridor to support the development of a greenfield CTL plant development in South Africa. The ESHIA process was conducted in accordance to the South African EIA Regulations and the IFC performance standards.
<b>Environmental and Social Impact Assessment for 2D seismic exploration project in the Rovuma Basin, Petronas, Mozambique (2009)</b>	Project Director for the ESIA for the offshore seismic exploration activities in Blocks 3 & 6, situated in the Rovuma Basin off the coast of Mozambique. The exploration activities comprise 2D seismic surveys in deepwater.
<b>Environmental and Social Screening Study for a river barging project on the Zambezi River, Riversdale Mining, Mozambique (2009)</b>	Project Director for the project which included the assessment of environmental and social risks associated with dredging over 500km of the Zambezi River. The project included reviewing existing information, mapping key sensitivities and facilitating a specialist workshop in order to develop Terms of Reference for detailed baseline studies that will be required should the project proceed to a full ESIA.

<b>Equator Principled and IFC Performance Standards Review and Training, African Housing Solutions, South Africa (2009)</b>	Lead reviewer for the ESIA and Resettlement Policy Framework, for a housing development in Nigeria, against the Equator Principles and IFC Performance Standards. Mr Heather-Clark was responsible for reviewing the ESIA Report and for presenting a 2 ½ day training course on the Equator Principles and IFC Performance Standards.
<b>Environmental Assessment for the dredging and disposal of dredge spoil at the Port of Saldanha, Transnet, South Africa (2008)</b>	Project Director for this project and was responsible for guidance of technical studies which included dredging studies and marine sediment contamination characterization. The study included the assessment of dredge spoil dumping alternatives. Stakeholder engagement included an important component of the project.
<b>Environmental and Social Screening Study, Port of Saldanha, Transnet, South Africa (2008)</b>	Project Director for the screening study which included an assessment of alternative berth options for the export of iron ore at the iron ore terminal at the Port of Saldanha, South Africa. The work included ongoing interaction with the port engineering and design teams, together with stakeholder engagement.
<b>ESIA for an Early Production System (EPS) and Power Plant for Kaiso-Tonya Area, Exploration Area 2, Tullow Uganda Operations Pty Ltd, Uganda (2007-08)</b>	Project Director for the project which included a full ESIA for an Early Production System and associated Power Plant in the Kaiso-Tonya area on the banks of Lake Albert, Uganda. The intent of the project is to produce oil (and small amounts of gas) which will be converted into electrical power and distillate products (kerosene and diesel) for consumption within Uganda. The electrical power will be fed into the main grid supplementing the Ugandan electrical power grid while the distilled products (diesel and kerosene) will be used to displace the currently imported fuels. The ESIA included a detailed assessment of alternative sites for the proposed EPS and power plant, together with various environmental and social baseline studies and stakeholder engagement.
<b>ESIA monitoring studies for Sasol's Off-shore gas exploration activities in Inhambane and Sofala Provinces, Mozambique, Sasol Petroleum Sofala &amp; Empresa Nacional de Hidrocarbonetos (2007-08)</b>	Project Director for an environmental monitoring survey programme for Sasol's offshore hydrocarbon exploration activities. Monitoring studies included seismic noise modelling and monitoring, dugong surveys, artisanal fish catch monitoring, coral reef surveys and monitoring, sea turtle monitoring and tourism monitoring.
<b>Strategic Environmental and Social Overview and ESIA's for offshore exploration well drilling activities in Blocks 2 and 3A, Lake Albert, Uganda. Tullow Oil Plc and Heritage Oil and Gas Limited (2006- 2008)</b>	Project Director for this project. The project involved undertaking a strategic overview study of Lake Albert that provided background information on the limnological (physical, chemical and biological) features of the lake as well as environmental and socio-economic resources (such as nature reserves, tourism nodes, prime fishing areas etc). It also presented areas of environmental risk and opportunity associated with oil explorations on, and immediately adjacent to, the lake. The strategic overview provided a framework within which ESIA's were undertaken for the offshore drilling project. A site selection study was undertaken for onshore support infrastructure. Baseline studies included shoreline sensitivity mapping, oil spill modelling, water and sediment quality surveys, fish and fisheries surveys, socio-economic surveys and terrestrial ecology surveys. An extensive public participation process was undertaken as part of the ESIA's.
<b>Environmental and Social Baseline Assessment for a green fields coal mine and CTL plant development, Sasol, South Africa (2008)</b>	Project Director the environmental and social baseline studies to support the evaluation of sites for potential development of a green field's coal mine and associated CTL Plant in South Africa. Mr. Heather-Clark has assisted with review and quality control of the various baseline studies.

<b>Development of guideline document for the integration of environmental and social issues into the project lifecycle for mine development, De Beers, South Africa (2008)</b>	Team member of the project team that assisted the client in developing a detailed guideline document for the integration of social and environmental issues into mine planning. This included all phases of the planning process from Concept through to Pre-feasibility, Feasibility and Implementation. Mr Heather-Clark, as lead facilitator, presented a 2 day training course on these guidelines, to mine planners and engineers.
<b>EIA for a Metal Recovery Plant and Slag Crushing, Screening and Weathering facility at Arcelor Mittal Saldanha Works, MultiServ, South Africa (2007 – 2008)</b>	Project Director for the EIA, including a public consultation process and the following specialist studies: air quality, groundwater, noise impact assessment, botanical and archaeology studies and a traffic impact assessment. Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports.
<b>Implementation of the Equator Principles for Standard Bank's Project Financing Processes, Standard Bank, South Africa (2008)</b>	Lead facilitators for Equator Principles and IFC Performance Standards training to assist Standard Bank in adopting the Equator Principles. An assessment system (based on the IFC Performance Standards) to link with Standard Bank's project finance transaction life-cycle was developed. This involved the development of "tools" and guidance documents to form a system, together with training on the use of the system for all project finance staff.
<b>Comparative review of EIAs undertaken by ERM globally for electricity utilities, Eskom, South Africa (2007)</b>	Project Director for this project. The project included research to provide Eskom with an overview of different EIA governance systems and approaches to managing EIAs in other countries, as well as identifying trends in EIA practice.
<b>Environmental and Social Screening and Qualitative Risk Assessment Western Ports and Rail Corridor, Transnet, South Africa (2007)</b>	Project Director involved in identifying environmental and social risks associated with future port development in the Port of Saldanha, Port of Cape Town and Port of Mossel Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
<b>Environmental and Social Screening and Qualitative Risk Assessment Central Ports and Rail Corridor, Transnet, South Africa (2007)</b>	Project Director involved in identifying environmental and social risks associated with future port development in the Port of East London, Port of Port Elizabeth and Port of Ngqura. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
<b>Environmental and Social Screening and Qualitative Risk Assessment Eastern Ports and Rail Corridor, Transnet, South Africa (2007)</b>	Project Director involved in identifying environmental and social risks associated with future port development in the Port of Durban and Port of Richards Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
<b>EIA of the Moatize Coal Mine and associated railway line and deep water port infrastructure, CVRD, Tete Province, Mozambique (2006-2007)</b>	Project Coordinator and Cost Controller on this project. ERM was commissioned by CVRD, a Brazilian Mining Company, to undertake environmental studies related to the green fields development of a coal mine in Tete Province, Mozambique. The project included the development of a power plant, railway line and port for the export of coal.

<b>Corporate Social Responsibility Strategy development for a leading South African retailer, South Africa (2006)</b>	Lead facilitator for this project. The project involved identifying and prioritising the company's sustainability issues and defining a strategy to address these issues. The process was driven by the need for the company to be listed on the Johannesburg Stock Exchanges SRI Index.
<b>Research project on the effects of water scarcity on the fresh produce supply to a major South Africa retailer, South Africa (2006)</b>	Project Leader coordinated a group of researchers to identify water scarce areas and to plot these against the location of fresh produce suppliers for a major retailer in South Africa. This researched form a core component of the companies Sustainability Strategy.
<b>Independent Environmental Advisers to the Financing Parties of the Gautrain Rapid Rail Link project, Bowman Gilfillan (2006)</b>	Independent Environmental Advisers to the Financing Parties, provided review and advisory services through Bowman Gilfillan on Environmental Management Plans for the Gautrain Rapid Link project.
<b>ESIA for seismic surveys and exploration well drilling and testing in Blocks 16 and 19 off the coast of Mozambique, Sasol Petroleum Sofala &amp; Empresa Nacional de Hidrocarbonetos (2005 – 2006)</b>	Project Manager for the ESIA which involved undertaking an ESIA and compiling EMPs for offshore exploration activities in Blocks 16 & 19, situated to the east of the Bazaruto Archipelago National Park, off the coast of Mozambique. The exploration activities comprised 2D and 3D seismic surveys in deepwater and shallow water as well as exploration well drilling and testing activities.
<b>EIA for the upgrade and expansion of the existing sinter plant at Vanderbijlpark, ArcelorMittal, South Africa (2006)</b>	Project Director for the EIA and stakeholder engagement process to meet South African requirements. This included coordination of the technology review, air quality, health and waste management specialist studies and compilation of the integrated Scoping and EIA Report.
<b>Review of Sustainability Report and Sustainability Management System, Confidential, South Africa (2004)</b>	Lead reviewer of the Sustainability Report of a leading retailer in South Africa and providing adhoc advice on sustainability issues. This included compiling a monthly news letter to staff on relevant sustainability issues facing the retail industry in South Africa.
<b>EIA of a proposed expansion of the Container Terminal Stacking area at the Port of Cape Town, National Ports Authority, South Africa (2003-2004)</b>	Project Manager for this EIA. The project included the expansion of the Cape Town container terminal into the sea though dredging 1 million m3 of material for reclamation. The project included a detailed study on alternative sources for fill material and other studies which focused on marine archaeology, coastal erosion, marine hydrodynamics and water quality, visual, noise and traffic. The EIA included full stakeholder engagement throughout the EIA process.
<b>Environmental Site Suitability Study for a manganese smelter, Asia Minerals Limited (2004)</b>	Part of the project team that undertook a preliminary site selection process for a manganese smelter by identifying key environmental and social issues for potential sites within Southern Africa. Sites included the Belualane Industrial Park (Mozambique) and Richards Bay, the Coega Industrial Development Zone (IDZ) and Saldanha (South Africa).
<b>DFID funded project to assess progress towards meeting the water relater targets of the Millennium Development Goals, DIFD, Zambia (2004)</b>	Country Coordinator for Zambia on this project. The project included detailed stakeholder surveys secondary data analysis to establish the countries progress towards meeting the Millennium Development Goals, specifically related to water supply and sanitation.
<b>Roll-out of ISO14001 and OHSAS18001 management systems to 2 industrial sites in South Africa, Confidential, South Africa (2004)</b>	Project Manager responsible for undertaking ISO14001 training at two industrial sites. The project formed part of a global initiative to have several industrial sites throughout Africa and Europe ISO14001 certified.

<p><b>Strategic Environmental Assessment (SEA) for the Port of Cape Town, National Ports Authority of South Africa, South Africa (2003)</b></p>	<p>Project Manager for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port planning was supported by city planning and visa-versa.</p>
<p><b>Strategic Environmental Assessment (SEA) for the Port of Richards Bay, National Ports Authority of South Africa, South Africa (2003)</b></p>	<p>Project Adviser for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port planning was supported by city planning and visa-versa.</p>
<p><b>E&amp;S Due Diligence of the Phase 2 Maputo Port Revitalisation and Rehabilitation Project, Standard Corporate Merchant Bank, Mozambique (2003)</b></p>	<p>Environmental Adviser to the Standard Corporate Merchant Bank for the review of the EIA and Risk Assessment studies undertaken for the Phase 2 Maputo Port Revitalisation and Rehabilitation Project. The EIA was reviewed against the Mozambican and International Best Practice guidelines and detailed recommendation made on how to manage the environmental risks associated with the revitalisation project.</p>
<p><b>National Oil Spill Contingency Plan for Cameroon, funded by the World Bank, Cameroon Government, Cameroon (2003)</b></p>	<p>Part of the team that compiled a comprehensive Oil Spill Contingency Plan for Cameroon (OSCP). The OSCP form a core component of the Chad Cameroon Pipeline and included contingency plans for both on land and marine based spills. The OSCP was compiled according to the IPEACA guidelines and was reviewed by the World Bank.</p>
<p><b>EIA/SEA Capacity Building, Environmental Public Authority (EPA), State of Kuwait (2003)</b></p>	<p>Lead facilitator for a 2 day training course on SEA and EIA for the Environmental Public Authority (EPA) of the State of Kuwait.</p>
<p><b>Training Workshop on Strategic Environmental Assessment for South Eastern Africa and the Western Indian Ocean Island States, SEACAM, Mozambique (2003)</b></p>	<p>Lead course facilitator for the SEA training course funded by SEACAM. The training course included the principles of SEA, SEA process and case studies of SEA's in Southern Africa.</p>
<p><b>Improving the Effectiveness of EIA and the Potential of SEA in Southern Africa: Case Study on SEA of the National Commercial Ports Policy and SEA for the Port of Cape Town, World Bank/SAIEA, Namibia (2003)</b></p>	<p>Presenter of two case studies on SEA at a regional workshop funded by the World Bank and SAIEA.</p>
<p><b>Environmental Impact Assessment for the Eskom SABRE-GEN wind turbine test facility, Eskom, South Africa (2002)</b></p>	<p>Project Manager for the EIA. The EIA included stakeholder engagement throughout the process and included the following specialist studies: visual assessment, bird strike modelling and noise assessment.</p>
<p><b>Strategic Environmental Assessment: Scoping Phase Port of Richards Bay, National Ports Authority of South Africa, South Africa (2002)</b></p>	<p>Project Leader and integrative writer for the Scoping Phase of the SEA for the Port of Richards Bay. This phase included detailed stakeholder consultation to identify opportunities and constraints to long term port development at the Port of Richards Bay.</p>



<b>White Paper on National Commercial Ports Policy, National Ports Authority, South Africa 2002</b>	Lead reviewer of the White Paper on National Commercial Ports Policy for South Africa. The review focussed on the integration of environmental and social issues into the port planning process. Mr Heather-Clark made a formal submission and presentation to the Portfolio Committee on Transport in the South African Parliament.
<b>Environmental Liability and Risk Assessment for the Multi-Purpose Terminal at the Port of Saldanha, National Ports Operations, South Africa (2002)</b>	Project Manager for the project. The purpose of the project was to identify key environmental risks associate with the material handling at the Multi-Purpose Terminal at the Port of Saldanha.
<b>Environmental Overview of South Africa's major ports with special reference to future container terminal development, National Ports Authority Container Terminal Strategy, National Ports Authority, South Africa (2002)</b>	Project Manager for the comparative assessment of the relative environmental sensitivity of the seven commercial ports in South Africa with reference to future container terminal development. The study included a detail review of secondary environmental information of all the ports, the identification of specific environmental criteria and the use of these criteria to rank each port in terms of its sensitivity to future container terminal development.
<b>Review of the EIA undertaken for the Maputo Port Privatisation and Rehabilitation Project, Development Bank of Southern Africa (DBSA), South Africa (2002)</b>	Environmental Adviser to the Development Bank of Southern Africa to review the Phase 1 EIA for the Maputo Port Privatisation and Rehabilitation Project. The review was undertaken against the Mozambican EIA Regulations and International Best Practice.
<b>Oil Spill Contingency Plan, Agip Angola oil operations, Angola, (2002)</b>	Team member of the team to develop an oil spill contingency plan according to the IPEICA International Guidelines.
<b>Ecologically Sustainable Industrial Development Programme, United Nations Industrial Development Organisation (UNIDO), Tanzania (2002)</b>	Team member of the project team appointed to review the Industrial Development Strategy for Industrial Development in Tanzania. The focus of the project was to integrate environmental and social issues into the programme.
<b>Environmental Audit and Assessment of the Socio-economic Impacts of the Trans-Kgalagadi Highway, Botswana, Development Bank of Southern Africa, Botswana (2002)</b>	Lead reviewer of the EIA and EMP implementation for the Trans-Kalagadi corridor in Botswana. The review included site visits, detailed interviews and review of secondary data and records.
<b>World Bank EIA Project Management Training Course, World Bank/SAIEA, Zambia (2002)</b>	Lead facilitator for the 5 day EIA Project Management Training Course. The course was presented to 20 African delegates from southern Africa. The course focused on the practical aspects of EIA project management including budgeting and scheduling an EIA, contract negotiations with clients, managing specialist studies, managing the public participation phase and compiling an integrated EIA report. The course formed part of a Southern Africa capacity building initiative lead by the SAIEA.
<b>Environmental screening study for the establishment of a deep-water port at Ponta Dabela, Confidential Client, Mozambique (2001)</b>	Team member of the project team who undertook a screening study to identify environmental, social and economic issues and show stoppers associated with the development of a deep-water port on the coast on Mozambique.



<b>ESIA of the proposed seismic survey in licence area 2814a on the continental shelf of Namibia, Shell Exploration and Production Namibia B.V., Namibia (2001)</b>	Team member of the ESIA for the offshore seismic exploration project. The ESIA included all issues associated with seismic surveys including seismic noise impacts on marine mammals, oil spill modelling and general environmental management issues.
<b>Environmental Impact Review for the abandonment of the Cuntala Well Protector Platform off the coast of Angola (Block 2), Texaco Panama Inc., Angola (2001)</b>	Team member of the project team who developed a decommissioning plan for a well protector platform off the coast of Angola.
<b>Legal, Technical and Economic Feasibility Study for the Commercialisation of the SSF Association Milnerton Tank Farm and its links to the Port of Cape Town, SFF, Cape Town (2001)</b>	Project Manager for this project.
<b>ESIA of the Phase 2 expansion of the Mozal Aluminium Smelter and Matola Port Terminal in Maputo, BHP Billiton, Mozambique (2000-2001)</b>	Project Manager and integrative writer for this ESIA. The EIA included an assessment of the expansion of the port terminal at the Port of Matola and a review of the Phase 2 expansion of the aluminium smelter. All reports together with the EIA process were reviewed and approved by the International Finance Corporation (IFC).
<b>Scoping Phase of the Environmental Impact Assessment for the expansion of the Container Terminal at the Port of Cape Town, Portnet, South Africa (2000)</b>	Project Manager for the EIA for the expansion of the container terminal at the Port of Cape Town. The project included the dredging of 1 million m3 dredge material to provide fill for the expansion of the port. Specialist studies that were required included coastal dynamic modelling, hydrodynamic modelling to assess water quality issues associated with dredging, marine archaeological issues, marine ecology issues, traffic, visual and noise.
<b>Strategic Integrated Port Planning, Port of Saldanha, Transnet (1998)</b>	Project Manager for the Strategic Integrated Port Planning process for the Port of Saldanha. The process culminated in the first Port Development Framework for the Port of Saldanha which integrated environmental and social issues into the port planning process. It included the identification and inclusion of environmental and social opportunities and constraints into the future port planning and development.
<b>Environmental Impact Assessment for the PPC Slag Grinding Mill within the Saldanha Steel Complex, PPC (1998)</b>	Project Manager for the EIA for PPC slag grinding mill. The EIA included a number of specialist studies and comprehensive stakeholder engagement.

<b>MEMBERSHIPS</b>	
<b>CEAPSA</b>	Registered as an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA)
<b>IAIAsa</b>	Member of the International Association for Impact Assessment South Africa
<b>IAIA International</b>	Member of the International Association for Impact Assessment
<b>PUBLICATIONS</b>	
	Sep 2007: Co-author of case study for IIEDs 'User Guide' to effective tools and methods for integrating environment and development. South African case study: Role of environmental and social screening in informing the conceptual design and planning of large-scale projects in the pre-feasibility stage.
	Aug 2003: Author of a case study on the SEA for the Port of Cape Town, contained in "The Status and Potential of Strategic Environmental Assessment" by Barry Dalal-Clayton and Barry Saddler, DRAFT 17 September 2003.
	March 2002: Strategic Integrated Port Planning: Moving from EIA to SEA. International Conference on Coastal Zone Management and Development, Kuwait 18 to 20 March 2002.
	Nov 2000: Sustainable Port Development: Report on the preparatory seminar for Africa. 7th International Conference of the International Association for Cities and Ports, Marseilles – France.
	Mar 2000: The development of Strategic Environmental Assessment in South Africa: Journal of Impact Assessment and Project Appraisal, Vol 18, Number 3, pg 217-223. September 2000.
	April 1999: Integrating environmental opportunities and constraints into Port Planning, Development and Operation. 5th International Conference on Coastal and Port Engineering in Developing Countries, Cape Town, 19 to 23 April 1999.

**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 (Pri.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 Consultors 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*.



**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', is written over a horizontal line.

Chairperson

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

Chief Executive Officer



## CURRICULUM VITAE

**Dr Brian Michael Colloty**

**7212215031083**

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Pari Park

Gqeberha, 6070

brianc@envirosci.co.za

083 498 3299

Profession: Ecologist & Environmental Assessment Practitioner (Pr. Sci. Nat. 400268/07)

Member of the South African Wetland Society

Specialisation: Ecology and conservation importance rating of inland habitats, wetlands, rivers & estuaries

Years experience: 25 years

### SKILLS BASE AND CORE COMPETENCIES

- 25 years experience in environmental sensitivity and conservation assessment of aquatic and terrestrial systems inclusive of Index of Habitat Integrity (IHI), WET Tools, Riparian Vegetation Response Assessment Index (VEGRAI) for Reserve Determinations, estuarine and wetland delineation throughout Africa. Experience also includes biodiversity and ecological assessments with regard sensitive fauna and flora, within the marine, coastal and inland environments. Countries include Mozambique, Kenya, Namibia, Central African Republic, Zambia, Eritrea, Mauritius, Madagascar, Angola, Ghana, Guinea-Bissau and Sierra Leone. Current projects also span all nine provinces in South Africa.
- 15 years experience in the coordination and management of multi-disciplinary teams, such as specialist teams for small to large scale EIAs and environmental monitoring programmes, throughout Africa and inclusive of marine, coastal and inland systems. This includes project and budget management, specialist team management, client and stakeholder engagement and project reporting.
- GIS mapping and sensitivity analysis

### TERTIARY EDUCATION

- 1994: B Sc Degree (Botany & Zoology) - NMU
- 1995: B Sc Hon (Zoology) - NMU
- 1996: M Sc (Botany - Rivers) - NMU
- 2000: Ph D (Botany – Estuaries & Mangroves) – NMU

### EMPLOYMENT HISTORY

- 1996 – 2000 Researcher at Nelson Mandela University – SAB institute for Coastal Research & Management. Funded by the WRC to develop estuarine importance rating methods for South African Estuaries
- 2001 – January 2003 Training development officer AVK SA (reason for leaving – sought work back in the environmental field rather than engineering sector)
- February 2003- June 2005 Project manager & Ecologist for Strategic Environmental Focus (Pretoria) – (reason for leaving – sought work related more to experience in the coastal environment)
- July 2005 – June 2009 Principal Environmental Consultant Coastal & Environmental Services (reason for leaving – company restructuring)
- June 2009 – August 2018 Owner / Ecologist of Scherman Colloty & Associates cc
- August 2018 Owner / Ecologist - EnviroSci (Pty) Ltd

### SELECTED RELEVANT PROJECT EXPERIENCE

#### World Bank IFC Standards

- Kenmare Mining Piliivilli, Mozambique - wetland (mangroves, peatlands and estuarine) assessment and biodiversity offset analysis - current
- Botswana South Africa 400kv transmission line (400km) biodiversity assessment on behalf of Aurecon - current
- Farim phosphate mine and port development, Guinea Bissau – biodiversity and estuarine assessment on behalf of Knight Piesold Canada – 2016.
- Tema LNG offshore pipeline EIA – marine and estuarine assessment for Quantum Power (2015).
- Colluli Potash South Boulder, Eritrea, SEIA marine baseline and hydrodynamic surveys co-ordinator and coastal vegetation specialist (coastal lagoon and marine) (on-going).
- Wetland, estuarine and riverine assessment for Addax Biofuels Sierra Leone, Makeni for Coastal & Environmental Services: 2009
- ESHA Project manager and long-term marine monitoring phase coordinator with regards the dredge works required in Luanda bay, Angola. Monitoring included water quality and biological changes in the bay and at the offshore disposal outfall site, 2005-2011



## South African

- Plant and animal search and rescue for the Karusa and Soetwater Wind Farms on behalf of Enel Green Power, Current
- Plant and animal search and rescue for the Nxuba, Oyster Bay and Garob Wind Farms on behalf of Enel Green Power, 2018 - 2019
- Plant and Animal Search and Rescue for the Port of Ngqura, Transnet Landside infrastructure Project, with development and management of on site nursery, Current
- Plant and Animal Search and Rescue for the Port of Ngqura, OTGC Tank Farm Project (2019)
- Plant search and rescue, for NMBM (Driftsands sewer, Glen Hurd Drive), Department of Social Development (Military veterans housing, Despatch) and Nxuba Wind Farm, - current
- Wetland specialist appointed to update the Eastern Cape Biodiversity Conservation Plan, for the Province on behalf of EOH CES appointment by SANBI – current. This includes updating the National Wetland Inventory for the province, submitting the new data to CSIR/SANBI.
- CDC IDZ Alien eradication plans for three renewable projects Coega Wind Farm, Sonop Wind Farm and Coega PV, on behalf of JG Afrika (2016 – 2017).
- Nelson Mandela Bay Municipality Baakens River Integrated Wetland Assessment (Inclusive of Rehabilitation and Monitoring Plans) for CEN IEM Unit - Current
- Rangers Biomass Gasification Project (Uitenhage), biodiversity and wetland assessment and wetland rehabilitation / monitoring plans for CEM IEM Unit – 2017
- Gibson Bay Wind Farm implementation of the wetland management plan during the construction and operation of the wind farm (includes surface / groundwater as well wetland rehabilitation & monitoring plan) on behalf of Enel Green Power - 2018
- Gibson Bay Wind Farm 133kV Transmission Line wetland management plan during the construction of the transmission line (includes wetland rehabilitation & monitoring plan) on behalf of Eskom – 2016.
- Tsitsikamma Community Wind Farm implementation of the wetland management plan during the construction of the wind farm (includes surface / biomonitoring, as well wetland rehabilitation & monitoring plan) on behalf of Cennergi – completed May 2016.
- Alicedale bulk sewer pipeline for Cadadu District, wetland and water quality assessment, 2016
- Mogalakwena 33kv transmission line in the Limpopo Province, on behalf of Aurecon, 2016
- Cape St Francis WWTW expansion wetland and passive treatment system for the Kouga Municipality, 2015
- Macindane bulk water and sewer pipelines wetland and wetland rehabilitation plan 2015
- Eskom Prieska to Copperton 132kV transmission line aquatic assessment, Northern Cape on behalf of Savannah Environmental 2015.
- Joe Slovo sewer pipeline upgrade wetland assessment for Nelson Mandela Bay Municipality 2014
- Cape Recife Waste Water Treatment Works expansion and pipeline aquatic assessment for Nelson Mandela Bay Municipality 2013
- Pola park bulk sewer line upgrade aquatic assessment for Nelson Mandela Bay Municipality 2013
- Transnet Freight Rail – Swazi Rail Link (Current) wetland and ecological assessment on behalf of Aurecon for the proposed rail upgrade from Ermelo to Richards Bay
- Eskom Transmission wetland and ecological assessment for the proposed transmission line between Pietermaritzburg and Richards Bay on behalf of Aurecon (2012).
- Port Durnford Exxaro Sands biodiversity assessment for the proposed mineral sands mine on behalf of Exxaro (2009)
- Fairbreeze Mine Exxaro (Mtunzini) wetland assessment on behalf of Strategic Environmental Services (2007).
- Wetland assessment for Richards Bay Minerals (2013) – Zulti North haul road on behalf of RBM.
- Biodiversity and aquatic assessments for 118 renewable projects in the past 9 years in the Western, Eastern, Northern Cape, KwaZulu-Natal and Free State provinces. Clients included RES-SA, Red Cap, ACED Renewables, Mainstream Renewable, GDF Suez, Globeleq, ENEL, Abengoa amongst others. Particular aquatic sensitivity assessment and Water Use License Applications on behalf of Mainstream Renewable Energy, Cennergi / Exxaro, WKN Wind current, ACED, and Windlab (3 Wind farms) were also conducted. Several of these projects also required the assessment of the proposed transmission lines and switching stations, which were conducted on behalf of Eskom.
- Vegetation assessments on the Great Brak rivers for Department of Water and Sanitation, 2006 and the Gouritz Water Management Area (2014)
- Proposed FibreCo fibre optic cable vegetation assessment along the PE to George, George to Graaf Reinet, PE to Colesburg, and East London to Bloemfontein on behalf of SRK (2013-2015).



**herewith certifies that**  
**Brian Michael Colloty**  
Registration Number: 400268/07  
**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 November 2007**

Expires **31 March 2023**



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

Chairperson

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

Chief Executive Officer





*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, Afrikaans, basic French

#### **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) [First Class]	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

#### **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
- ASAPA 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
  - Heritage Impact Assessments
    - Self-standing assessments under Section 38(1) of the NHRA
    - Assessments under NEMA and Section 38(8) of the NHRA
  - Archaeological specialist studies
  - Strategic assessments
  - 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
  - Agricultural developments
  - Dams and pipe lines
  - Power lines and substations
  - Renewable energy facilities (wind, solar and hydro-electric)

#### 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, Franschoek, Namaqualand, Bushmanland
- LSA coastal shell middens
  - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
  - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
  - Franschoek (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:***

1998: Frank Schweitzer memorial book prize for an outstanding student.

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

## Curriculum vitae: Chris van Rooyen

Profession/Specialisation	:	Avifaunal Specialist
Highest Qualification	:	BA LLB
Nationality	:	South African
Years of experience	:	25 years

## Key Experience

Chris van Rooyen has twenty-two years' experience in the assessment of avifaunal interactions with industrial infrastructure. He was employed by the Endangered Wildlife Trust as head of the Eskom-EWT Strategic Partnership from 1996 to 2007, which has received international acclaim as a model of co-operative management between industry and natural resource conservation. He is an acknowledged global expert in this field and has consulted in South Africa, Namibia, Botswana, Lesotho, New Zealand, Texas, New Mexico and Florida. He also has extensive project management experience and he has received several management awards from Eskom for his work in the Eskom-EWT Strategic Partnership. He is the author and/or co-author of 17 conference papers, co-author of two book chapters, several research reports and the current best practice guidelines for avifaunal monitoring at wind farm sites. He has completed around 130 power line assessments; and has to date been employed as specialist avifaunal consultant on more than 50 renewable energy generation projects. He has also conducted numerous risk assessments on existing power lines infrastructure. He also works outside the electricity industry and he has done a wide range of bird impact assessment studies associated with various residential and industrial developments. He serves on the Birds and Wind Energy Specialist Group which was formed in 2011 to serve as a liaison body between the ornithological community and the wind industry.

## Key Project Experience

### **Bird Impact Assessment Studies and avifaunal monitoring for wind-powered generation facilities:**

1. Eskom Klipheuwel Experimental Wind Power Facility, Western Cape
2. Mainstream Wind Facility Jeffreys Bay, Eastern Cape (EIA and monitoring)
3. Biotherm, Swellendam, (Excelsior), Western Cape (EIA and monitoring)
4. Biotherm, Napier, (Matjieskloof), Western Cape (pre-feasibility)
5. Windcurrent SA, Jeffreys Bay, Eastern Cape (2 sites) (EIA and monitoring)
6. Caledon Wind, Caledon, Western Cape (EIA)
7. Innowind (4 sites), Western Cape (EIA)
8. Renewable Energy Systems (RES) Oyster Bay, Eastern Cape (EIA and monitoring)
9. Oelsner Group (Kerriefontein), Western Cape (EIA)
10. Oelsner Group (Langefontein), Western Cape (EIA)
11. InCa Energy, Vredendal Wind Energy Facility Western Cape (EIA)
12. Mainstream Loeriesfontein Wind Energy Facility (EIA and monitoring)
13. Mainstream Noupoot Wind Energy Facility (EIA and monitoring)
14. Biotherm Port Nolloth Wind Energy Facility (Monitoring)
15. Biotherm Laingsburg Wind Energy Facility (EIA and monitoring)
16. Langhoogte Wind Energy Facility (EIA)
17. Vleesbaai Wind Energy Facility (EIA and monitoring)
18. St. Helena Bay Wind Energy Facility (EIA and monitoring)
19. Electrawind, St Helena Bay Wind Energy Facility (EIA and monitoring)
20. Electrawind, Vredendal Wind Energy Facility (EIA)
21. SAGIT, Langhoogte and Wolseley Wind Energy facilities
22. Renosterberg Wind Energy Project – 12-month preconstruction avifaunal monitoring project
23. De Aar – North (Mulilo) Wind Energy Project – 12-month preconstruction avifaunal monitoring project
24. De Aar – South (Mulilo) Wind Energy Project – 12-month bird monitoring
25. Namies – Aggenys Wind Energy Project – 12-month bird monitoring
26. Pofadder - Wind Energy Project – 12-month bird monitoring
27. Dwarsrug Loeriesfontein - Wind Energy Project – 12-month bird monitoring

28. Waaihoek – Utrecht Wind Energy Project – 12-month bird monitoring
29. Amathole – Butterworth Utrecht Wind Energy Project – 12-month bird monitoring & EIA specialist
30. Phezukomoya and San Kraal Wind Energy Projects 12-month bird monitoring & EIA specialist study (Innowind)
31. Beaufort West Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mainstream)
32. Leeuwdraai Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mainstream)
33. Sutherland Wind Energy Facility 12-month bird monitoring (Mainstream)
34. Maralla Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
35. Esizayo Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
36. Humansdorp Wind Energy Facility 12-month bird monitoring & EIA specialist study (Cennergi)
37. Aletta Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
38. Eureka Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
39. Makambako Wind Energy Facility (Tanzania) 12-month bird monitoring & EIA specialist study (Windlab)
40. R355 Wind Energy Facility 12-month bird monitoring (Mainstream)
41. Groenekloof Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mulilo)
42. Tsitsikamma Wind Energy Facility 24-months post-construction monitoring (Cennergi)
43. Noupoot Wind Energy Facility 24-months post-construction monitoring (Mainstream)
44. Kokerboom Wind Energy Facility 12-month bird monitoring & EIA specialist study (Business Venture Investments)
45. Kuruman Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mulilo)
46. Dassieklip Wind Energy Facility 3 years post-construction monitoring (Biotherm)
47. Loeriesfontein 2 Wind Energy Facility 2 years post-construction monitoring (Mainstream)
48. Khobab Wind Energy Facility 2 years post-construction monitoring (Mainstream)
49. Excelsior Wind Energy Facility 18 months construction phase monitoring (Biotherm)
50. Boesmansberg Wind Energy Facility 12-months pre-construction bird monitoring (juwi)
51. Mañhica Wind Energy Facility, Mozambique, 12-months pre-construction monitoring (Windlab)
52. Kwagga Wind Energy Facility, Beaufort West, 12-months pre-construction monitoring (ABO)
53. Pienaarspoort Wind Energy Facility, Touws River, Western Cape, 12-months pre-construction monitoring (ABO).
54. Koup 1 and 2 Wind Energy Facilities, Beaufort West, Western Cape, 12 months pre-construction monitoring (Genesis Eco-energy)
55. Duiker Wind Energy Facility, Vredendal, Western Cape 12 months pre-construction monitoring (ABO)
56. Perdekraal East Wind Energy Facility, Touws River, Western Cape, 18 months construction phase monitoring (Mainstream).
57. Swellendam Wind Energy Facility, Western Cape, 12-month pre-construction monitoring (Veld Renewables)
58. Lombardskraal Wind Energy Facility, Western Cape, 12-month pre-construction monitoring (Enertrag SA)
59. Mainstream Kolkies & Heuweltjies Wind Energy Facilities, Western Cape, 12-month pre-construction monitoring (Mainstream)
60. Great Karoo Wind Energy Facility, Northern Cape, 12-month pre-construction monitoring (African Green Ventures).
61. Mpumalanga & Gauteng Wind and Hybrid Energy Facilities (6x), pre-construction monitoring (Enertrag SA)
62. Dordrecht Wind Energy Facilities, Eastern Cape, Screening Report (Enertrag SA)
63. Dordrecht Wind Energy Facilities, Eastern Cape, Screening Report (ACED)
64. Nanibees North & South Wind Energy Facilities, Northern Cape, Screening Report (juwi)
65. Sutherland Wind Energy Facilities, Northern Cape, Screening Report (WKN Windcurrent)
66. Pofadder Wind Energy Facility, Northern Cape, Screening Report (Atlantic Energy)
67. Haga Haga Wind Energy Facility, Eastern Cape, Amendment Report (WKN Windcurrent)
68. Banken Wind Energy Facility, Northern Cape, Screening Report (Atlantic Energy)
69. Hartebeest Wind Energy Facility, Western Cape, 12-month pre-construction monitoring (juwi).
70. Perdekraal East Wind Energy Facility, Touws River, Western Cape, 24 months operational phase monitoring (Mainstream).
71. Great Karoo Wind Energy Facility, Richmond, Northern Cape, 12 months pre-construction monitoring, African Green Ventures.



72. Ezelsjacht Wind Energy Facility, De Doorns, Western Cape, 12-months pre-construction monitoring Mainstream Renewable Power.
73. Canopus Wind Energy Facility, Laingsburg, Western Cape, 12-months pre-construction monitoring WKN Windcurrent.
74. Kangnas Wind Energy Facility, Aggeneys, Northern Cape, 24-months operational monitoring, Mainstream Renewable Power.
75. Taaibosch Wind Energy Facility, Lime Acres, Northern Cape, 12-months pre-construction monitoring, Enertrag SA
76. Mpumalanga & Gauteng Wind and Hybrid Energy Facilities (6x), pre-construction monitoring (Enertrag SA)
77. Dordrecht Wind Energy Facilities, Eastern Cape, Screening Report (Enertrag SA)
78. Dordrecht Wind Energy Facilities, Eastern Cape, Screening Report (ACED)
79. Nanibees North & South Wind Energy Facilities, Northern Cape, Screening Report (juwi)
80. Kappa Solar PV facility, Touwsrivier, Western Cape, pre-construction monitoring (Veroniva)
81. Sutherland Wind Energy Facilities, Northern Cape, Screening Report (WKN Windcurrent)
82. Pofadder Wind Energy Facility, Northern Cape, Screening Report (Atlantic Energy)
83. Haga Haga Wind Energy Facility, Eastern Cape, Amendment Report (WKN Windcurrent)
84. Banken Wind Energy Facility, Northern Cape, Screening Report (Atlantic Energy)
85. Hartebeest Wind Energy Facility, Western Cape, 12-month pre-construction monitoring (juwi).
86. Iphiko Wind Energy facilities, Laingsburg, Western Cape, screening and pre- construction monitoring (G7 Energies)
87. Kangnas Wind Energy Facility, Northern Cape, Operational Phase 2 years avifaunal monitoring (Mainstream)
88. Perdekraal East Wind Energy Facility, Northern Cape, Operational Phase 2 years avifaunal monitoring (Mainstream)
89. Aberdeen 1, 2 & Aberdeen Kudu (3&4) Wind Energy Facilities, Eastern Cape, 12- month pre-construction monitoring (Atlantic Renewable Energy Partners)
90. Loxton / Beaufort West Wind Energy Facilities, Northern Cape, 12-month pre- construction monitoring (Genesis Eco-Energy Developments)
91. Ermelo & Volksrust Wind Energy Facilities, Northern Cape, Screening Report (WKN Windcurrent)

## **Bird Impact Assessment Studies for Solar Energy Plants:**

1. Concentrated Solar Power Plant, Upington, Northern Cape.
2. Globeleq De Aar and Droogfontein Solar PV Pre- and Post-construction avifaunal monitoring
3. JUWI Kronos PV project, Copperton, Northern Cape
4. Sand Draai CSP project, Groblershoop, Northern Cape
5. Biotherm Helena PV Project, Copperton, Northern Cape
6. Biotherm Letsiao CSP Project, Aggeneys, Northern Cape
7. Biotherm Enamandla PV Project, Aggeneys, Northern Cape
8. Biotherm Sendawo PV Project, Vryburg, North-West
9. Biotherm Tlisitseng PV Project, Lichtenburg, North-West
10. JUWI Hotazel Solar Park Project, Hotazel, Northern Cape
11. Namakwa Solar Project, Aggeneys, Northern Cape
12. Brypaal Solar Power Project, Kakamas, Northern Cape
13. ABO Vryburg 1,2,3 Solar PV Project, Vryburg, North-West
14. NamPower CSP Facility near Arandis, Namibia
15. Dayson Klip PV Facility near Upington, Northern Cape
16. Geelkop PV Facility near Upington, Northern Cape
17. Oya PV Facility, Ceres, Western Cape
18. Vrede and Rondawel PV Facilities, Free State
19. Kolkies & Sadawa PV Facilities, Western Cape
20. Leeuwbosch PV1 and 2 and Wildebeeskuil PV1 and 2 Facilities, North-West
21. Kenhardt PV 3,4 and 5, Northern Cape
22. Wittewal PV, Grootfontein PV and Hoekdoornen PV Facilities, Touws River, Western Cape
23. Aardvark Solar PV facility, Copperton, Northern Cape, 12-month pre-construction monitoring (ABO)
24. Bestwood Solar PV facility, Kathu, Northern Cape, pre-construction monitoring (AMDA)
25. Boundary Solar PV facility, Kimberley, Northern Cape, Site sensitivity verification

26. Rinkhals PV 1 – 6 Solar PV Facility, Kimberley, Northern Cape.

## **Bird Impact Assessment Studies for the following overhead line projects:**

1. Chobe 33kV Distribution line
2. Athene - Umfolozi 400kV
3. Beta-Delphi 400kV
4. Cape Strengthening Scheme 765kV
5. Flurian-Louis-Trichardt 132kV
6. Ghanzi 132kV (Botswana)
7. Ikaros 400kV
8. Matimba-Witkop 400kV
9. Naboomspruit 132kV
10. Tabor-Flurian 132kV
11. Windhoek - Walvisbaai 220 kV (Namibia)
12. Witkop-Overysseel 132kV
13. Breyten 88kV
14. Adis-Phoebus 400kV
15. Dhuvu-Janus 400kV
16. Perseus-Mercury 400kV
17. Gravelotte 132kV
18. Ikaros 400 kV
19. Khanye 132kV (Botswana)
20. Moropule – Thamaga 220 kV (Botswana)
21. Parys 132kV
22. Simplon –Everest 132kV
23. Tutuka-Alpha 400kV
24. Simplon-Der Brochen 132kV
25. Big Tree 132kV
26. Mercury-Ferrum-Garona 400kV
27. Zeus-Perseus 765kV
28. Matimba B Integration Project
29. Caprivi 350kV DC (Namibia)
30. Gerus-Mururani Gate 350kV DC (Namibia)
31. Mmamabula 220kV (Botswana)
32. Steenberg-Der Brochen 132kV
33. Venetia-Paradise T 132kV
34. Burgersfort 132kV
35. Majuba-Umfolozi 765kV
36. Delta 765kV Substation
37. Braamhoek 22kV
38. Steelpoort Merensky 400kV
39. Mmamabula Delta 400kV
40. Delta Epsilon 765kV
41. Gerus-Zambezi 350kV DC Interconnector: Review of proposed avian mitigation measures for the Okavango and Kwando River crossings
42. Giyani 22kV Distribution line
43. Lihobong-Kao 132/11kV distribution power line, Lesotho
44. 132kV Leslie – Wildebeest distribution line
45. A proposed new 50 kV Spoornet feeder line between Sishen and Saldanha
46. Cairns 132kv substation extension and associated power lines
47. Pimlico 132kv substation extension and associated power lines
48. Gyani 22kV
49. Matafin 132kV
50. Nkomazi\_Fig Tree 132kV
51. Pebble Rock 132kV
52. Reddersburg 132kV

AFRIMAGE Photography (Pty) Ltd Trading as:

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53. Thaba Combine 132kV
54. Nkomati 132kV
55. Louis Trichardt – Musina 132kV
56. Endicot 44kV
57. Apollo Lepini 400kV
58. Tarlton-Spring Farms 132kV
59. Kuschke 132kV substation
60. Bendstore 66kV Substation and associated lines
61. Kuiseb 400kV (Namibia)
62. Gyani-Malamulele 132kV
63. Watershed 132kV
64. Bakone 132kV substation
65. Eerstegoud 132kV LILO lines
66. Kumba Iron Ore: SWEP - Relocation of Infrastructure
67. Kudu Gas Power Station: Associated power lines
68. Steenberg Booyendal 132kV
69. Toulon Pumps 33kV
70. Thabatshipi 132kV
71. Witkop-Silica 132kV
72. Bakubung 132kV
73. Nelsriver 132kV
74. Rethabiseng 132kV
75. Tilburg 132kV
76. GaKgapanne 66kV
77. Knobel Gilead 132kV
78. Bochum Knobel 132kV
79. Madibeng 132kV
80. Witbank Railway Line and associated infrastructure
81. Spencer NDP phase 2 (5 lines)
82. Akanani 132kV
83. Hermes-Dominion Reefs 132kV
84. Cape Pensinsula Strengthening Project 400kV
85. Magalakwena 132kV
86. Benfiosa 132kV
87. Dithabaneng 132kV
88. Taunus Diepkloof 132kV
89. Taunus Doornkop 132kV
90. Tweedracht 132kV
91. Jane Furse 132kV
92. Majeje Sub 132kV
93. Tabor Louis Trichardt 132kV
94. Riversong 88kV
95. Mamatsekele 132kV
96. Kabokweni 132kV
97. MDPP 400kV Botswana
98. Marble Hall NDP 132kV
99. Bokmakiere 132kV Substation and LILO lines
100. Styldrift 132kV
101. Taunus – Diepkloof 132kV
102. Bighorn NDP 132kV
103. Waterkloof 88kV
104. Camden – Theta 765kV
105. Dhuvu – Minerva 400kV Diversion
106. Lesedi –Grootpan 132kV
107. Waterberg NDP
108. Bulgerivier – Dorset 132kV
109. Bulgerivier – Toulon 132kV
110. Nokeng-Fluorspar 132kV

111. Mantsole 132kV
112. Tshilamba 132kV
113. Thabamoopo - Tshebela – Nhlovuko 132kV
114. Arthurseat 132kV
115. Borutho 132kV MTS
116. Volspruit - Potgietersrus 132kV
117. Neotel Optic Fibre Cable Installation Project: Western Cape
118. Matla-Glockner 400kV
119. Delmas North 44kV
120. Houwhoek 11kV Refurbishment
121. Clau-Clau 132kV
122. Ngwedi-Silwerkrans 134kV
123. Nieuwehoop 400kV walk-through
124. Booyesdal 132kV Switching Station
125. Tarlton 132kV
126. Medupi - Witkop 400kV walk-through
127. Germiston Industries Substation
128. Sekgame 132kV
129. Botswana – South Africa 400kV Transfrontier Interconnector
130. Syferkuil – Rampheri 132kV
131. Queens Substation and associated 132kV powerlines
132. Oranjemond 400kV Transmission line
133. Aries – Helios – Juno walk-down
134. Kuruman Phase 1 and 2 Wind Energy facilities 132kV Grid connection
135. Transnet Thaba 132kV

## **Bird Impact Assessment Studies for the following residential and industrial developments:**

1. Lizard Point Golf Estate
2. Lever Creek Estates
3. Leloko Lifestyle Estates
4. Vaaloewers Residential Development
5. Clearwater Estates Grass Owl Impact Study
6. Somerset Ext. Grass Owl Study
7. Proposed Three Diamonds Trading Mining Project (Portion 9 and 15 of the Farm Blesbokfontein)
8. N17 Section: Springs To Leandra –“Borrow Pit 12 And Access Road On (Section 9, 6 And 28 Of The Farm Winterhoek 314 Ir)
9. South African Police Services Gauteng Radio Communication System: Portion 136 Of The Farm 528 Jq, Lindley.
10. Report for the proposed upgrade and extension of the Zeekoegat Wastewater Treatment Works, Gauteng.
11. Bird Impact Assessment for Portion 265 (a portion of Portion 163) of the farm Rietfontein 189-JR, Gauteng.
12. Bird Impact Assessment Study for Portions 54 and 55 of the Farm Zwartkop 525 JQ, Gauteng.
13. Bird Impact Assessment Study Portions 8 and 36 of the Farm Nooitgedacht 534 JQ, Gauteng.
14. Shumba's Rest Bird Impact Assessment Study
15. Randfontein Golf Estate Bird Impact Assessment Study
16. Zilkaatsnek Wildlife Estate
17. Regenstein Communications Tower (Namibia)
18. Avifaunal Input into Richards Bay Comparative Risk Assessment Study
19. Maquasa West Open Cast Coal Mine
20. Glen Erasmia Residential Development, Kempton Park, Gauteng
21. Bird Impact Assessment Study, Weltevreden Mine, Mpumalanga
22. Bird Impact Assessment Study, Olifantsvlei Cemetery, Johannesburg
23. Camden Ash Disposal Facility, Mpumalanga
24. Lindley Estate, Lanseria, Gauteng
25. Proposed open cast iron ore mine on the farm Lylyveld 545, Northern Cape

AFRIMAGE Photography (Pty) Ltd Trading as:

# Chris van Rooyen Consulting

VAT#: 4580238113

email: vanrooyen.chris@gmail.com

Tel: +27 (0)82 4549570 cell

26. Avifaunal monitoring for the Sishen Mine in the Northern Cape as part of the EMPr requirements
27. Steelpoort CNC Bird Impact Assessment Study

## Professional affiliations

I work under the supervision of and in association with Albert Froneman (MSc Conservation Biology) (SACNASP Zoological Science Registration number 400177/09) as stipulated by the Natural Scientific Professions Act 27 of 2003.

## Curriculum vitae: Albert Froneman

Profession/Specialisation : Avifaunal Specialist  
Highest Qualification : MSc (Conservation Biology)  
Nationality : South African  
Years of experience : 22 years

### Key Qualifications

Albert Froneman (*Pr.Sci.Nat*) has more than 22 years' experience in the management of avifaunal interactions with industrial infrastructure. He holds a M.Sc. degree in Conservation Biology from the University of Cape Town. He managed the Airports Company South Africa (ACSA) – Endangered Wildlife Trust Strategic Partnership from 1999 to 2008 which has been internationally recognized for its achievements in addressing airport wildlife hazards in an environmentally sensitive manner at ACSA's airports across South Africa. Albert is recognized worldwide as an expert in the field of bird hazard management on airports and has worked in South Africa, Swaziland, Botswana, Namibia, Kenya, Israel, and the USA. He has served as the vice chairman of the International Bird Strike Committee and has presented various papers at international conferences and workshops. At present he is consulting to ACSA with wildlife hazard management on all their airports. He also an accomplished specialist ornithological consultant outside the aviation industry and has completed a wide range of bird impact assessment studies. He has co-authored many avifaunal specialist studies and pre-construction monitoring reports for proposed renewable energy developments across South Africa. He also has vast experience in using Geographic Information Systems to analyse and interpret avifaunal data spatially and derive meaningful conclusions. Since 2009 Albert has been a registered Professional Natural Scientist (reg. nr 400177/09) with The South African Council for Natural Scientific Professions, specialising in Zoological Science.

### Key Project Experience

#### **Renewable Energy Facilities –avifaunal monitoring projects in association with Chris van Rooyen Consulting**

1. Jeffrey's Bay Wind Farm – 12-months preconstruction avifaunal monitoring project
2. Oysterbay Wind Energy Project – 12-months preconstruction avifaunal monitoring project
3. Ubuntu Wind Energy Project near Jeffrey's Bay – 12-months preconstruction avifaunal monitoring project
4. Bana-ba-Pifu Wind Energy Project near Humansdorp – 12-months preconstruction avifaunal monitoring project
5. Excelsior Wind Energy Project near Caledon – 12-months preconstruction avifaunal monitoring project
6. Laingsburg Spitskopvlakte Wind Energy Project – 12-months preconstruction avifaunal monitoring project
7. Loeriesfontein Wind Energy Project Phase 1, 2 & 3 – 12-months preconstruction avifaunal monitoring project
8. Noupoot Wind Energy Project – 12-months preconstruction avifaunal monitoring project
9. Vleesbaai Wind Energy Project – 12-months preconstruction avifaunal monitoring project
10. Port Nolloth Wind Energy Project – 12-months preconstruction avifaunal monitoring project
11. Langhoogte Caledon Wind Energy Project – 12-months preconstruction avifaunal monitoring project
12. Lunsklip – Stilbaai Wind Energy Project – 12-months preconstruction avifaunal monitoring project
13. Indwe Wind Energy Project – 12-months preconstruction avifaunal monitoring project
14. Zeeland St Helena bay Wind Energy Project – 12-months preconstruction avifaunal monitoring project
15. Wolseley Wind Energy Project – 12-months preconstruction avifaunal monitoring project
16. Renosterberg Wind Energy Project – 12-months preconstruction avifaunal monitoring project
17. De Aar – North (Mulilo) Wind Energy Project – 12-months preconstruction avifaunal monitoring project (2014)
18. De Aar – South (Mulilo) Wind Energy Project – 12-months bird monitoring
19. Namies – Aggenys Wind Energy Project – 12-months bird monitoring
20. Pofadder - Wind Energy Project – 12-months bird monitoring
21. Dwarsrug Loeriesfontein - Wind Energy Project – 12-months bird monitoring

22. Waaihoek – Utrecht Wind Energy Project – 12-months bird monitoring
23. Amathole – Butterworth Wind Energy Project – 12-months bird monitoring & EIA specialist study
24. De Aar and Droogfontein Solar PV Pre- and Post-construction avifaunal monitoring
25. Makambako Wind Energy Facility (Tanzania) 12-month bird monitoring & EIA specialist study (Windlab)
26. R355 Wind Energy Facility 12-month bird monitoring (Mainstream)
27. Aletta Wind Energy Facility 12-month bird monitoring (Biotherm)
28. Maralla Wind Energy Facility 12-month bird monitoring (Biotherm)
29. Groenekloof Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mulilo)
30. Tsitsikamma Wind Energy Facility 24-months post-construction monitoring (Cennergi)
31. Noupoot Wind Energy Facility 24-months post-construction monitoring (Mainstream)
32. Kokerboom Wind Energy Facility 12-month bird monitoring & EIA specialist study (Business Venture Investments)
33. Kuruman Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mulilo)
34. Mañhica Wind Energy Facility 12-month bird monitoring & EIA specialist study (Windlab)
35. Klipheuwel-Dassiefontein Wind Energy Facility, Caledon, Western Cape – Operational phase bird monitoring – Year 5 (Klipheuwel-Dassiefontein Wind Energy Facility)
36. Kwagga Wind Energy Facility, Beaufort West, 12-months pre-construction monitoring (ABO)
37. Pienaarspoort Wind Energy Facility, Touws River, Western Cape, 12-months pre-construction monitoring (ABO). Koup 1 and 2 Wind Energy Facilities, Beaufort West, Western Cape, 12 months pre-construction monitoring (Genesis Eco-energy)
38. Duiker Wind Energy Facility, Vredendal, Western Cape 12 months pre-construction monitoring (ABO)
39. Perdekraal East Wind Energy Facility, Touws River, Western Cape, 18 months construction phase monitoring (Mainstream).
40. Swellendam Wind Energy Facility, Western Cape, 12-month pre-construction monitoring (Veld Renewables)
41. Lombardskraal Wind Energy Facility, Western Cape, 12-month pre-construction monitoring (Enertrag SA)
42. Mainstream Kolkies & Heuweltjies Wind Energy Facilities, Western Cape, 12-month pre-construction monitoring (Mainstream)
43. Great Karoo Wind Energy Facility, Northern Cape, 12-month pre-construction monitoring (African Green Ventures).
44. Mpumalanga & Gauteng Wind and Hybrid Energy Facilities (6x), pre-construction monitoring (Enertrag SA)
45. Dordrecht Wind Energy Facilities, Eastern Cape, Screening Report (Enertrag SA)
46. Dordrecht Wind Energy Facilities, Eastern Cape, Screening Report (ACED)
47. Nanibees North & South Wind Energy Facilities, Northern Cape, Screening Report (juwi)
48. Kappa Solar PV facility, Touwsrivier, Western Cape, pre-construction monitoring (Veroniva)
49. Sutherland Wind Energy Facilities, Northern Cape, Screening Report (WKN Windcurrent)
50. Pofadder Wind Energy Facility, Northern Cape, Screening Report (AtlanticEnergy)
51. Haga Haga Wind Energy Facility, Eastern Cape, Amendment Report (WKN Windcurrent)
52. Banken Wind Energy Facility, Northern Cape, Screening Report (Atlantic Energy)
53. Hartebeest Wind Energy Facility, Western Cape, 12-month pre-construction monitoring (juwi).
54. Iphiko Wind Energy facilities, Laingsburg, Western Cape, screening and pre-construction monitoring (G7 Energies)
55. Kangnas Wind Energy Facility, Northern Cape, Operational Phase 2 years avifaunal monitoring (Mainstream)
56. Perdekraal East Wind Energy Facility, Northern Cape, Operational Phase 2 years avifaunal monitoring (Mainstream)
57. Aberdeen 1, 2 & Aberdeen Kudu (3&4) Wind Energy Facilities, Eastern Cape, 12-month pre-construction monitoring (Atlantic Renewable Energy Partners)
58. Loxton / Beaufort West Wind Energy Facilities, Northern Cape, 12-month pre-construction monitoring (Genesis Eco-Energy Developments)
59. Ermelo & Volksrust Wind Energy Facilities, Northern Cape, Screening Report (WKN Windcurrent)
60. Aardvark Solar PV facility, Copperton, Northern Cape, 12-month pre-construction monitoring (ABO)
61. Bestwood Solar PV facility, Kathu, Northern Cape, pre-construction monitoring (AMDA)
62. Boundary Solar PV facility, Kimberley, Northern Cape, Site sensitivity verification

- (Atlantic Renewable Energy Partners)
63. Excelsior Wind Energy Facility, Swellendam, Western Cape, Operational Phase 2 years avifaunal monitoring & implementation of Shut Down on Demand (SDOD) pro-active mitigation strategy (Biotherm)
  64. De Aar cluster Solar PV facilities, De Aar, Western Cape, Site sensitivity verification (Atlantic Renewable Energy Partners)
  65. Rinkhals Solar PV facilities, Kimberley, Northern Cape, Pre-construction monitoring (ABO)
  66. Kolkies Sadawa Solar PV facilities, Touwsrivier, Western Cape, pre-construction monitoring (Mainstream)
  67. Leeudoringstad Solar PV facilities, Leeudoringstad, North West, Pre-construction monitoring (Upgrade Energy)
  68. Noupoot Umsobomvu Solar PV facilities, Noupoot, Northern Cape, Pre-construction monitoring (EDF Renewables)
  69. Oya Solar PV facilities, Matjiesfontein, Western Cape, pre-construction monitoring (G7 Energies)
  70. Scafell Solar PV facilities, Sasolburg, Free state, pre-construction monitoring (Mainstream)
  71. Vrede & Rondawel Solar PV facilities, Kroonstad, Free state, pre-construction monitoring (Mainstream)
  72. Gunstfontein Wind Energy Facilities, Sutherland, Northern Cape, additional pre-construction monitoring (ACED)
  73. Ezelsjacht Wind Energy Facility, De Doorns, Western Cape, pre-construction monitoring (Mainstream)
  74. Klipkraal Wind Energy Facility, Fraserburg, Northern Cape, avifaunal screening (Klipkraal WEF)
  75. Pofadder Wind Energy Facility, Pofadder, Northern Cape, pre-construction monitoring (Atlantic Renewable Energy Partners)

**Bird Impact Assessment studies and / or GIS analysis:**

1. Aviation Bird Hazard Assessment Study for the proposed Madiba Bay Leisure Park adjacent to Port Elizabeth Airport.
2. Extension of Runway and Provision of Parallel Taxiway at Sir Seretse Khama Airport, Botswana Bird / Wildlife Hazard Management Specialist Study
3. Maun Airport Improvements Bird / Wildlife Hazard Management Specialist Study
4. Bird Impact Assessment Study - Bird Helicopter Interaction – The Bitou River, Western Cape Province South Africa
5. Proposed La Mercy Airport – Bird Aircraft interaction specialists study using bird detection radar to assess swallow flocking behaviour
6. KwaZulu Natal Power Line Vulture Mitigation Project – GIS analysis
7. Perseus-Zeus Powerline EIA – GIS Analysis
8. Southern Region Pro-active GIS Blue Crane Collision Project.
9. Specialist advisor ~ Implementation of a bird detection radar system and development of an airport wildlife hazard management and operational environmental management plan for the King Shaka International Airport
10. Matsapha International Airport – bird hazard assessment study with management recommendations
11. Evaluation of aviation bird strike risk at candidate solid waste disposal sites in the Ekurhuleni Metropolitan Municipality
12. Gateway Airport Authority Limited – Gateway International Airport, Polokwane: Bird hazard assessment; Compile a bird hazard management plan for the airport
13. Bird Specialist Study - Evaluation of aviation bird strike risk at the Mwakirunge Landfill site near Mombasa Kenya
14. Bird Impact Assessment Study - Proposed Weltevreden Open Cast Coal Mine Belfast, Mpumalanga
15. Avian biodiversity assessment for the Mafube Colliery Coal mine near Middelburg Mpumalanga
16. Avifaunal Specialist Study - SRVM Volspruit Mining project – Mokopane Limpopo Province
17. Avifaunal Impact Assessment Study (with specific reference to African Grass Owls and other Red List species) Stone Rivers Arch
18. Airport bird and wildlife hazard management plan and training to Swaziland Civil Aviation Authority (SWACAA) for Matsapha and Sikhupe International Airports



19. Bird Impact Assessment Study - Proposed 60 year Ash Disposal Facility near to the Kusile Power Station
20. Avifaunal pre-feasibility assessment for the proposed Montrose dam, Mpumalanga
21. Bird Impact Assessment Study – Proposed ESKOM Phantom Substation near Knysna, Western Cape
22. Habitat sensitivity map for Denham’s Bustard, Blue Crane and White-bellied Korhaan in the Kouga Municipal area of the Eastern Cape Province
23. Swaziland Civil Aviation Authority – Sikhuphe International Airport – Bird hazard management assessment
24. Avifaunal monitoring – extension of Specialist Study - SRVM Volspruit Mining project – Mokopane Limpopo Province
25. Avifaunal Specialist Study – Meerkat Hydro Electric Dam – Hope Town, Northern Cape
26. The Stewards Pan Reclamation Project – Bird Impact Assessment study
27. Airports Company South Africa – Avifaunal Specialist Consultant – Airport Bird and Wildlife Hazard Mitigation
28. Strategic Environmental Assessment For Gas Pipeline Development, CSIR
29. Avifaunal Specialist Assessment - Proposed monopole telecommunications mast – Roodekrans, Roodepoort, Gauteng (Enviroworks)
30. Gromis-Nama-Aggeneis 400kv lpp Integration: Environmental Screening - Avifaunal Specialist Desktop Study
31. Melkspruit - Rouxville 132kV Distribution Line - Avifaunal Amendment and Walk-through Report
32. Gamma - Kappa 2nd 765kV transmission line – Avifaunal impact assessment GIS analysis

#### **Geographic Information System analysis & maps**

1. ESKOM Power line Makgalakwena EIA – GIS specialist & map production
2. ESKOM Power line Benficsosa EIA – GIS specialist & map production
3. ESKOM Power line Riversong EIA – GIS specialist & map production
4. ESKOM Power line Waterberg NDP EIA – GIS specialist & map production
5. ESKOM Power line Bulge Toulon EIA – GIS specialist & map production
6. ESKOM Power line Bulge DORSET EIA – GIS specialist & map production
7. ESKOM Power lines Marblehall EIA – GIS specialist & map production
8. ESKOM Power line Grootpan Lesedi EIA – GIS specialist & map production
9. ESKOM Power line Tanga EIA – GIS specialist & map production
10. ESKOM Power line Bokmakierie EIA – GIS specialist & map production
11. ESKOM Power line Rietfontein EIA – GIS specialist & map production
12. Power line Anglo Coal EIA – GIS specialist & map production
13. ESKOM Power line Camcoll Jericho EIA – GIS specialist & map production
14. Hartbeespoort Residential Development – GIS specialist & map production
15. ESKOM Power line Mantsole EIA – GIS specialist & map production
16. ESKOM Power line Nokeng Flourspar EIA – GIS specialist & map production
17. ESKOM Power line Greenview EIA – GIS specialist & map production
18. Derdepoort Residential Development – GIS specialist & map production
19. ESKOM Power line Boynton EIA – GIS specialist & map production
20. ESKOM Power line United EIA – GIS specialist & map production
21. ESKOM Power line Gutshwa & Malelane EIA – GIS specialist & map production
22. ESKOM Power line Origstad EIA – GIS specialist & map production
23. Zilkaatsnek Development Public Participation – map production
24. Belfast – Paarde Power line - GIS specialist & map production
25. Solar Park Solar Park Integration Project Bird Impact Assessment Study – avifaunal GIS analysis.
26. Kappa-Omega-Aurora 765kV Bird Impact Assessment Report – Avifaunal GIS analysis.
27. Gamma – Kappa 2nd 765kV – Bird Impact Assessment Report – Avifaunal GIS analysis.
28. ESKOM Power line Kudu-Dorstfontein Amendment EIA – GIS specialist & map production.
29. Proposed Heilbron filling station EIA – GIS specialist & map production
30. ESKOM Lebatlhane EIA – GIS specialist & map production
31. ESKOM Pienaars River CNC EIA – GIS specialist & map production
32. ESKOM Lemara Phiring Ohrigstad EIA – GIS specialist & map production
33. ESKOM Pelly-Warmbad EIA – GIS specialist & map production
34. ESKOM Rosco-Bracken EIA – GIS specialist & map production
35. ESKOM Ermelo-Uitkoms EIA – GIS specialist & map production
36. ESKOM Wisani bridge EIA – GIS specialist & map production

37. City of Tswane – New bulkfeeder pipeline projects x3Map production
38. ESKOM Lebohang Substation and 132kV Distribution Power Line Project Amendment GIS specialist & map production
39. ESKOM Geluk Rural Powerline GIS & Mapping
40. Eskom Kimberley Strengthening Phase 4 Project GIS & Mapping
41. ESKOM Kwaggafontein - Amandla Amendment Project GIS & Mapping
42. ESKOM Lephalele CNC – GIS Specialist & Mapping
43. ESKOM Marken CNC – GIS Specialist & Mapping
44. ESKOM Lethabong substation and powerlines – GIS Specialist & Mapping
45. ESKOM Magopela- Pitsong 132kV line and new substation – GIS Specialist & Mapping
46. Vlakfontein Filling Station – GIS Specialist & Mapping -EIA
47. Prieska – Hoekplaas Solar PV & BESS - GIS Specialist & Mapping – EIA
48. Mulilo Total Hydra Storage (MTHS) De Aar - GIS Specialist & Mapping – EIA
49. Merensky Uchoba Powerline, Steelpoort - GIS Specialist & Mapping – EIA
50. Douglas Solar Part 2 Amendment – grid connection - GIS Specialist & Mapping – EIA

### **Professional affiliations**

- South African Council for Natural Scientific Professions (SACNASP) registered Professional Natural Scientist (reg. nr 400177/09) – specialist field: Zoological Science. Registered since 2009.
- Southern African Wildlife Management Association - Member
- Zoological Society of South Africa - Member



**herewith certifies that**

**Albert Froneman**

Registration Number: 400177/09

**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)

Zoological Science (Professional Natural Scientist)

Effective **8 September 2009**

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. Froneman', written over a horizontal line.

Chief Executive Officer



***ABBREVIATED CURRICULUM VITAE:***  
**STEPHANIE CHRISTIA DIPPENAAR**

*Stephanie Dippenaar Consulting, trading as Ekovler*



**PROFESSION: BAT SPECIALIST**

**Nationality:** South African  
**ID number:** 6402040117089

**CONTACT DETAILS**

Postal Address: 8 Florida Street, Stellenbosch, 7600  
Telephone Number: 021-8801653  
Cell: 0822005244  
e-mail: sdippenaar@snowisp.com

**EDUCATION**

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1986BA University of Stellenbosch  
1987BA Hon(Geography) University of Stellenbosch  
1999MEM (Masters in Environmental Management) University of the Free State

**MEMBERSHIPS**

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- Steering committee of The South African Bat Assessment Association
- Member of the Southern African Institute of Ecologists and Environmental Scientists (SAIEES), since 2002.
- SACNASP registration in process.

**EMPLOYMENT RECORD**

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- 1989: The Academy: University of Namibia. One-year contract as a lecturer in the Department of Geography.
- 1990: Windhoek College of Education. One-year contract as a lecturer in the Department of Geography.
  - Research assistant, Namibian Institute for Social and Economic Research, working on, amongst others, a situation analyses on women and children in Namibia, contracted by UNICEF.
  - Media officer for Earthlife African, Namibian Branch.
- 1991: University of Limpopo. One-year contract as a lecturer in the Department of Environmental Sciences.
- 1992: Max Planck Institute (Radolfzell-Germany). Mainly involved in handling birds and assisting with aviary studies.
- Swiss Ornithological Institute. Working in the Arava valley, Negev – Israel, as a radar operator on a project, contracted by Voice of America, involved in an Impact Assessment Study concerning shortwave towers on bird migration patterns.
- 1993 - 2004: University of Limpopo. Lecturer in the sub-discipline Geography, School of Agriculture and Environmental Sciences. Teaching post- and pre-graduate courses in environment related subjects

## Ezelsjacht WEF: Pre-Construction Bat Monitoring Scoping Report

in the Faculty of Mathematics and Natural Sciences, Faculty of Law, Faculty of Health and the Water and Sanitation Institute.

- 2002-2004: Member of the Faculty Board of the Faculty of Natural Sciences and Mathematics.
- 2002: Principal investigator of the Blue Swallow project, Northern Province, Birdlife SA.
- 2002: Evaluating committee for the EMEM awards (award system for environmental practice at mines in South Africa)
- 2001-2004: Private consultancy work, focussing on environmental management plans for game reserves.
- 2004-2011: CSIR, South Africa, doing environmental strategy and management plans and environmental impact assessments, mainly on renewable energy projects.
- 2011 onwards: Sole proprietor private consultancy.
- From 2015 to 2017: Teaching a part-time course in Environmental Management to Post-graduate students at the Department of Geography and Environmental Studies, University of Stellenbosch.

### **PROJECT EXPERIENCE RECORD**

The following table presents an abridged list of project involvement, as well as the role played in each project:

<b>Completion</b>	<b>Project description</b>	<b>Role</b>
In progress	Preconstruction Bat monitoring at Khoe Wind Energy Facility	Bat specialist
In progress	Preconstruction Bat monitoring at Hugo Wind Energy Facility	Bat specialist
In progress	Operational bat monitoring at Roggeveld Wind Farm	Bat specialist
In progress	Operational bat monitoring at Kangnas Wind Farm	Bat specialist
In progress	Operational bat monitoring at Perdekraal East Wind Farm	Bat specialist
2022	Preconstruction Bat monitoring at Juno 2 and Juno 3 Wind Energy Facilities	Bat specialist
2022	Background study for the impact on bats by Small Scale Wind Turbines in Cape Town Municipality	Bat specialist
In progress	Preconstruction Bat monitoring at Patatskloof Wind Energy Facility	Bat specialist
In progress	Preconstruction Bat monitoring at Karee Wind Energy Facility	Bat specialist
In progress	Operational bat monitoring at Excelsior Wind Farm	Bat specialist
2021	Preconstruction Bat monitoring at Koup 1 and Koup 2 Wind Energy Facilities	Bat specialist
In progress	Preconstruction bat monitoring for two wind energy facilities at Kleinzee	Bat specialist
2021	Preconstruction bat monitoring at Komas and Gromis Wind Energy Facilities	Bat specialist
In progress	Preconstruction Bat monitoring at Kappa 1 and 2 Wind Energy Facilities	Bat specialist
2020	Preconstruction Bat monitoring at Kokerboom 3 and 4 Wind Energy Facilities	Bat specialist
2020	Operational bat monitoring at Khobab Wind Farm	Bat specialist
2020	Operational bat monitoring at Loeriesfontein 2 Wind Farm	Bat specialist

## Ezelsjacht WEF: Pre-Construction Bat Monitoring Scoping Report

Completion	Project description	Role
In progress (year 5)	Operational bat monitoring at the Noupoort Wind Farm	Bat specialist
2019	Paalfontein bat screening study	Bat specialist
2019	12 Amendment reports	Bat specialist
2019	Preconstruction bat impact assessment for the Bosjesmansberg WEF	Bat specialist
2018	Preconstruction Bat Monitoring at the Tooverberg Wind Energy Facility	Bat specialist
2016	Bat “walk through” for the Hopefield Powerline associated with the Hopefield Community WEF	Bat specialist
2016	Environmental Management Plan for Elephants in Captivity at the Elephant Section, Camp Jabulani, Kapama Private Game Reserve.	Project Manager
2016	Environmental Management Plan for Hoedspruit Endangered Species Centre, Kapama Game Reserve.	Project Manager
2012-2013	Bat impact assessment for the Karookop Wind Energy Project EIA.	Bat specialist
2012	Bat specialist study for Vredendal Wind Farm EIA.	Bat specialist
2011-2012	Bat monitoring and bat impact assessment for the Ubuntu Wind Project EIA, Jeffreys Bay.	Bat specialist
2011	Bat specialist study for the Banna Ba Pifhu Wind Energy Development, Jeffrey’s Bay .	Bat specialist
2011(project cancelled)	Basic Assessment for the development of an air strip outside Betty’s Bay.	Project Manager
2011	Bat specialist study for the wind energy facility EIA at zone 12, Coega IDZ, Port Elizabeth.	Bat specialist
2010-2011	Bat specialist study for the Wind Energy Facility EIA at Langefontein, Darling.	Bat specialist
2010-2011	Bat specialist study for the EIA concerning four wind energy development sites in the Western Cape.	Bat specialist
2010	Bat specialist study for Electrawinds Wind Project EIA, Port Elizabeth.	Bat specialist
2010	Environmental Management Plan for the Goukou Estuary.	Project Manager
2010	EIA for the 180MW Jeffrey’s Bay Wind Project, Eastern Cape (Authorisation received).	Project Manager
2010	EIA for 9 Wind Monitoring Masts for the Jeffrey’s Bay Wind Project (Authorisation received).	Project Manager
2009-2010	EIA for the NamWater Desalination Plant, Swakopmund (Authorisation received).	Project Manager
2007 -2011	EIA for the proposed Jacobsbaai Tortoise reserve, Western Cape(Letf CSIR before completion of project, Authorisation rejected).	Project Manager
2007-2008	Environmental Impact Assessment for the Kouga Wind Farm, Jeffrey’s Bay, Eastern Cape (Authorisation received).	Project Manager
2006-2008	Site Selection Criteria for Nuclear Power Stations in South Africa.	Co-author
2005	Auditing the Environmental Impact Assessment process for the Department of Environment and Agriculture, Kwazulu Natal, South Africa	Project Manager
2005	Background paper on Water Issues for discussions between OECD countries and Developing Countries.	Author



## Ezelsjacht WEF: Pre-Construction Bat Monitoring Scoping Report

Completion	Project description	Role
2005	Integrated Environmental Education Strategy for the City of Tshwane.	Co- author
2005	Developing a ranking system prioritizing derelict mines in South Africa, steering the biodiversity section.	Contributor
2005	Policy and Legislative Section for a Strategy to improve the contribution of Granite Mining to Sustainable Development in the Brits-Rustenburg Region, North-West Province, South Africa.	Author
2005	Environmental Management Plan for the purpose of Leopard permits: Dinaka Game Reserve.	Project Manager in collaboration with Flip Schoeman†
2004	Environmental Management Plan for the introduction of lion: Pride of Africa.	Project Manager in collaboration with Flip Schoeman†
2004	Environmental Management Plan for the establishment of a Conservancy: Greater Kudu Safaris	Project Manager in collaboration with Flip Schoeman†

### **MEMBERSHIPS, CONFERENCES, WORKSHOPS AND COURSES**

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- Member of the Steering Committee of the South Africa Bat Assessment Association.
- Member of the KZN Bat Rescue Group.
- Updated Basic Fall Arrest certification.
- Presenting a paper at the South African Bat Assessment Association conference, October 2017: Ackerman, C and S.C Dippenaar, 2017: Friend or Foe? The Perception of Stellenbosch Residents Towards Bats, 2017.
- Attend Snake Awareness, Identification and Handling course by Cape Reptile Institute, 2016.
- Attend a course in the management and care of bats injured by wind turbines by Dr. Elaenor Richardson, Kirstenbosch, 27 August 2014
- Mist netting and bat handling course by Dr. Sandie Sowler, Swellendam, 5 November 2013.
- Attendance and fieldwork to identify bat species and look at new Analoow software with Chris Corben, the writer of the Analoow bat identification software package and the Anabat Detector, during 10 and 11 October 2013.
- Attend yearly Bats and Wind Energy workshops.
- A four-day training course on Bat Surveys at proposed Wind Energy Facilities in South Africa, hosted by The Endangered Wildlife Trust, Greyton, between 22 and 26 January 2012.
- Presentation as a plenary speaker at the 4th Wind Power Africa Conference and Renewable Energy Exhibition, at the Cape Town International Convention Centre, on 28 May 2012. Title: *Bat Impact Assessments in South Africa: An advantage or disadvantage to wind development EIAs.*
- Anabat course by Dr. Sandy Sowler, Greyton, February 2011.
- Attending a Biodiversity Course for Environmental Impact Assessments presented by the University of the Free State, May 2010.

### **LANGUAGE CAPABILITY**

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Fluent in Afrikaans and English, very limited Xhosa

### **PEER REVIEWED PUBLICATIONS**

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## Ezelsjacht WEF: Pre-Construction Bat Monitoring Scoping Report

- Dippenaar, S, and Lochner, P (2010): EIA for a proposed Wind Energy Project, Jeffrey's Bay in SEA/EIA Case Studies for Renewable Energy.
- Dippenaar, S. and Kotze, N. (2005): People with disabilities and nature tourism: A South African case study. *Social work*, 41(1), p96-108.
- Kotze, N.J. and Dippenaar, S.C. (2004): Accessibility for tourists with disabilities in the Limpopo Province, South Africa. In: Rodgerson, CM & G Visser (Eds.), *Tourism and Development: Issues in contemporary South Africa*. Institute of South Africa.



## APPENDIX 2 – CURRICULUM VITAE

### DAVID ALAN EDGE

**Date of birth:** 22<sup>nd</sup> August 1943  
**Place of birth:** Ormskirk, Lancs., UK  
**Residence:** Brenton-on-Sea, Knysna, Western Cape

### QUALIFICATIONS

**1965** MA (Cantab) – Mechanical Engineering  
**2001** BSc (cum laude) – Zoology & Botany (UNISA)  
**2002** BSc (Hons) (cum laude) – Environmental Science (Potchefstroom University)  
Specialising in Biodiversity and Conservation biology  
**2006** PhD in Environmental Sciences – North-West University. Thesis entitled “The ecology and conservation of the Brenton Blue”  
**2020** Professional Natural Scientist (Ecological Science) – SACNASP registration no. 129735.

### ENGINEERING & MANAGEMENT CAREER

**1965 – 1973** **Nchanga Consolidated Copper Mines, Zambia**  
**Assistant Divisional Engineer**  
Maintenance engineering and management  
**1973-1979** **Palabora Mining Company**  
**Assistant General Manager**  
Operations and maintenance management, mechanical engineering and extractive metallurgy, general management  
**1979-1993** **LTA Process Engineering**  
**Managing Director**  
General management, marketing, project engineering and management, design engineering, procurement and construction management.

### LEPIDOPTERISTS'S SOCIETY OF AFRICA (LEPSOC AFRICA)

**1983** Founder member  
**1984–2021** Council member  
**1993–2021** Representative – Southern Cape  
**2008–2019** Treasurer  
**2011–2021** Editor – *Metamorphosis*, a scientific journal dedicated to the study of African Lepidoptera

### CONSERVATION ACTIVITIES

**1993–1996** Leading role-player in the campaign to save Brenton Blue  
**1995–2018** Brenton Blue Management Committee - member and leader of research programme  
**1999–2018** Knysna Environmental Forum - Co-chairman  
**2005–2018** Brenton Blue Trust – Trustee  
**2008–2013** South African Butterfly Conservation Assessment (SABCA)  
Digitised own collection of over 8000 specimens of South African butterflies. Project leader for the southern Cape – an area of 60 000 sq. km, supervising three other field workers. Field surveys yielded over 2500 new species–QDGS records. Editor of South African Butterfly Atlas, lead author for Chapters 3 and 4 (see publications below). Authored over 100 species accounts (out of 800)  
**2011–2021** Leader of the Conservation of Rare and Endangered Lepidoptera (COREL) programme for South Africa, including being “Custodian” for six species.  
**2015-2019** Taxon Lead – Butterflies for the BioGaps project to establish the biological diversity of the ‘Shale Gas Fracking’ area of the Karoo  
**2015-2020** Project Director for the South African Lepidoptera Conservation Assessment (SALCA) project carried out for the South African Biodiversity Institute (SANBI)

### ENVIRONMENTAL CONSULTING

#### Dave Edge & Associates Environmental Consulting (57 projects)

1997 – 2001	Sparrebosch, Knysna	Detailed butterfly surveys for EIA and monitoring
2000 – 2004	Roodefontein, Plettenberg Bay	Butterfly surveys for scoping report and EIA
2001	Pezula Estate, Knysna	Preliminary assessment of butterfly potential
2001	The Cove, Knysna	Preliminary assessment of butterfly potential
2001 – 2003	Fernwood, Knysna	Butterfly surveys for scoping report and EIA
2003 – 2004	The Lakes, Sedgefield	Butterfly survey for scoping report and EIA
2004 – 2005	Lagoon Bay, Glentana	Butterfly survey for scoping report and EIA
2004 – 2006	Paradise Coast, Mossel Bay	Butterfly survey for scoping report and EIA

2004 – 2005	Pezula@Hunters, Knysna	Butterfly survey for scoping report and EIA
2004 – 2006	Uitzicht 216-176, Knysna	Butterfly survey for scoping report and EIA
2004 – 2008	Pierpoint Nature Estate, Knysna	Butterfly survey for scoping report and EIA
2005 – 2006	Erf 4016 Eastford, Knysna	Butterfly survey for scoping report
2006 – 2007	Stilbaai Farm 485/51	Butterfly survey for scoping report
2006 – 2008	Destiny Africa, George	Butterfly survey for scoping report
2008	Eskom, Nuclear Power Stations	Preliminary assessment of butterfly potential
2009	Pierpoint Nature Estate, Knysna	Research programme to establish ecology of <i>A. almeida</i>
2009 – 2010	Eskom, Nuclear Power Stations	Detailed butterfly surveys (3 power station sites)
2011 – 2012	Uitzicht 216-77, Brenton	Biodiversity survey for scoping report
2012	Green View Estate, Mossel Bay	Butterfly survey for scoping report
2015	Zeelandsnek, Oudtshoorn	Butterfly survey for scoping report
2015 – 2018	Mossel Bay Cemetery project	Butterfly survey for scoping report; monitoring programme
2016	Schaapkraal, Cape Town	Butterfly scoping and sensitivity report
2016 – 2019	Entabeni Estate, Knysna	Management plan for butterfly reserve
2016 – 2019	Uitzicht 216-71 & 72, Brenton	EIA for development proposal
2017 – 2019	Hartenbosheuvels	Butterfly scoping study
2019	Abalone Hatchery, Gouritsmond	Desk top study – butterflies
2019	Lamloch Safari Park, Kleinmond	Butterfly survey
2019	Village-on-Sea, Mossel Bay	Butterfly survey
2019	Mossel Bay Golf Estate	Butterfly survey
2019	Lamloch Safari Park, Kleinmond	Preliminary butterfly survey for scoping report
2019	Garden Route Dam, George	Preliminary butterfly survey for scoping report
2020	Drakenzicht, Paarl	Terrestrial biodiversity compliance statement – butterflies
2020	Rouen Farm, Gordon's Bay	Terrestrial biodiversity compliance statement – butterflies
2020	Still Bay Cemetery	Terrestrial biodiversity sensitivity – butterflies
2020	Nuweveld Wind Farm, W Cape	Desk top study of potential impact on butterflies
2020	Nuweveld Wind Farm, W Cape	Butterfly survey to determine occurrence of ERT butterflies
2020	Kokerboom Wind Farm, N Cape	Desk top study of potential impact on butterflies
2020–2021	Villa Billion Project, Kuils River	Terrestrial biodiversity compliance statement – butterflies
2021	Erf 4016, Knysna	Environmental impact assessment – butterflies
2021	Impofu Grid Extension, E Cape	Butterfly sensitivity study; habitat modelling
2021	Belhar Project, Cape Town	Terrestrial biodiversity sensitivity – butterflies
2021	Hoogland Wind Farm, W. Cape	Desk top study of potential impact on butterflies
2021	Still Bay West Erf 485-82 & 92	Desk top study, site survey and TBCS – butterflies
2021	Aalwyndal Erf 21275, Mossel Bay	Desk top study, site survey and TBCS – butterflies
2021	Still Bay East Erf 1692	Desk top study, site survey and TBCS – butterflies
2021	Hoogland Wind Farm, W. Cape	Butterfly survey to determine occurrence of ERT butterflies
2021	Zandberg Sand Mine Expansion	Desk top study, site survey and EIA – butterflies
2021	Aalwyndal Erven 21238 & 9	Desk top study, site survey and TBCS – butterflies
2022	Aalwyndal Erven 205 & 220	Butterfly site survey
2022	Still Bay West Erf 591	Desk top study, site survey and TBCS – butterflies
2022	Knysna Uitzicht 216-111	Desk top study and preliminary site survey – butterflies
2022	Mfuleni, Cape Town	Desk top study and site survey – butterflies
2022	Ezelsjacht Wind & Solar	Desk top study – butterflies
2022	Jongensfontein, Still Bay	Desk top study, site survey and EIA – butterflies
2022	Klein Brak Hotel	Desk top study and TBCS – butterflies
2022	Vrygrond, Cape Town	Desk top study and site survey – butterflies
2022	Retreat, Cape Town	Desk top study and site survey – butterflies

## ACADEMIC CAREER

### 2009–2014 North-West University (Potchefstroom) Senior Lecturer

Developed new post graduate teaching module for “Conservation Ecology”  
Lectured to postgraduate (honours and masters) students on Conservation Ecology; including setting and marking assignments and examination papers.

## AWARDS

- 1998** The Habitat Council "for outstanding achievements in the field of environmental conservation and management – for his role in helping to secure the habitat of the endangered Brenton Blue butterfly"
- 2003** LepSoc Africa – June 2003 – Chairman's Award "for the most significant contribution to African Lepidoptera conservation for the period July 2002 – June 2003"
- 2013** LepSoc Africa – October 2013 – President's Award "for his passion and commitment leading the development and completion of the new *e-Metamorphosis* web journal.
- 2015** LepSoc Africa – August 2015 – Honorary Life Membership.
- 2018** LepSoc Africa – September 2018 – President's Award "in acknowledgement of his tireless work and commitment to the Lepidopterists' Society of Africa".

## PUBLICATIONS IN SCIENTIFIC JOURNALS (39 Articles)

- EDGE, D.A.** 1982. Re-discovery of *Erikssonia acraeina* Trimen. *Rostrum*, **1**(2): 2
- EDGE, D.A.** 1985. Life history of *Iolaua diametra natalica* Vári. *Metamorphosis*, **1**(13): 4–6
- EDGE, D.A.** 1987. Life history of *Iolaua pallene* (Wallengren). *Metamorphosis*, **1**(19): 3–5
- EDGE, D.A.** 1990. Life history - *Aphnaeus hutchinsonii* Trimen 1887. *Metamorphosis*, **1**(27): 16–18
- EDGE, D.A.** & PRINGLE, E.L. 1996. Notes on the natural history of the Brenton Blue *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *Metamorphosis* **7**(3): 109–120
- EDGE, D.A.** 2002. Some ecological factors influencing the breeding success of the Brenton Blue *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *Koedoe* **45**(2): 19–34
- EDGE, D.A.** 2005a. Butterfly conservation in the southern Cape. *Metamorphosis* **16**(2): 28–46
- EDGE, D.A.** 2005b. Ecological factors influencing the survival of the Brenton Blue butterfly, *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). Potchefstroom: North-West University. (Thesis–D.Phil.)
- EDGE, D.A.** 2005c. Life history and ecological observations on *Aloeides pallida*, undescribed subspecies (Lepidoptera: Lycaenidae). *Metamorphosis* **16**(4): 110–115
- EDGE, D.A.** & WILLIAMS, M.C. 2005. Observations on the life history of *Lepidochrysops balli* Dickson (Lepidoptera: Lycaenidae). *Metamorphosis* **16**(4): 106–109
- EDGE, D.A.** & PRINGLE, E.L. 2006. Observations on the life history of *Chrysothrix braueri* (Pennington) (Lepidoptera: Lycaenidae). *Metamorphosis* **17**(4): 134–139
- EDGE, D.A.** 2007. The Brenton Blue – tiny icon for biodiversity. *Vision – Endangered Wildlife Trust 15<sup>th</sup> Annual*. Future Publishing, Rivonia.
- TERBLANCHE, R.F. & **EDGE, D.A.** 2007. The first record of an *Orachrysops* in Gauteng. *Metamorphosis* **18**(4): 131–141
- EDGE, D.A.** 2008a. Adult behaviour of *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *Metamorphosis* **19**(3): 116–126.
- EDGE, D.A.** 2008b. Environmental management plan: Brenton Blue butterfly special nature reserve: Revision 2 (unpublished). CapeNature document. 43 pp.
- EDGE, D.A.**, CILLIERS, S.S. & TERBLANCHE, R.F. 2008. Vegetation associated with the Brenton Blue butterfly. *South African Journal of Science* **104**(11/12): 505–510.
- EDGE, D.A.**, ROBERTSON, H.G. & VAN HAMBURG, H. 2008. Ant assemblages at potential breeding sites for the Brenton Blue butterfly *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *African Entomology* **16**(2): 253–262.
- EDGE, D.A.** & VAN HAMBURG, H. 2009. Larval feeding behaviour and myrmecophily of the Brenton Blue butterfly *Orachrysops niobe* (Trimen). *Journal of Research on the Lepidoptera* **42**: 21–33.
- EDGE, D.A.** 2011a. The Brenton Blue butterfly – twenty years of conservation. *Environment* **6**: 34–35.
- EDGE, D.A.** 2011b. Custodians of rare and endangered Lepidoptera (COREL). *Metamorphosis* **22**(3): 81–96.
- EDGE, D.A.** & TERBLANCHE, R.F. 2011. A rapid assessment protocol for surveying and monitoring diurnal Lepidoptera in Africa. *Metamorphosis* **22**(3): 75–80.
- EDGE, D.A.**, TERBLANCHE, R.F., HENNING, G.A., MECENERO, S. and NAVARRO, R. 2013. Butterfly conservation in South Africa: Analysis of the Red List and threats. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Saffronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 13–33.
- EDGE, D.A.**, WOODHALL, S.E., BALL, J.B., HENNING, G.A., ARMSTRONG, A.J. and MECENERO, S. 2013. Future priorities for butterfly conservation and research. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Saffronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 36–40.
- EDGE, D.A.** 2013. Family Lycaenidae Leach, 1815. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Saffronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 335–610.
- MECENERO, S., BALL, J.B., **EDGE, D.A.**, HAMER, M.L., HENNING, G.A., KRÜGER, M., PRINGLE, E.L., TERBLANCHE, R.F., and WILLIAMS M.C. (eds). 2013. *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Saffronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town.
- MECENERO, S., NAVARRO, R., COETZER, B. and **EDGE, D.A.** 2013. Description of data and methods. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Saffronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 3–11.
- EDGE, D.A.** 2014. Searching in the Waterberg for *Erikssonia edgei* Gardiner & Terblanche, 2010 during December 2011 & January 2012. *Metamorphosis* **25**: 77–81.
- GARVIE, O.G., DOBSON, J., **EDGE, D.A.**, GARDINER, A.J., TERBLANCHE, R.F. & WILLIAMS, M.C. (2014). Research and conservation plan for the Waterberg Copper (*Erikssonia edgei* Gardiner & Terblanche, 2010) (Lepidoptera: Lycaenidae) at the Bateleur Nature Reserve. *Metamorphosis* **25**: 100–108
- BAZIN, E.A. & **EDGE, D.A.** 2015. The ecology and conservation of *Thestor brachycerus brachycerus* (Trimen, 1883) – an aphytophagous miletine butterfly from South Africa. *Journal of Insect Conservation* **19**(2): 349–357.
- EDGE, D.A.** & MECENERO, S. 2015. Butterfly conservation in southern Africa. *Journal of Insect Conservation* **19**(2): 325–339.
- GILIOME, J.H. & **EDGE, D.A.** 2015. The ants and scale insects on which the critically endangered butterfly *Chrysothrix dicksoni* (Gabriel) (Lepidoptera: Lycaenidae: Aphnaeinae) depends for its survival. *Metamorphosis* **26**: 38–43.
- WILLIS, C.K. & **EDGE, D.A.** 2015. Oviposition and mating behaviour in *Orachrysops warreni* G.A. & S.F. Henning, 1994 (Lepidoptera: Lycaenidae: Polyommatae), in Mpumalanga, South Africa. *Metamorphosis* **26**: 1–3.
- MECENERO, S. & **EDGE, D.A.** 2015. Southern African Lepidoptera Conservation Assessment (SALCA). *Metamorphosis* **26**: 116–122.



- EDGE, D.A.** 2016. Vegetation associated with the critically endangered butterfly *Chrysoritis dicksoni* (Gabriel, 1947) (Lepidoptera: Lycaenidae: Aphnaeinae) at Witsand, Western Cape Province. *Metamorphosis* **27**: 66–77.
- EDGE, D.A.** 2018. A new species of *Cooksonia* Druce, 1905 (Lepidoptera: Lycaenidae: Poritiinae) from Western Zambia. *Metamorphosis* **29(1)**: 51–55.
- EDGE, D.A.** & MECENERO, S. 2019. Karoo BioGaps project – butterfly survey results and their interpretation. *Metamorphosis* **30(1)**: 58–68.
- ARMSTRONG, A.J., LOUW, S. L., STAUDE, H. S., TERBLANCHE, R. F., **EDGE, D. A.**, VAN NOORT, S. 2020. Observations on parasitoid interaction with *Zerenopsis lepida* (Walker, 1854) (Lepidoptera: Geometridae: Ennominae: Diptychini) at Entumeni Nature Reserve, KwaZulu-Natal, South Africa. *Metamorphosis* **31(1)**: 49–52.
- STAUDE, H.S., MACLEAN, M., MECENERO, S., PRETORIUS, R.J., OBERPRIELER, R.G., VAN NOORT, S., **EDGE, D.A.**, WILLIAMS, M.C. & SIHVONEN, P., *et al.* (2020). An overview of Lepidoptera-host-parasitoid associations for southern Africa, including an illustrated report on 2 370 African Lepidoptera-host and 119 parasitoid-Lepidoptera associations. *Metamorphosis* **31(3)**: 1–380.
- MECENERO, S., **EDGE, D.A.**, STAUDE, H.S., COETZER, B.H., COETZER, A.J., RAIMONDO, D.C. & WILLIAMS, M.C., *et al.* 2020. Outcomes of the Southern African Lepidoptera Conservation Assessment (SALCA). *Metamorphosis* **31(4)**: 1–160.

# CURRICULUM VITAE



## STUART HEATHER-CLARK

TECHNICAL DIRECTOR  
AFRICA POWER SECTOR LEAD

Environmental Management Planning & Approvals,  
Africa

### QUALIFICATIONS

Masters	1996	Environmental Science
BSc (Hons)	1992	Civil Engineering
EAPASA	2019	Registered Environmental Assessment Practitioner SA # 2019/613

### EXPERTISE

- Environmental and Social Impact Assessment
- Environmental Management Plans/Programmes
- Public Participation & Facilitation
- Environmental & Social Due Diligence
- Environmental & Social Screening & Site Selection
- Training and Capacity Building
- Strategic Environmental Assessment

Stuart has over 24 years of environmental and social consulting experience in Africa. Having worked on over 130 development projects in Africa, his key strength is identifying and managing ESG risks for major capital projects from the concept phase through to the pre-feasibility, feasibility and implementation phases.

Through leading Environmental & Social Screening Studies, Environmental & Social Impact Assessments and Environmental & Social Due Diligences for major capital project in over 13 African countries; Stuart has developed a deep appreciation of key sustainability challenges facing development in Africa. He has excellent project management skills with the ability to manage projects from the concept phase through to project completion.

Stuart has worked for and with a number of IFI's, DFI's and PE firms to identify and managing ESG risks of their investments in Africa. He has an integral knowledge of the Equator Principles and IFC Performance Standards and understands the expectations of lenders and financial institutions when it comes to managing ESG risks.

Stuart has worked across various sectors including O&G, mining, infrastructure and power. Over the past ten years he has focussed on the power sector leading projects for wind farms, solar PV plants, hydropower plants and gas to power plants. More recently he has advised various clients on the regulatory challenges for green hydrogen projects in Southern Africa.

### PROJECTS

#### All Sectors

**ESIA for a 2GW solar PV plant and associated Green Hydrogen Project, South Africa, Confidential Client (2021-22)**

Project Director for an ESIA for a Green Hydrogen project including 2GW solar PV generation, transmission, desalination plant, water pipeline, electrolysis and hydrogen storage, ammonia production and storage and associated port facilities.

**ESIA for full scale Hydrogen Production Facility on the Mogalakwena Platinum Mine in South Africa (2022)**

Project Director for an ESIA for the Anglo American's Full Scale Hydrogen Production Plant at Mogalakwena Platinum Mine in South Africa. The project forms part of Anglo American's NuGen™ programme as part of their FutureSmart Mining™ programme in order to develop a hydrogen-powered mining truck fleet in collaboration with leading fuel cell, electrolyser, battery and engineering firms.

<p><b>ESIA for a Hybrid Solar PV-BESS-Green Hydrogen Fuel Cell Power Plant in Swakopmund, Namibia (2022)</b></p>	<p>Project Director for an ESIA for the establishment of the Renewstable® Swakopmund project, that will generate consistent, reliable, and clean renewable power from an intermittent source of energy. The Hybrid Power Plant consists of a 85 MW solar PV plant, Battery Energy Storage System, a desalination plant, electrolysis plant, hydrogen storage, a 6MW hydrogen fuel cell, substations and transmission lines.</p>
<p><b>Environmental and Social Alternatives Assessment for a 5GW Green Hydrogen Project, Namibia, Confidential Client (2022)</b></p>	<p>Project Director for an Environmental and Social Alternatives Assessment for a 5GW Green Hydrogen Project, Namibia. The project includes 5GW's of wind and solar PV generation, battery energy storage, transmission, desalination plant, water pipeline, electrolysis and hydrogen storage, ammonia production and storage and associated port facilities.</p>
<p><b>Regulatory Review for the permitting of green hydrogen and ammonia projects in South Africa, Confidential Client (2021)</b></p>	<p>Project Director for the regulatory review for permitting of green hydrogen and ammonia projects in South Africa.</p>
<p><b>Environmental and Social Screening and constraints mapping for a 5GW green hydrogen project, Namibia, Confidential Client (2021)</b></p>	<p>Project Director for an environmental and social screening and constraints mapping for green hydrogen project in response to the Namibian Governments RFP to conduct feasibility activities within the Tsau//Khaeb (Sperrgebiet) National Park for Renewable Wind Energy. NIPDB/RFP/SCDI/2021-001.</p>
<p><b>Position Paper of the green hydrogen market in South Africa, Confidential Client (2021)</b></p>	<p>Researcher and lead author for a position paper on the green hydrogen market in South Africa including global trends and South African environmental regulatory requirements.</p>
<p><b>ESIA for four 250MW wind energy facilities and associated transmission lines, Red Cap (2021)</b></p>	<p>Project Director for the ESIA for 4 x 250MW wind energy facilities and associated transmission line. The ESIA includes terrestrial and aquatic biodiversity, avifauna and bat monitoring, visual, social and heritage baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP.</p>
<p><b>Environmental and Social Screening Study for a Wind Energy Facility to provide power to a green hydrogen facility, Confidential Client (2021)</b></p>	<p>Project Director for an Environmental and Social Screening Study for a Wind Energy Facility to provide power to a green hydrogen facility on the east coast of South Africa.</p>
<p><b>E&amp;S Advisory (RMIPPPP) for the establishment of a 450MW OCGT Power Plant in Richards Bay, Confidential Client, (2020)</b></p>	<p>Project Director for advisory services for the development of a 450MW LPG OCGT Power Plant in Richards Bay. Advisory services included the review of the Final Scoping Report and all associated documents.</p>
<p><b>Environmental Authorisation Amendment (RMIPPPP) for a 1500MW OCGT/CCGT Power Plant in Atlantis, Confidential Client, South Africa (2020)</b></p>	<p>Project Director for the Amendment of the Environmental Authorisation for the change of the project from an 1500MW OCGT/CCGT Power Plant using LNG as a fuel source, to a 400MW OCGT power plant using LPG as a fuel source. EA Amendment includes undertaking revised air quality, noise, risk assessment, climate change, flora and heritage studies. Process includes stakeholder engagement.</p>

<p><b>Environmental Authorisation Review (RMIPPPPP) for a 1507MW OCGT/CCGT Power Plant in Saldanha Bay, Confidential Client, South Africa (2020)</b></p>	<p>Project Director for the review of the Environmental Authorisation for the change of Phase 1 of the project from OCGT Power Plant using LNG as a fuel source, to a OCGT power plant using LPG as a fuel source. EA Amendment includes undertaking revised air quality, noise, risk assessment, climate change, flora and heritage studies. Process includes stakeholder engagement.</p>
<p><b>ESIA for 4 x 100MW solar PV plants and associated transmission lines, Freestate, South Africa, Confidential client, (2020 - 21)</b></p>	<p>Project Director for the ESIA for 4 x 100MW solar PV Plants associated transmission line. The ESIA includes terrestrial and aquatic biodiversity, avifauna, visual, social and heritage baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP.</p>
<p><b>Environmental and Social Impact Assessment for a 20MW solar PV plant and transmission line, Gigawatt Global, Liberia, (2020)</b></p>	<p>Project Director for the ESIA a 20MW solar PV plant and associated transmission line. The ESIA includes biodiversity, social and heritage baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP. The ESIA will be aligned with the IFC Performance Standards.</p>
<p><b>ESIA for an 80-200 MW wind farm development, Mphepo Power, Zambia (2019-20)</b></p>	<p>Project Director for the ESIA for the development of a wind farm in Zambia. The ESIA included terrestrial and aquatic, social, heritage, noise and visual baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP. The ESIA was aligned with the IFC Performance Standards.</p>
<p><b>Environmental and Social Impact Assessment for a Road Upgrade, QGMI, Ghana, (2019-20)</b></p>	<p>Project Director for the Scoping Phase of the Environmental and Social Impact Assessment process for the proposed Winneba Obetsebi-Lamptey Flyover (Phase 2) project in Accra, Ghana in collaboration with local consultants. The project included additional visual impact assessment, air quality modelling and noise modelling. All work undertaken to IFC Performance Standards.</p>
<p><b>Environmental and Social Impact Assessment (ESIA) for the Gamsberg Mine Zinc Smelter, Black Mountain Mine (Vedanta), South Africa (2019-20)</b></p>	<p>Project Director for the ESIA for a new zinc smelter and associated infrastructure to beneficiate the 250 000 to 300 000 tpa of zinc concentrate produced at the Gamsberg Zinc Mine Phase-1 concentrator plant. The ESIA included extensive baseline studies including biodiversity, social, air quality, noise, visual, hydrology, geohydrology, and climate change. The process included extensive stakeholder engagement during the scoping and impact assessment phase.</p>
<p><b>ESIA Scoping Phase for the desalination plant and water carrier system, NamWater, Windhoek Namibia (2019-20)</b></p>	<p>Team member for the ESIA Scoping Phase for the proposed desalination plant and water carriage system to secure water supply to the central coast, Windhoek and en-route users. The Scoping Process included extensive stakeholder engagement and the Scoping Report was aligned with the KfW Sustainability Guidelines and World Bank Environmental and Social Standards.</p>
<p><b>Environmental &amp; Social Due Diligence for 5MW solar PV plant, Confidential Client, Namibia (2019)</b></p>	<p>Project Director for an Environmental and Social (E&amp;S) Due Diligence (Red Flags only) of a 5 MW solar PV facility located near Outapi, Namibia.</p>
<p><b>Environmental &amp; Social Screening Study for 20MW solar PV plant, CIGenCo, Eswatini (2019)</b></p>	<p>Project Director for an Environmental and Social (E&amp;S) Screening Study of two potential sites for development of solar PV projects as part of CIGenCo's bid as part of the Eswatini Independent Power Producers Policy (ESIPPP).</p>

<p><b>Permitting Strategy and Planning for the Rovuma LNG Project in Mozambique, ExxonMobil, Mozambique (2018-2019)</b></p>	<p>Team member supporting Exxon with the permitting strategy and plans for the Rovuma LNG Project in northern Mozambique.</p>
<p><b>Environmental and Social Impact Assessment (ESIA) Gap Analysis for a 50MW solar PV Plant, Volt Renewable, Zimbabwe (2018)</b></p>	<p>Environmental lead for the review of the locally approved EIA against the IFC Performance Standards. Gaps were identified and an Environmental and Social Action Plan (ESAP) developed to close the gaps.</p>
<p><b>Environmental and Social Impact Assessment (ESIA) Gap Analysis for a 5-star hotel development, Motal-Engil, Zimbabwe (2018)</b></p>	<p>Environmental lead for the review of the locally approved EIA against the IFC Performance Standards. Gaps were identified and an Environmental and Social Action Plan (ESAP) developed to close the gaps.</p>
<p><b>Environmental and Social Screening Study for a 100MW hybrid HFO and Solar PV Power Plant for a mine in Mali, Confidential client (2018)</b></p>	<p>Environmental lead for the screening of environmental and social risks for the development of a solar PV plant on a mine in Mali.</p>
<p><b>Environmental and Social Screening Study for 3 x 40MW solar PV plants, Confidential Client, GETFIT Zambia (2018)</b></p>	<p>Project Manager for an environmental and social screening study for 3 x solar PV sites in Zambia. The Screening Study included the review of desk top information and site visits to assess environmental and social risks. A comparative analysis was undertaken to select the site with the least environmental and social risks. This was combined with the technical analysis to select the preferred site to be taken into more detailed studies.</p>
<p><b>Environmental and Social Impact Assessment for a 40MW solar PV farm for Goldfield's South Deep Mine, Enel Green Power, South Africa (2017)</b></p>	<p>Project Director for an Environmental and Social Impact Assessment for a 40MW solar PV plant for Goldfield's South Deep Mine in South Africa. The study included scoping and stakeholder engagement, various specialist studies and the compilation of an ESIA Report and ESMP.</p>
<p><b>Environmental and Social Impact Assessment for 2 run-of-river Hydropower Plants and associated transmission lines in Northern Zambia, Globeleq, Zambia (2017)</b></p>	<p>Project Director for an Environmental and Social Impact Assessment for 2 run-of-river hydropower plants and associated transmission lines on the Kalungwishi River in Northern Zambia. The study included scoping and stakeholder engagement, various specialist studies including environmental flow, heritage, social, biodiversity, visual, noise and other studies. All work was undertaken to IFC Performance Standards. The project was put on hold after the baseline and Scoping Phase.</p>
<p><b>Environmental and Social Screening Study for an 212MW HFO Power Plant, Confidential Client, Angola (2017)</b></p>	<p>Project Director for an Environmental and Social Screening Study for a 212MW HFO Power Plant in Angola. The study included noise and air quality baseline sampling, soil and groundwater baseline sampling, community health screening, and the compilation of a detail legal register and compliance road map.</p>

<b>Environmental and Social Screening Study for a Hydropower Plant in Gabon, Confidential Client, Gabon (2017)</b>	Environmental and Social Screening Study for a Hydropower Plant in Gabon, Confidential Client, Gabon, 2017
<b>Environmental and Social Due Diligence (ESDD) for two Solar PV and two Wind Farm Projects South Africa, Confidential Client, South Africa (2017)</b>	Project Director for the ESDD for two Solar PV and two Wind Farm Projects in South Africa.
<b>Environmental, Health and Safety Risk assessment of four Solar PV sites in South Africa, Enel Green Power, South Africa (2017)</b>	Project Director for the EHS Risk Assessments.
<b>Environmental and Social Impact Assessment for a 100MW to 250MW solar PV Plant, Globeleq, Zambia (2016-17)</b>	Project Director for an Environmental and Social Impact Assessment for a 100MW to 250MW solar PV plant in Zambia. The study included the analysis of key environmental and social impacts, compilation of an ESIA and ESMP reports and stakeholder engagement.
<b>Environmental and Social Screening Study for a solar PV Plant, Confidential client, Zambia (2016)</b>	Project Director for an Environmental and Social Screening Study for the establishment of solar PV power plant in Zambia. The study included the analysis of key environmental and social risks including regulatory, biodiversity and social risks.
<b>Environmental and Social Due Diligence, Six Solar PV Farms, Confidential Client, South Africa (2016)</b>	Project Director for an ESDD for six solar pv farms in South Africa. The ESDD was undertaken against SA Legislation and Regulations and IFC Performance Standards.
<b>Environmental and Social Impact Assessment for a CCGT Power Plant, ArcelorMittal, South Africa (2016)</b>	Project Director for an Environmental and Social Impact Assessment study for the establishment of a 1500MW CCGT power plant for ArcelorMittal in Saldanha Bay, South Africa. The ESIA includes detailed specialist studies including air emissions modelling, noise modelling, biodiversity and heritage assessment. Full stakeholder engagement is also part of the scope of work.
<b>Environmental and Social Management Plans, Wind Farm Development, Confidential Client, Kenya (2016)</b>	Project Director and involved in advising the client on various strategies including vantage point bird monitoring and management plan development.
<b>Environmental and Social Screening Study of potential solar PV sites, Confidential Client, Ivory Coast (2016)</b>	Environmental and Social Screening Study of potential solar PV sites, Confidential Client, Ivory Coast, 2016
<b>Environmental and Social Impact Assessment for the Tete-Macuse Railway Line and Macuse Power Development, Italthai, Mozambique (2015-17)</b>	Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Tete-Macuse railway line and Macuse Port development for the export of coal from Tete Province in Mozambique. The project included the development of over 700km of railway line and a new port development.



<b>Strategic Environmental Assessment for the supporting infrastructure for the Baynes Hydropower Project, Baynes PJTC, Namibia/Angola (2014-15)</b>	Project Director for the Strategic Environmental Assessment of the associated infrastructure for the Baynes hydropower project. The SEA covered the assessment of access roads for construction, transmission lines routing in Angola and Namibia and locations of an airfield.
<b>Cumulative Impact Assessment of the development of numerous hydropower plants on the Kwanza River, Odebrecht, Angola (2014-15)</b>	Project Director for the Cumulative Impact Assessment of the development of a number of hydropower plants on the Cuanza River in Angola.
<b>Environmental and Social Impact Assessment for the Batoka Gorge Hydropower Project, ZRA, Zambia/Zimbabwe (2014-15)</b>	Advisor to the ESIA team undertaking the Environmental and Social Impact Assessment (ESIA) for the proposed Batoka Gorge Hydropower Plant on the Zambezi River below the Victoria Falls. The project includes the construction of a dam wall, hydropower plants, transmission lines and associated infrastructure. The ESIA is being conducted in alignment with the IFC Performance Standards and the World Bank Safeguard Policies.
<b>Environmental and Social Impact Assessment for the Rehabilitation of the Kariba Dam Wall, ZRA, Zambia/Zimbabwe (2014-15)</b>	Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Kariba Dam Rehabilitation Project. The project includes the rehabilitation of the plunge pool and spillway of the dam wall. The project is being funded by the World Bank, African Development Bank and the EU.
<b>Environmental and Social Due Diligence (ESDD) for a 98 MW wind farm in South Africa, Confidential Client, South Africa (2015)</b>	Project Director for the ESDD.
<b>Environmental and Social Due Diligence (ESDD) for a 2 x 75 MW solar pv farm in South Africa, Confidential Client, South Africa (2015)</b>	Project Director for the ESDD.
<b>Environmental and Social Due Diligence (ESDD) for a 74 MW wind farm in South Africa, Confidential Client (2015)</b>	Project Director for the ESDD.
<b>Environmental and Social Screening Study for a CCGT Power Plant, Confidential Client, South Africa (2015)</b>	Project Director for an Environmental and Social Screening study for the establishment of a gas power plant in Saldanha Bay, South Africa. The screening study outputs included a permitting strategy, environmental opportunities and constraints maps, and input into the site selection process.
<b>Environmental and Social Impact Assessment for Floating Power Plants in the Port of Richards Bay, Department of Energy IPP Office, South Africa (2015-16)</b>	Project Director for the ESIA for the establishment of Floating Power Plants in the Ports of Richards Bay in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.
<b>Environmental and Social Impact Assessment for Floating Power Plants in the Port of Richards Bay, Department of Energy IPP Office, South Africa, (2015-16)</b>	Project Director for the ESIA for the establishment of Floating Power Plants in the Ports of Saldanha in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.

<p><b>Environmental and Social Impact Assessment (Scoping Phase) for LNG Import Terminal in the Port Richards Bay for the Gas to Power Programme, Department of Energy IPP Office, South Africa (2015-16)</b></p>	<p>Project Director for the ESIA for the establishment of LNG Import Terminals as part of the DoE's Gas to Power Programme in South Africa. The ESIA (Scoping Phase) included scoping of detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.</p>
<p><b>Environmental and Social Impact Assessment (Scoping Phase) for LNG Import Terminal in the Port Saldanha for the Gas to Power Programme, Department of Energy IPP Office, South Africa, (2015-16)</b></p>	<p>Project Director for the ESIA for the establishment of LNG Import Terminals as part of the DoE's Gas to Power Programme in South Africa. The ESIA (Scoping Phase) included detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.</p>
<p><b>Environmental and Social Screening study for the establishment of an CCGT power plant in the Ports of Richards Bay, Confidential client, South Africa (2015)</b></p>	<p>Project Director for an Environmental and Social Screening Study for the establishment of a CCGT power plant in Richards Bay, South Africa. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing and compares the opportunities and constraints associated with the two locations.</p>
<p><b>Environmental and Social Screening study for the establishment of an CCGT power plant in the Port of Saldanha, Confidential client, South Africa (2015)</b></p>	<p>Project Director for an Environmental and Social Screening Study for the establishment of a CCGT power plant in Saldanha Bay, South Africa. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing and compares the opportunities and constraints associated with the two locations.</p>
<p><b>Environmental and Social Screening study for the establishment of an SCGT power plant in the Ports of Saldanha, Confidential client, South Africa (2015)</b></p>	<p>Project Director for an Environmental and Social Screening Study for the establishment of an SCGT power plant in the Port of Saldanha. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing.</p>
<p><b>Environmental and Social Impact Assessment for the Burgan Oil Fuel Storage Depot in the Port of Cape Town, Burgan Oil, South Africa (2014-15)</b></p>	<p>Project Director for the ESIA for the Burgan Oil Fuel Storage Depot in the Port of Cape Town.</p>
<p><b>Millennium Challenge Account – Malawi: Infrastructure Development Project – Energy Sector (hydropower plants, transmission and distribution lines and substations), MCC, Malawi (2014-15)</b></p>	<p>Environmental Lead for the Independent Engineer to review all the Contracting Engineers environmental and social studies associated with the Infrastructure Development Project. The project includes the upgrade and development of new power infrastructure including hydropower plants, transmission lines, distribution lines and substations.</p>
<p><b>Strategic Environmental Assessment of the New Town Integrated Development Zone, TFM Mining, Katanga Province, DRC (2014)</b></p>	<p>Project Director for the Strategic Environmental Assessment of the New Town Integrated Development Zone undertaken for Tenke Fungurume Mining (TFM) in Katanga Province, DRC.</p>

<p><b>Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine, South Africa, Black Mountain Mine (Vedanta) (2012-13)</b></p>	<p>Project Director for the Environmental and Social Impact Assessment for a new Zinc Mine in the Northern Cape Province in South Africa. The ESIA includes the assessment of the mine and all associated infrastructure including waste rock dumps, tailing dams, processing plant, transmission lines, a new township development, upgrade of a water pipeline and associated water treatment facilities, and transport options to the Port of Saldanha via both road and rail. The ESIA is being undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act. The process includes various specialist studies, full stakeholder engagement as well as integration with a Biodiversity Off-sets process.</p>
<p><b>Environmental and Social Impact Assessment for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure, South Africa (2012)</b></p>	<p>Project Director for the ESIA for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure in the Northern and Eastern Cape, South Africa.</p>
<p><b>Ore Line Expansion Project for the Sishen-Saldanha Ore Line and Port of Saldanha, various Mining Companies and Transnet, South Africa (2011-2012)</b></p>	<p>Project Director for the Environmental and Social Screening Study for the Pre-feasibility Phase of the Ore Line Expansion Project. This included compiling a detail Environmental and Social Design Criteria Report together with initial Stakeholder Engagement. A detailed multi-criteria assessment for various port and stockpile options was undertaken. The project included upgrading over a 1000 km of railway line and upgrading the port facilities including stockpiles, stacker-reclaimers, conveyors and ship loading facilities. The stakeholder engagement process was specifically designed to obtain buy-in from stakeholder who were strongly opposed some components of the port and rail expansion.</p>
<p><b>Strategic Environmental Assessment for the Mozambican Regional Gateway Programme, MRGP, Mozambique, Malawi, Zambia, Zimbabwe (2012)</b></p>	<p>Project Director for the SEA of the MRGP. The MRGP aims to support the improvement of the Southern African transport (roads, rail and ports), regional infrastructure network, which uses Mozambique as a gateway for international trade. The MRGP geographic scope encompasses the Beira and Nacala Transport Corridors and the respective links to the Maputo and Limpopo Corridors. The SEA identified environmental and social issues that need to be considered in the long terms planning an implementation of the rail and port infrastructure that makes up the Beira and Nacala Transport Corridors.</p>
<p><b>Strategic Environmental Assessment (SEA) for the coastline of Mozambique, MICOA, Mozambique (2012)</b></p>	<p>Adviser on the SEA for the coast of Mozambique. The SEA aims to identify potential conflicts between various uses of the coastal zone and to recommend strategic interventions to facilitate sustainable development within the coastal zone. Various users of the coastal zone that are being considered include off-shore oil and gas operations, coastal mining, tourism, conservation and artisanal and industrial fishing.</p>
<p><b>Environmental and Social Screening Study for port options in Pemba Bay, Anadarko, Mozambique (2012)</b></p>	<p>Project Lead for an Environmental and Social Screening Study for various port options in Pemba Bay. The screening study includes a multi-criteria assessment of various port locations taking into account marine and terrestrial ecology, social issues, land ownership, legal aspects and physical marine conditions.</p>
<p><b>Environmental and Social Impact Assessment for a LPG import and distribution facility, Sunrise Energy, South Africa (2011-2012)</b></p>	<p>Project Director for the Scoping/EIA for a LPG importation, storage and distribution facility which includes a marine offloading facility in Saldanha Bay, a pipeline and a storage facility. The environmental permitting process required the liaison with local and provincial environmental authorities, co-ordination of specialist studies, public participation and impact assessment.</p>

<b>Environmental and Social Screening Study for a Mine development in Angola, Confidential Client, Angola (2011-2012)</b>	Project Director for the Environmental and Social Screening Study for the Concept Phase for a new mine development in Angola. The study included identifying environmental and social risks to the project and costing a full ESIA according to IFC Performance Standards and Equator Principles.
<b>Equator Principles and IFC Performance Standards Training, Vedanta Resources Plc, Zambia (2012)</b>	Lead facilitator of a 5-day training course on the implementation of the Equator Principles and IFC Performance Standards for a number of Vedanta's mining operations across Southern Africa, Europe and Australia.
<b>Environmental and Social Impact Assessment for the upgrade of the Principe Airport, HBD, Principe (2011-2012)</b>	Project Director for the Environmental and Social Impact Assessment for the upgrade of the airport in Principe.
<b>EIA for a 380MW renewable energy facility north of Touwsrivier in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 170MW renewable energy facility east of Touwsrivier in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 670MW renewable energy facility south of Sutherland in the Western and Northern Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 500MW renewable energy facility south of Beaufort West in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 120MW renewable energy facility south east of Victoria West in the Northern Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 225MW wind farm in the Richtersveld, Western Cape (2011)</b>	Project Director for the Scoping/EIA for a proposed wind farm. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>EIA for a 750MW wind farm in the Roggeveld, Western Cape and Northern Cape (2011) Director</b>	Project Director for the Scoping/EIA for a proposed wind farm. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

<b>EIA for a 225MW renewable energy facility between Vredenburg and Velddrif in the in the Western Cape (2010-2011)</b>	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
<b>Environmental and Social Impact Assessment for the Lesotho Highland 150 MW Wind Power Project, Breeze Power, Lesotho (2011)</b>	Project Director for the Scoping Phase of the Environmental and Social Impact Assessment for a 150MW wind farm development in Lesotho. The Scoping Phase included the analysis of available information to identify key environmental and social risks associated with the siting of the wind farm.
<b>Environmental Screening Study for a Wind Farm Development in the Southern Cape, South Africa (2011)</b>	Project Director for the Environmental Screening Study for a wind farm development in the Southern Cape.
<b>Environmental and Social Due Diligence for a Wind Farm Development in Coega, Electrawinds, South Africa (2011)</b>	Project Director for the Environmental and Social Due Diligence for a wind farm development in the Coega.
<b>Environmental and Social Impact Assessment for Venetia Diamond Mine, De Beers, South Africa (2011)</b>	Project Director for the Scoping and ESIA for the proposed new underground mine and EMP consolidation for existing mining activities. The ESIA was undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act.
<b>Environmental and Social Impact Assessment for a river barging project on the Zambezi River, Riversdale Mining, Mozambique (2010-2011)</b>	Project Director for the project which includes the assessment of environmental and social impacts associated with dredging over 500km of the Zambezi River. The project includes full stakeholder engagement, coordination of various specialist studies with extensive field work and the integration of all information into an ESIA report and ESMP.
<b>EIA for two solar PV plant development, South Africa (2010)</b>	Project Director of the EIA for the development of two solar PV plants in the Northern Cape and Free State Provinces of South Africa. ERM undertook the required studies to obtain environmental approval for these developments, including specialist studies such as landscape and visual and cultural heritage assessments, and stakeholder engagement.
<b>Basic Assessment for the installation of wind measuring masts on six sites in the Western Cape and two sites in the Northern Cape (2010)</b>	Project Director for the Basic Assessments to install wind measuring masts at eight sites in South Africa. The scope of work included the submission of the application, public participation, preparation of an EMP and submission of the Basic Assessment report.
<b>EIA for a 100MW renewable energy facility north of Velddrif in the in the Western Cape (2010)</b>	Project Director for the Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.
<b>EIA for a 300MW renewable energy facility east of Lambert's Bay in the Western Cape (2010)</b>	Project Director for the Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.



<b>External adviser and reviewer for an ESIA for a wind farm development in the Eastern Cape, Confidential Client, South Africa (2010)</b>	Adviser and reviewer for an EIA for the development of a wind farm in the Eastern Cape.
<b>Environmental Advisor Environmental and Social Impact Assessment for the Mphanda Nkuwa Hydropower Project in Mozambique (2010)</b>	Adviser for the ESIA for the Mphanda Nkuwa Hydropower Project in Mozambique. The core service was to advise the project team on international standards such as the IFC Performance Standards and World Commission on Dams.
<b>Environmental Sensitivity Study of the Durban Airport Site Expansion Project , South Africa, Transnet (2010)</b>	Project Director for the Environmental Sensitivity Study for the proposed dig-out port currently being considered by Transnet at the Durban International Airport Site. The aim of this assessment was to determine the biophysical, natural and social opportunities and constraints to the development of the dig-out port, as well as provide a strategic overview of the environmental context of the site. In addition, the sensitivity study provided strategic guidance in terms of the environmental due process and licensing requirements with respect to the National Environmental Management Act, and associated legislation.
<b>ESIA for a new high voltage overhead transmission power line in Cameroon, AES Sonel, Cameroon (2007- 2009)</b>	Project Director for the Environmental and Social Impact Assessment and a full Resettlement Action Plan for a new electricity distribution project, comprising a 113km overhead power line, for AES Sonel. As Project Director, Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports.
<b>Advisor to the Environmental and Social Impact Assessment for the Baynes Hydropower Project in Namibia and Angola (2009)</b>	Project Advisor for the Environmental and Social Impact Assessment for the proposed Baynes Hydropower Project on the Kunene River. The ESHIA process is being conducted in accordance to the Angolan EIA Regulations, the Namibian EIA Regulations, the World Bank Safeguard Policies and the IFC performance standards.
<b>Environmental and Social Impact Assessment for the upgrade of a 1100 km railway line in South Africa, Transnet (2008- 2009)</b>	Project Director for the Environmental and Social Impact Assessment for the upgrade of a commodities railway line across South Africa. The project included a number of specialist studies, managing subcontractors, interfacing with the railway engineering team, report writing, managing an extensive stakeholder consultation process, client liaison and management of project finances.
<b>Environmental and Social Impact Assessment for the services corridor associated with the development of a greenfield CTL Plant, Sasol, South Africa (2009)</b>	Project Director for an ESIA of a services corridor to support the development of a greenfield CTL plant development in South Africa. The ESHIA process was conducted in accordance to the South African EIA Regulations and the IFC performance standards.
<b>Environmental and Social Impact Assessment for 2D seismic exploration project in the Rovuma Basin, Petronas, Mozambique (2009)</b>	Project Director for the ESIA for the offshore seismic exploration activities in Blocks 3 & 6, situated in the Rovuma Basin off the coast of Mozambique. The exploration activities comprise 2D seismic surveys in deepwater.
<b>Environmental and Social Screening Study for a river barging project on the Zambezi River, Riversdale Mining, Mozambique (2009)</b>	Project Director for the project which included the assessment of environmental and social risks associated with dredging over 500km of the Zambezi River. The project included reviewing existing information, mapping key sensitivities and facilitating a specialist workshop in order to develop Terms of Reference for detailed baseline studies that will be required should the project proceed to a full ESIA.

<b>Equator Principled and IFC Performance Standards Review and Training, African Housing Solutions, South Africa (2009)</b>	Lead reviewer for the ESIA and Resettlement Policy Framework, for a housing development in Nigeria, against the Equator Principles and IFC Performance Standards. Mr Heather-Clark was responsible for reviewing the ESIA Report and for presenting a 2 ½ day training course on the Equator Principles and IFC Performance Standards.
<b>Environmental Assessment for the dredging and disposal of dredge spoil at the Port of Saldanha, Transnet, South Africa (2008)</b>	Project Director for this project and was responsible for guidance of technical studies which included dredging studies and marine sediment contamination characterization. The study included the assessment of dredge spoil dumping alternatives. Stakeholder engagement included an important component of the project.
<b>Environmental and Social Screening Study, Port of Saldanha, Transnet, South Africa (2008)</b>	Project Director for the screening study which included an assessment of alternative berth options for the export of iron ore at the iron ore terminal at the Port of Saldanha, South Africa. The work included ongoing interaction with the port engineering and design teams, together with stakeholder engagement.
<b>ESIA for an Early Production System (EPS) and Power Plant for Kaiso-Tonya Area, Exploration Area 2, Tullow Uganda Operations Pty Ltd, Uganda (2007-08)</b>	Project Director for the project which included a full ESIA for an Early Production System and associated Power Plant in the Kaiso-Tonya area on the banks of Lake Albert, Uganda. The intent of the project is to produce oil (and small amounts of gas) which will be converted into electrical power and distillate products (kerosene and diesel) for consumption within Uganda. The electrical power will be fed into the main grid supplementing the Ugandan electrical power grid while the distilled products (diesel and kerosene) will be used to displace the currently imported fuels. The ESIA included a detailed assessment of alternative sites for the proposed EPS and power plant, together with various environmental and social baseline studies and stakeholder engagement.
<b>ESIA monitoring studies for Sasol's Off-shore gas exploration activities in Inhambane and Sofala Provinces, Mozambique, Sasol Petroleum Sofala &amp; Empresa Nacional de Hidrocarbonetos (2007-08)</b>	Project Director for an environmental monitoring survey programme for Sasol's offshore hydrocarbon exploration activities. Monitoring studies included seismic noise modelling and monitoring, dugong surveys, artisanal fish catch monitoring, coral reef surveys and monitoring, sea turtle monitoring and tourism monitoring.
<b>Strategic Environmental and Social Overview and ESIA's for offshore exploration well drilling activities in Blocks 2 and 3A, Lake Albert, Uganda. Tullow Oil Plc and Heritage Oil and Gas Limited (2006- 2008)</b>	Project Director for this project. The project involved undertaking a strategic overview study of Lake Albert that provided background information on the limnological (physical, chemical and biological) features of the lake as well as environmental and socio-economic resources (such as nature reserves, tourism nodes, prime fishing areas etc). It also presented areas of environmental risk and opportunity associated with oil explorations on, and immediately adjacent to, the lake. The strategic overview provided a framework within which ESIA's were undertaken for the offshore drilling project. A site selection study was undertaken for onshore support infrastructure. Baseline studies included shoreline sensitivity mapping, oil spill modelling, water and sediment quality surveys, fish and fisheries surveys, socio-economic surveys and terrestrial ecology surveys. An extensive public participation process was undertaken as part of the ESIA's.
<b>Environmental and Social Baseline Assessment for a green fields coal mine and CTL plant development, Sasol, South Africa (2008)</b>	Project Director the environmental and social baseline studies to support the evaluation of sites for potential development of a green field's coal mine and associated CTL Plant in South Africa. Mr. Heather-Clark has assisted with review and quality control of the various baseline studies.



<b>Development of guideline document for the integration of environmental and social issues into the project lifecycle for mine development, De Beers, South Africa (2008)</b>	Team member of the project team that assisted the client in developing a detailed guideline document for the integration of social and environmental issues into mine planning. This included all phases of the planning process from Concept through to Pre-feasibility, Feasibility and Implementation. Mr Heather-Clark, as lead facilitator, presented a 2 day training course on these guidelines, to mine planners and engineers.
<b>EIA for a Metal Recovery Plant and Slag Crushing, Screening and Weathering facility at Arcelor Mittal Saldanha Works, MultiServ, South Africa (2007 – 2008)</b>	Project Director for the EIA, including a public consultation process and the following specialist studies: air quality, groundwater, noise impact assessment, botanical and archaeology studies and a traffic impact assessment. Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports.
<b>Implementation of the Equator Principles for Standard Bank's Project Financing Processes, Standard Bank, South Africa (2008)</b>	Lead facilitators for Equator Principles and IFC Performance Standards training to assist Standard Bank in adopting the Equator Principles. An assessment system (based on the IFC Performance Standards) to link with Standard Bank's project finance transaction life-cycle was developed. This involved the development of "tools" and guidance documents to form a system, together with training on the use of the system for all project finance staff.
<b>Comparative review of EIAs undertaken by ERM globally for electricity utilities, Eskom, South Africa (2007)</b>	Project Director for this project. The project included research to provide Eskom with an overview of different EIA governance systems and approaches to managing EIAs in other countries, as well as identifying trends in EIA practice.
<b>Environmental and Social Screening and Qualitative Risk Assessment Western Ports and Rail Corridor, Transnet, South Africa (2007)</b>	Project Director involved in identifying environmental and social risks associated with future port development in the Port of Saldanha, Port of Cape Town and Port of Mossel Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
<b>Environmental and Social Screening and Qualitative Risk Assessment Central Ports and Rail Corridor, Transnet, South Africa (2007)</b>	Project Director involved in identifying environmental and social risks associated with future port development in the Port of East London, Port of Port Elizabeth and Port of Ngqura. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
<b>Environmental and Social Screening and Qualitative Risk Assessment Eastern Ports and Rail Corridor, Transnet, South Africa (2007)</b>	Project Director involved in identifying environmental and social risks associated with future port development in the Port of Durban and Port of Richards Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
<b>EIA of the Moatize Coal Mine and associated railway line and deep water port infrastructure, CVRD, Tete Province, Mozambique (2006-2007)</b>	Project Coordinator and Cost Controller on this project. ERM was commissioned by CVRD, a Brazilian Mining Company, to undertake environmental studies related to the green fields development of a coal mine in Tete Province, Mozambique. The project included the development of a power plant, railway line and port for the export of coal.

<b>Corporate Social Responsibility Strategy development for a leading South African retailer, South Africa (2006)</b>	Lead facilitator for this project. The project involved identifying and prioritising the company's sustainability issues and defining a strategy to address these issues. The process was driven by the need for the company to be listed on the Johannesburg Stock Exchanges SRI Index.
<b>Research project on the effects of water scarcity on the fresh produce supply to a major South Africa retailer, South Africa (2006)</b>	Project Leader coordinated a group of researchers to identify water scarce areas and to plot these against the location of fresh produce suppliers for a major retailer in South Africa. This researched form a core component of the companies Sustainability Strategy.
<b>Independent Environmental Advisers to the Financing Parties of the Gautrain Rapid Rail Link project, Bowman Gilfillan (2006)</b>	Independent Environmental Advisers to the Financing Parties, provided review and advisory services through Bowman Gilfillan on Environmental Management Plans for the Gautrain Rapid Link project.
<b>ESIA for seismic surveys and exploration well drilling and testing in Blocks 16 and 19 off the coast of Mozambique, Sasol Petroleum Sofala &amp; Empresa Nacional de Hidrocarbonetos (2005 – 2006)</b>	Project Manager for the ESIA which involved undertaking an ESIA and compiling EMPs for offshore exploration activities in Blocks 16 & 19, situated to the east of the Bazaruto Archipelago National Park, off the coast of Mozambique. The exploration activities comprised 2D and 3D seismic surveys in deepwater and shallow water as well as exploration well drilling and testing activities.
<b>EIA for the upgrade and expansion of the existing sinter plant at Vanderbijlpark, ArcelorMittal, South Africa (2006)</b>	Project Director for the EIA and stakeholder engagement process to meet South African requirements. This included coordination of the technology review, air quality, health and waste management specialist studies and compilation of the integrated Scoping and EIA Report.
<b>Review of Sustainability Report and Sustainability Management System, Confidential, South Africa (2004)</b>	Lead reviewer of the Sustainability Report of a leading retailer in South Africa and providing adhoc advice on sustainability issues. This included compiling a monthly news letter to staff on relevant sustainability issues facing the retail industry in South Africa.
<b>EIA of a proposed expansion of the Container Terminal Stacking area at the Port of Cape Town, National Ports Authority, South Africa (2003-2004)</b>	Project Manager for this EIA. The project included the expansion of the Cape Town container terminal into the sea though dredging 1 million m3 of material for reclamation. The project included a detailed study on alternative sources for fill material and other studies which focused on marine archaeology, coastal erosion, marine hydrodynamics and water quality, visual, noise and traffic. The EIA included full stakeholder engagement throughout the EIA process.
<b>Environmental Site Suitability Study for a manganese smelter, Asia Minerals Limited (2004)</b>	Part of the project team that undertook a preliminary site selection process for a manganese smelter by identifying key environmental and social issues for potential sites within Southern Africa. Sites included the Belualane Industrial Park (Mozambique) and Richards Bay, the Coega Industrial Development Zone (IDZ) and Saldanha (South Africa).
<b>DFID funded project to assess progress towards meeting the water relater targets of the Millennium Development Goals, DIFD, Zambia (2004)</b>	Country Coordinator for Zambia on this project. The project included detailed stakeholder surveys secondary data analysis to establish the countries progress towards meeting the Millennium Development Goals, specifically related to water supply and sanitation.
<b>Roll-out of ISO14001 and OHSAS18001 management systems to 2 industrial sites in South Africa, Confidential, South Africa (2004)</b>	Project Manager responsible for undertaking ISO14001 training at two industrial sites. The project formed part of a global initiative to have several industrial sites throughout Africa and Europe ISO14001 certified.

<p><b>Strategic Environmental Assessment (SEA) for the Port of Cape Town, National Ports Authority of South Africa, South Africa (2003)</b></p>	<p>Project Manager for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port planning was supported by city planning and visa-versa.</p>
<p><b>Strategic Environmental Assessment (SEA) for the Port of Richards Bay, National Ports Authority of South Africa, South Africa (2003)</b></p>	<p>Project Adviser for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port planning was supported by city planning and visa-versa.</p>
<p><b>E&amp;S Due Diligence of the Phase 2 Maputo Port Revitalisation and Rehabilitation Project, Standard Corporate Merchant Bank, Mozambique (2003)</b></p>	<p>Environmental Adviser to the Standard Corporate Merchant Bank for the review of the EIA and Risk Assessment studies undertaken for the Phase 2 Maputo Port Revitalisation and Rehabilitation Project. The EIA was reviewed against the Mozambican and International Best Practice guidelines and detailed recommendation made on how to manage the environmental risks associated with the revitalisation project.</p>
<p><b>National Oil Spill Contingency Plan for Cameroon, funded by the World Bank, Cameroon Government, Cameroon (2003)</b></p>	<p>Part of the team that compiled a comprehensive Oil Spill Contingency Plan for Cameroon (OSCP). The OSCP form a core component of the Chad Cameroon Pipeline and included contingency plans for both on land and marine based spills. The OSCP was compiled according to the IPEACA guidelines and was reviewed by the World Bank.</p>
<p><b>EIA/SEA Capacity Building, Environmental Public Authority (EPA), State of Kuwait (2003)</b></p>	<p>Lead facilitator for a 2 day training course on SEA and EIA for the Environmental Public Authority (EPA) of the State of Kuwait.</p>
<p><b>Training Workshop on Strategic Environmental Assessment for South Eastern Africa and the Western Indian Ocean Island States, SEACAM, Mozambique (2003)</b></p>	<p>Lead course facilitator for the SEA training course funded by SEACAM. The training course included the principles of SEA, SEA process and case studies of SEA's in Southern Africa.</p>
<p><b>Improving the Effectiveness of EIA and the Potential of SEA in Southern Africa: Case Study on SEA of the National Commercial Ports Policy and SEA for the Port of Cape Town, World Bank/SAIEA, Namibia (2003)</b></p>	<p>Presenter of two case studies on SEA at a regional workshop funded by the World Bank and SAIEA.</p>
<p><b>Environmental Impact Assessment for the Eskom SABRE-GEN wind turbine test facility, Eskom, South Africa (2002)</b></p>	<p>Project Manager for the EIA. The EIA included stakeholder engagement throughout the process and included the following specialist studies: visual assessment, bird strike modelling and noise assessment.</p>
<p><b>Strategic Environmental Assessment: Scoping Phase Port of Richards Bay, National Ports Authority of South Africa, South Africa (2002)</b></p>	<p>Project Leader and integrative writer for the Scoping Phase of the SEA for the Port of Richards Bay. This phase included detailed stakeholder consultation to identify opportunities and constraints to long term port development at the Port of Richards Bay.</p>

<b>White Paper on National Commercial Ports Policy, National Ports Authority, South Africa 2002</b>	Lead reviewer of the White Paper on National Commercial Ports Policy for South Africa. The review focussed on the integration of environmental and social issues into the port planning process. Mr Heather-Clark made a formal submission and presentation to the Portfolio Committee on Transport in the South African Parliament.
<b>Environmental Liability and Risk Assessment for the Multi-Purpose Terminal at the Port of Saldanha, National Ports Operations, South Africa (2002)</b>	Project Manager for the project. The purpose of the project was to identify key environmental risks associate with the material handling at the Multi-Purpose Terminal at the Port of Saldanha.
<b>Environmental Overview of South Africa's major ports with special reference to future container terminal development, National Ports Authority Container Terminal Strategy, National Ports Authority, South Africa (2002)</b>	Project Manager for the comparative assessment of the relative environmental sensitivity of the seven commercial ports in South Africa with reference to future container terminal development. The study included a detail review of secondary environmental information of all the ports, the identification of specific environmental criteria and the use of these criteria to rank each port in terms of its sensitivity to future container terminal development.
<b>Review of the EIA undertaken for the Maputo Port Privatisation and Rehabilitation Project, Development Bank of Southern Africa (DBSA), South Africa (2002)</b>	Environmental Adviser to the Development Bank of Southern Africa to review the Phase 1 EIA for the Maputo Port Privatisation and Rehabilitation Project. The review was undertaken against the Mozambican EIA Regulations and International Best Practice.
<b>Oil Spill Contingency Plan, Agip Angola oil operations, Angola, (2002)</b>	Team member of the team to develop an oil spill contingency plan according to the IPEICA International Guidelines.
<b>Ecologically Sustainable Industrial Development Programme, United Nations Industrial Development Organisation (UNIDO), Tanzania (2002)</b>	Team member of the project team appointed to review the Industrial Development Strategy for Industrial Development in Tanzania. The focus of the project was to integrate environmental and social issues into the programme.
<b>Environmental Audit and Assessment of the Socio-economic Impacts of the Trans-Kgalagadi Highway, Botswana, Development Bank of Southern Africa, Botswana (2002)</b>	Lead reviewer of the EIA and EMP implementation for the Trans-Kalagadi corridor in Botswana. The review included site visits, detailed interviews and review of secondary data and records.
<b>World Bank EIA Project Management Training Course, World Bank/SAIEA, Zambia (2002)</b>	Lead facilitator for the 5 day EIA Project Management Training Course. The course was presented to 20 African delegates from southern Africa. The course focused on the practical aspects of EIA project management including budgeting and scheduling an EIA, contract negotiations with clients, managing specialist studies, managing the public participation phase and compiling an integrated EIA report. The course formed part of a Southern Africa capacity building initiative lead by the SAIEA.
<b>Environmental screening study for the establishment of a deep-water port at Ponta Dobela, Confidential Client, Mozambique (2001)</b>	Team member of the project team who undertook a screening study to identify environmental, social and economic issues and show stoppers associated with the development of a deep-water port on the coast on Mozambique.

<b>ESIA of the proposed seismic survey in licence area 2814a on the continental shelf of Namibia, Shell Exploration and Production Namibia B.V., Namibia (2001)</b>	Team member of the ESIA for the offshore seismic exploration project. The ESIA included all issues associated with seismic surveys including seismic noise impacts on marine mammals, oil spill modelling and general environmental management issues.
<b>Environmental Impact Review for the abandonment of the Cuntala Well Protector Platform off the coast of Angola (Block 2), Texaco Panama Inc., Angola (2001)</b>	Team member of the project team who developed a decommissioning plan for a well protector platform off the coast of Angola.
<b>Legal, Technical and Economic Feasibility Study for the Commercialisation of the SSF Association Milnerton Tank Farm and its links to the Port of Cape Town, SFF, Cape Town (2001)</b>	Project Manager for this project.
<b>ESIA of the Phase 2 expansion of the Mozal Aluminium Smelter and Matola Port Terminal in Maputo, BHP Billiton, Mozambique (2000-2001)</b>	Project Manager and integrative writer for this ESIA. The EIA included an assessment of the expansion of the port terminal at the Port of Matola and a review of the Phase 2 expansion of the aluminium smelter. All reports together with the EIA process were reviewed and approved by the International Finance Corporation (IFC).
<b>Scoping Phase of the Environmental Impact Assessment for the expansion of the Container Terminal at the Port of Cape Town, Portnet, South Africa (2000)</b>	Project Manager for the EIA for the expansion of the container terminal at the Port of Cape Town. The project included the dredging of 1 million m3 dredge material to provide fill for the expansion of the port. Specialist studies that were required included coastal dynamic modelling, hydrodynamic modelling to assess water quality issues associated with dredging, marine archaeological issues, marine ecology issues, traffic, visual and noise.
<b>Strategic Integrated Port Planning, Port of Saldanha, Transnet (1998)</b>	Project Manager for the Strategic Integrated Port Planning process for the Port of Saldanha. The process culminated in the first Port Development Framework for the Port of Saldanha which integrated environmental and social issues into the port planning process. It included the identification and inclusion of environmental and social opportunities and constraints into the future port planning and development.
<b>Environmental Impact Assessment for the PPC Slag Grinding Mill within the Saldanha Steel Complex, PPC (1998)</b>	Project Manager for the EIA for PPC slag grinding mill. The EIA included a number of specialist studies and comprehensive stakeholder engagement.

<b>MEMBERSHIPS</b>	
<b>CEAPSA</b>	Registered as an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA)
<b>IAIAsa</b>	Member of the International Association for Impact Assessment South Africa
<b>IAIA International</b>	Member of the International Association for Impact Assessment
<b>PUBLICATIONS</b>	
	Sep 2007: Co-author of case study for IIEDs 'User Guide' to effective tools and methods for integrating environment and development. South African case study: Role of environmental and social screening in informing the conceptual design and planning of large-scale projects in the pre-feasibility stage.
	Aug 2003: Author of a case study on the SEA for the Port of Cape Town, contained in "The Status and Potential of Strategic Environmental Assessment" by Barry Dalal-Clayton and Barry Saddler, DRAFT 17 September 2003.
	March 2002: Strategic Integrated Port Planning: Moving from EIA to SEA. International Conference on Coastal Zone Management and Development, Kuwait 18 to 20 March 2002.
	Nov 2000: Sustainable Port Development: Report on the preparatory seminar for Africa. 7th International Conference of the International Association for Cities and Ports, Marseilles – France.
	Mar 2000: The development of Strategic Environmental Assessment in South Africa: Journal of Impact Assessment and Project Appraisal, Vol 18, Number 3, pg 217-223. September 2000.
	April 1999: Integrating environmental opportunities and constraints into Port Planning, Development and Operation. 5th International Conference on Coastal and Port Engineering in Developing Countries, Cape Town, 19 to 23 April 1999.



# CURRICULUM VITAE

## KERRY LIANNE SCHWARTZ

SENIOR GIS CONSULTANT

EMPA, South Africa

### QUALIFICATIONS

BA 1982 Geography, Leeds Trinity University, UK

### EXPERTISE

- GIS, spatial modelling and 3D analysis
- Visual Impact Assessment
- Fatal Flaw Assessments
- Glint and Glare Assessments

Kerry is a highly focused and dedicated Spatial Professional with strong technical skills and some 27 years' experience in the application and use of geographic analysis and geospatial technologies in support of a range of environmental and development planning projects. While Kerry's expertise is largely centred on the management and presentation of geospatial data for environmental impact assessments, her GIS skills are frequently utilised in support of a range of other projects, including:

- Strategic environmental assessments and management plans;
- Visual and landscape assessments;
- Glint and glare assessments;
- Wetland / surface water assessments;
- Catchment delineation for floodline analysis;
- Urban and Rural Development Planning;
- Transport Assessments; and
- Infrastructure Development Planning.

Kerry has extended her skills base to include the undertaking of specialist Visual Impact Assessments (VIAs) for a range of projects, including renewable energy, power line and residential / mixed-use developments.

### PROJECTS

A selection of Kerry's key project's are presented below.

#### Built Infrastructure

**EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese**

Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Northern Cape, South Africa.

**EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations**

Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Port Elizabeth area in the Eastern Cape, South Africa.



<p><b>EIA for multi petroleum products pipeline from Kendall Waltloo, and from Jameson Park to Langlaagte Tanks farms Pipelines</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of the EIA project.</p>
<p><b>Environmental Management Plan for copper and cobalt mine</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of the EMP project in the Democratic Republic of Congo.</p>
<p><b>EIA and Agricultural Feasibility study for Miwani Sugar Mill</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of the EIA project in Kenya.</p>
<p><b>EIAs for several Solar Photovoltaic Energy Facilities and associated infrastructure</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of several EIAs for Solar PV facilities, the most recent projects being:</p> <ul style="list-style-type: none"> <li>• Oya Energy Facility (Western Cape Province);</li> <li>• Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV Facilities (Northern Cape Province); and</li> <li>• Sendawo 1, 2 and 3 Solar Energy Facilities (North West Province).</li> </ul>
<p><b>EIAs / BAs for several WEFs and associated infrastructure</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of several EIAs for Wind Energy Farms, the most recent projects being:</p> <ul style="list-style-type: none"> <li>• Tooverberg WEF (Western Cape Province);</li> <li>• Rondekop WEF (Western Cape Province); and</li> <li>• Graskoppies, Hartebeest Leegte, Ithuba and !Xha Boom (Leeuwberg Cluster) WEFs (Northern Cape Province).</li> </ul>
<p><b>Basic Assessments for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of the powerline BA project in KwaZulu-Natal and Mpumalanga, South Africa.</p>
<p><b>Environmental Assessment for the proposed Moloto Development Corridor</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Limpopo Province.</p>
<p><b>Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of a feasibility study for a rail extension in Gauteng, South Africa.</p>
<p><b>Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of the environmental screening for strategic infrastructure in KwaZulu-Natal, the Free State and Gauteng.</p>

<p><b>Fatal Flaw Assessments for various proposed Renewable Energy Facilities</b></p>	<p>Kerry was responsible for GIS analysis and mapping in support of fatal flaw assessment for renewable energy projects in the Northern Cape and Western Cape Provinces.</p>
	<p><b>Strategic Planning</b></p>
<p><b>Lesotho Highlands Development Association – Lesotho</b></p>	<p>GIS database development for socio-economic and health indicators arising from Social Impact Assessments</p>
<p><b>Development Plans for the adjacent towns of Kasane and Kazungula and for the rural village of Hukunsi</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for the development plans for towns in Botswana.</p>
<p><b>Integrated Development Plans for various District and Local Municipalities</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for various IDPs for District Municipalities in KwaZulu-Natal.</p>
<p><b>Rural Development Initiative and Rural Roads Identification for uMhlathuze Local Municipality</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for rural road identification in the uMhlathuze Local Municipality in KwaZulu-Natal.</p>
<p><b>Tourism Initiatives and Master Plans for areas such as the Mapungubwe Cultural Landscape</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for various Master Plans in the Limpopo and Northern Cape Provinces.</p>
<p><b>Spatial Development Frameworks for various Local and District Municipalities</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for Spatial Development Frameworks for various Municipalities in KwaZulu-Natal, Mpumalanga and the Free State.</p>
<p><b>Land Use Management Plans/Systems (LUMS) for various Local Municipalities</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for the development of Land Use Management Systems for various Local Municipalities in KwaZulu-Natal.</p>
<p><b>Land use study for the Johannesburg Inner City Summit and Charter</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for the Johannesburg Inner City land use study.</p>
<p><b>Due Diligence Investigation for the Port of Richards Bay</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for the Port of Richards Bay Due Diligence Investigation.</p>
	<p><b>State of the Environment Reporting</b></p>
<p><b>2008 State of the Environment Report for City of Johannesburg</b></p>	<p>Kerry was responsible for GIS database management, spatial data analysis and mapping for the 2008 Johannesburg State of the Environment Report.</p>

	<b>Strategic Environmental Assessments and Environmental Management Frameworks</b>
<b>SEA for Greater Clarens</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Greater Clarens SEA in the Free State Province.
<b>SEA for the Marula Region of the Kruger National Park</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Marula Region SEA on behalf of SANParks.
<b>SEA for Thanda Private Game Reserve</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Thanda Private Game Reserve SEA in KwaZulu-Natal.
<b>SEA for KwaDukuza Local Municipality</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the KwaDukuza Local Municipality SEA in KwaZulu-Natal.
<b>SEA for Molemole Local Municipality, Capricorn District Municipality</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Molemole Local Municipality SEA in Limpopo Province.
<b>SEA for Blouberg Local Municipality, Capricorn District Municipality</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Blouberg Local Municipality in Limpopo Province.
<b>SEA for the Bishopstowe study area in the Msunduzi Local Municipality</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Bishopstowe SEA in KwaZulu-Natal.
<b>EMF for proposed Renishaw Estate</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Reinshaw Estate EMF in KwaZulu-Natal.
<b>EMF for Mogale City Local Municipality, Mogale City Local Municipality</b>	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Mogale City Local Municipality EMF in Gauteng.
	<b>Visual Impact Assessments</b>
<b>VIAs for various Solar Power Plants and associated grid connection infrastructure</b>	<p>Kerry was responsible for the GIS mapping and visual impact assessments for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province) the most recent projects being:</p> <ul style="list-style-type: none"> <li>• Oya Energy Facility (Western Cape Province);</li> <li>• Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV facilities (Northern Cape Province); and</li> <li>• Nokukhanya Solar PV Facility (Limpopo Province).</li> </ul>

<p><b>VIAs for various WEFs and associated grid connection infrastructure</b></p>	<p>Kerry was responsible for the GIS mapping and visual impact assessments for various Wind Energy Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including:</p> <ul style="list-style-type: none"> <li>• Gromis and Komas WEFs (Northern Cape Province).</li> <li>• Paulputs WEF (Northern Cape Province);</li> <li>• Kudusberg WEF (Western Cape Province);</li> <li>• Tooverberg WEF (Western Cape Province);</li> <li>• Rondekop WEF (Northern Cape Province); and</li> <li>• San Kraal and Phezukomya WEFs (Northern Cape Province).</li> </ul>
<p><b>VIAs for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project</b></p>	<p>Kerry was responsible for the GIS mapping and visual impact assessments for various powerlines in KwaZulu-Natal and Mpumalanga Provinces.</p>
<p><b>VIAs for the proposed Assagay Valley and Kassier Road North Mixed Use Development</b></p>	<p>Kerry was responsible for the GIS mapping and a visual impact assessment for the Assagay Valley and Kassier Road North Mixed Use Development in KwaZulu-Natal.</p>
<p><b>VIA for the proposed Tinley Manor South Banks Development</b></p>	<p>Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Manor Southbanks Coastal Development in KwaZulu-Natal.</p>
<p><b>VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution</b></p>	<p>Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Beach Enhancement EIA in KwaZulu-Natal.</p>
<p><b>VIA for the proposed Mlonzi Hotel and Golf Estate Development</b></p>	<p>Kerry was responsible for the GIS mapping and a visual impact assessment for the Mlonzi Hotel and Golf Estate in the Eastern Cape.</p>
<p><b>Landscape Assessment for the Mogale City Local Municipality</b></p>	<p>Kerry was responsible for the GIS mapping and a visual impact assessment for the Mogale City Local Municipality landscape assessment.</p>
<p><b>MEMBERSHIPS</b></p>	
<p><b>GISSA</b></p>	<p>Member of Geo-Information Society of South Africa</p>
<p><b>SAGC</b></p>	<p>Registered as GISc Technician with the South African Geomatics Council, Membership No. GTC GISc 1187</p>

*Kschwartz*

04 February 2022

The Author started his career in the mining industry as a bursar Learner Official (JCI, Randfontein), working in the mining industry, doing various mining related courses (Rock Mechanics, Surveying, Sampling, Safety and Health [Ventilation, noise, illumination etc.] and Metallurgy. He did work in both underground (Coal, Gold and Platinum) as well as opencast (Coal) for 4 years. He changed course from Mining Engineering to Chemical Engineering after his second year of his studies at the University of Pretoria.

After graduation he worked as a Water Pollution Control Officer at the Department of Water Affairs and Forestry for two years (first year seconded from Wates, Meiring and Barnard), where duties included the perusal (evaluation, commenting and recommendation) of various regulatory required documents (such as EMPR's, Water Use License Applications and EIA's), auditing of license conditions as well as the compilation of Technical Documents.

Since leaving the Department of Water Affairs, Morné has been in private consulting for the last 20 years, managing various projects for the mining and industrial sector, private developers, business, other environmental consulting firms as well as the Department of Water Affairs. During that period he has been involved in various projects, either as specialist, consultant, trainer or project manager, successfully completing these projects within budget and timeframe. During that period he gradually moved towards environmental acoustics, focusing on this field exclusively since 2007.

He has been interested in acoustics as from school days, doing projects mainly related to loudspeaker design. Interest in the matter brought him into the field of Environmental Noise Measurement, Prediction and Control as well as blasting impacts. Since 2007 he has completed more than 400 Environmental Noise Impact Assessments and Noise Monitoring Reports as well as various acoustic consulting services, including amongst others:

**Wind Energy  
Facilities**

Full Environmental Noise Impact Assessments for - Bannf (Vidigenix), iNCA Gouda (Aurecon SA), Isivunguvungu (Aurecon), De Aar (Aurecon), Kokerboom 1 (Aurecon), Kokerboom 2 (Aurecon), Kokerboom 3 (Aurecon), Kangnas (Aurecon), Plateau East and West (Aurecon), Wolf (Aurecon), Outeniqwa (Aurecon), Umsinde Emoyeni (ARCUS), Komsberg (ARCUS), Karee (ARCUS), Kolkies (ARCUS), San Kraal (ARCUS), Phezukomoya (ARCUS), Canyon Springs (Canyon Springs), Perdekraal (ERM), Scarlet Ibis (CESNET), Albany (CESNET), Sutherland (CSIR), Kap Vley (CSIR), Kuruman (CSIR), Rietrug (CSIR), Sutherland 2 (CSIR), Perdekraal (ERM), Teekloof (Mainstream), Eskom Aberdene (SE), Dorper (SE), Spreeukloof (SE), Loperberg (SE), Penhoek Pass (SE), Amakhala Emoyeni (SE), Zen (Savannah Environmental – SE), Goereesoe (SE), Springfontein (SE), Garob (SE), Project Blue (SE), ESKOM Kleinzee (SE), Namas (SE), Zonnequa (SE), Walker Bay (SE), Oyster Bay (SE), Hidden Valley (SE), Deep River (SE), Tsitsikamma (SE), AB (SE), West Coast One (SE), Hopefield II (SE), Namakwa Sands (SE), VentuSA Gouda (SE), Dorper (SE), Klipheuwel (SE), INCA Swellendam (SE), Cookhouse (SE), Iziduli (SE), Msenge (SE), Cookhouse II (SE), Rhebokfontein (SE), Suurplaat (SE), Karoo Renewables (SE), Koningaas (SE), Spitskop (SE), Castle (SE), Khai Ma (SE), Poortjies (SE), Korana (SE), IE Moorreesburg (SE), Gunstfontein (SE), Boulders (SE), Vredenburg (Terramanzi), Loeriesfontein (SiVEST), Rhenosterberg (SiVEST), Noupoot (SiVEST), Prieska (SiVEST), Dwarsrug (SiVEST),

	<p><i>Graskoppies (SiVEST), Philco (SiVEST), Hartebeest Leegte (SiVEST), Ithemba (SiVEST), IXha Boom (SiVEST), Spitskop West (Terramanzi), Haga Haga (Terramanzi), Vredenburg (Terramanzi), Msenge Emoyeni (Windlab), Wobben (IWP), Trakas (SiVest), Beaufort West (SiVest)</i></p>
<p><b>Mining and Industry</b></p>	<p><i>Full Environmental Noise Impact Assessments for – Delft Sand (AGES), BECSA – Middelburg (Golder Associates), Kromkrans Colliery (Geovicon Environmental), SASOL Borrow Pits Project (JMA Consulting), Lesego Platinum (AGES), Tweefontein Colliery (Cleanstream Environmental), Evraz Vametco Mine and Plant (JMA), Goedehoop Colliery (Geovicon), Haca Project (Prescali Environmental), Der Brochen Platinum Project (J9 Environment), Brandbach Sand (AGES), Verkeerdepan Extension (CleanStream Environmental), Dwaalboom Limestone (AGES), Jagdlust Chrome (MENCO), WPB Coal (MENCO), Landau Expansion (CleanStream Environmental), Otjikoto Gold (AurexGold), Klipfontein Colliery (MENCO), Imbabala Coal (MENCO), ATCOM East Expansion (Jones and Wagner), IPP Waterberg Power Station (SE), Kangra Coal (ERM), Schoongesicht (CleanStream Environmental), EastPlats (CleanStream Environmental), Chapudi Coal (Jacana Environmental), Generaal Coal (JE), Mopane Coal (JE), Glencore Boshhoek Chrome (JMA), Langpan Chrome (PE), Vlakpoort Chrome (PE), Sekoko Coal (SE), Frankford Power (REMIG), Strahrae Coal (Ferret Mining), Transalloys Power Station (Savannah), Pan Palladium Smelter, Iron and PGM Complex (Prescali Environmental), Fumani Gold (AGES), Leiden Coal (EIMS), Colenso Coal and Power Station (SiVEST/EcoPartners), Klippoortjie Coal (Gudani), Rietspruit Crushers (MENCO), Assen Iron (Tshikovha), Transalloys (SE), ESKOM Ankerlig (SE), Nooitgedacht Titano Project (EcoPartners), Algoa Oil Well (EIMS), Spitskop Chrome (EMAssistance), Vlakfontein South (Gudani), Leandra Coal (Jacana), Grazvalley and Zoetveld (Prescali), Tjate Chrome (Prescali), Langpan Chromite (Prescali), Vereeniging Recycling (Pro Roof), Meyerton Recycling (Pro Roof), Hammanskraal Billeting Plant 1 and 2 (Unica), Development of Altona Furnace, Limpopo Province (Prescali Environmental), Haakdoorndrift Opencast at Amandelbult Platinum (Aurecon), Landau Dragline relocation (Aurecon), Stuart Coal Opencast (CleanStream Environmental), Tetra4 Gas Field Development (EIMS), Kao Diamonds – Tipping Village Relocation (EIMS), Kao Diamonds – West Valley Tailings Deposit (EIMS), Upington Special Economic Zone (EOH), Arcelor Mittal CCGT Project near Saldanha (ERM), Malawi Sugar Mill Project (ERM), Proposed Mooifontein Colliery (Geovicon Environmental), Goedehoop North Residue Deposit Expansion (Geovicon Environmental), Mutsho 600MW Coal-Fired Power Plant (Jacana Environmentals), Tshivhaso Coal-Fired Power Plant (Savannah Environmental), Doornhoek Fluorspar Project (Exigo), Royal Sheba Project (Cabanga Environmental), Rietkol Silica (Jacana), Gruisfontein Colliery (Jacana), Lehlabile Colliery (Jaco-K Consulting), Bloemendal Colliery (Enviro-Insight), Rondevly Colliery (REC), Welgedacht Colliery (REC), Kalabasfontein Extension (EIMS), Waltloo Power Generation Project (EScience), Buffalo Colliery (Marang), Balgarthen Colliery (Rayten), Kusipongo Block C (Rayten), Zandheuvel (Exigo), NamPower Walvis Bay (GPT), Eloff Phase 3 (EIMS), Dunbar (Enviro-Insight), Smokey Hills (Prescali), Bierspruit (Aurecon)</i></p>
<p><b>Road and Railway</b></p>	<p><i>K220 Road Extension (Urbansmart), Boskop Road (MTO), Sekoko Mining (AGES), Davel-Swaziland-Richards Bay Rail Link (Aurecon), Moloto Transport Corridor Status Quo Report and Pre-Feasibility (SiVEST), Postmasburg Housing Development (SE), Tshwane Rapid Transport Project, Phase 1 and 2 (NRM Consulting/City of Tshwane), Transnet Apies-river Bridge Upgrade (Transnet), Gautrain Due-diligence (SiVest), N2 Piet Retief (SANRAL), Atterbury Extension, CoT (Bokomoso Environmental), Riverfarm Development (Terramanzi), Conakry to Kindia Toll Road (Rayten)</i></p>
<p><b>Airport</b></p>	<p><i>Oudtshoorn Noise Monitoring (AGES), Sandton Heliport (Alpine Aviation), Tete Airport Scoping (Aurecon)</i></p>
<p><b>Noise monitoring and Audit Reports</b></p>	<p><i>Peerboom Colliery (EcoPartners), Thabametsi (Digby Wells), Doxa Deo (Doxa Deo), Harties Dredging (Rand Water), Xstrata Coal – Witbank Regional (Xstrata), Sephaku Delmas (AGES), Amakhala Emoyeni WEF (Windlab Developments), Oyster Bay WEF (Renewable Energy Systems), Tsitsikamma WEF Ambient Sound Level study (Cennergi and SE), Hopefield WEF (Umoya), Wesley WEF (Innowind), Ncora WEF (Innowind), Boschmanspoort (Jones and Wagner), Nqamakwe WEF (Innowind), Hopefield WEF Noise Analysis (Umoya), Dassiesfontein WEF Noise Analysis (BioTherm), Transnet Noise Analysis (Aurecon), Jeffries Bay Wind Farm (Globeleq), Sephaku Aganang (Exigo), Sephaku Delmas (Exigo), Beira Audit (BP/GPT), Nacala Audit (BP/GPT), NATREF (Nemai), Rappa Resources (Rayten), Measurement Report for Sephaku Delmas (Ages), Measurement Report for Sephaku Aganang (Ages), Bank of Botswana measurements (Linnspace), Skukuza Noise Measurements (Concor), Development noise measurement protocol for Mamba Cement (Exigo), Measurement Report for Mamba Cement (Exigo), Measurement Report for Nokeng Fluorspar (Exigo), Tsitsikamma Community Wind Farm Pre-operation sound measurements (Cennergi), Waainek WEF Operational Noise Measurements (Innowind), Sedibeng Brewery Noise Measurements (MENCO), Tsitsikamma Community Wind Farm</i></p>



	<p><i>Operational noise measurements (Cennergi), Noupoot Wind Farm Operational noise measurements (Mainstream), Twisdraai Colliery (Lefatshe Minerals), SASOL Prospecting (Lefatshe Minerals), South32 Klipspruit (Rayten), Sibanye Stillwater Kroondal (Rayten), Rooiberg Asphalt (Rooiberg Asphalt), SASOL Shondoni (Lefatshe), SASOL Twisdraai (Lefatshe), Anglo Mototolo (Exigo), Heineken Inyaniga (AECOM), Glencore Izimbiwa (Cleanstream) Glencore Impunzi (Cleanstream), Black Chrome Mine (Prescali) Sibanye Stillwater Ezulwini (Aurecon), Sibanye Stillwater Beatrix (Aurecon), Bank of Botswana (Linspace), Lakeside (Linspace), Skukuza (SiVest), Rietvlei Colliery (Jaco-K Consulting)</i></p>
<p><b>Small Noise Impact Assessments</b></p>	<p><i>TCTA AMD Project Baseline (AECOM), NATREF (Nemai Consulting), Christian Life Church (UrbanSmart), Kosmosdale (UrbanSmart), Louwardia K220 (UrbanSmart), Richards Bay Port Expansion (AECOM), Babalegi Steel Recycling (AGES), Safika Slag Milling Plant (AGES), Arcelor Mittal WEF (Aurecon), RVM Hydroplant (Aurecon), Grootvlei PS Oil Storage (SiVEST), Rhenosterberg WEF, (SiVEST), Concerto Estate (BPTrust), Ekuseni Youth Centre (MENCO), Kranskop Industrial Park (Cape South Developments), Pretoria Central Mosque (Noman Shaikh), Soshanguve Development (Maluleke Investments), Seshego-D Waste Disposal (Enviroexcellence), Zambesi Safari Equipment (Owner), Noise Annoyance Assessment due to the Operation of the Gautrain (Thornhill and Lakeside Residential Estate), Upington Solar (SE), Ilangaletu Solar (SE), Pofadder Solar (SE), Flagging Trees WEF (SE), Uyekraal WEF (SE), Ruuki Power Station (SE), Richards Bay Port Expansion 2 (AECOM), Babalegi Steel Recycling (AGES), Safika Ladium (AGES), Safika Cement Isando (AGES), RareCo (SE), Struisbaai WEF (SE), Perdekraal WEF (ERM), Kotula Tsatsi Energy (SE), Olievenhoutbosch Township (Nali), , HDMS Project (AECOM), Quarry extensions near Ermelo (Rietspruit Crushers), Proposed uMzimkhulu Landfill in KZN (nZingwe Consultancy), Linksfield Residential Development (Bokomoso Environmental), Rooihuiskraal Ext. Residential Development, CoT (Plandev Town Planners), Floating Power Plant and LNG Import Facility, Richards Bay (ERM), Floating Power Plant project, Saldanha (ERM), Vopak Growth 4 project (ERM), Elandspoort Ext 3 Residential Development (Gibb Engineering), Tiegerpoort Wedding Venue (Henwood Environmental), Monavoni Development (Marindzini), Rezoning of Portion 1 (Primo Properties), Tswaing Mega City (Makole), Mabopane Church (EP Architects), ERGO Soweto Cluster (Kongiwe), Fabio Chains (Marang), GIDZ JMP (Marang), Temple Complex (KWP Create), Germiston Metals (Dorean), Sebenza Metals (Dorean)</i></p>
<p><b>Project reviews and amendment reports</b></p>	<p><i>Loperberg (Savannah), Dorper (Savannah), Penhoek Pass (Savannah), Oyster Bay (RES), Tsitsikamma Community Wind Farm Noise Simulation project (Cennergi), Amakhala Emoyeni (Windlab), Spreeukloof (Savannah), Spinning Head (SE), Kangra Coal (ERM), West Coast One (Moyeng Energy), Rhebokfontein (Moyeng Energy), De Aar WEF (Holland), Quarterly Measurement Reports – Dangote Delmas (Exigo), Quarterly Measurement Reports – Dangote Lichtenburg (Exigo), Quarterly Measurement Reports – Mamba Cement (Exigo), Quarterly Measurement Reports – Dangote Delmas (Exigo) Quarterly Measurement Reports – Nokeng Fluorspar (Exigo), Proton Energy Limited Nigeria (ERM), Hartebeest WEF Update (Moorreesburg) (Savannah Environmental), Modderfontein WEF Opinion (Terramanzi), IPD Vredenburg WEF (IPD Power Vredenburg), Paul Puts WEF (ARCUS), Juno WEF (ARCUS), etc.</i></p>

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## SHORT CV OF AUTHOR

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and the University of Tübingen in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa and Madagascar. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out numerous palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Limpopo, Northwest Province, Mpumalanga, Gauteng, KwaZulu-Natal and the Free State under the aegis of his Cape Town-based company *Natura Viva* cc. He has served as a member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Practitioners – Western Cape).

### **Declaration of Independence**

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



**Dr John E. Almond**  
**Palaeontologist**  
***Natura Viva* cc**



## CV - Dr Hugo van Zyl

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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 environmental resource economics, biodiversity conservation finance and socio-economic impact assessment. He has conducted over 70 economic and socio-economic appraisals of complex infrastructure, industrial, residential, 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, Botswana, Mauritius, Cape Verde, Seychelles, Nigeria, Georgia, Kazakhstan, Russia and Armenia.

### Tertiary Education and Other Training

PhD. (Economics). University of Cape Town, South Africa. 2005 – 2007.  
MCom. (Economics). University of Cape Town, South Africa. 1996 – 1998.  
BCom. Honours (Economics). University of Cape Town, South Africa. 1995.  
BSc. University of Cape Town, South Africa. 1992 – 1994.

- Teaching Workshop in Environmental Economics held by the Beijer International Institute of Ecological Economics (Sweden) in Cape Town (1996).
- Natural resource economics course presented by the United States Bureau of Reclamation in Cape Town (2000).

### Employment Record

- Founder and head of Independent Economic Researchers in Cape Town, South Africa (Apr.1999 – present).
- Resource Economics Co-ordinator for Cape Action for People and the Environment (C.A.P.E) – a World Bank funded biodiversity conservation programme housed at the South African National Biodiversity Institute. Main responsibilities include conceptualising and planning the environmental resource economics programme of work, liaison with donors and partners, drawing up ToRs for consultants and managing their inputs, formulating policy implications (on a contract basis from Apr. 2007 – Dec. 2010).
- Freelance economic researcher in Cape Town, South Africa (part time whilst studying: 1996 to 1998).

**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 Riebeeck 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 Klapmuts, 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)

### ***Environmental valuations and ecosystem services assessments***

- Strategic guidance, training, methodological support and reporting writing assistance to the team of local consultants appointed by GiZ to carry out an ecosystem services valuation and cost-benefit analysis of increased investment in four protected areas in Ethiopia. (2021)
- Part of Helmholtz Centre for Environmental Research / GiZ team tasked by the German Ministry of Economic Co-operation and Development (BMZ) with compiling a comprehensive review paper on Africa's Protected Natural Assets with a view to highlighting their value and increasing support (2020).
- Strategic guidance, training and methodological support to the team of local consultants appointed by UNDP to carry out a cost-benefit analysis, ecosystem services valuation and viability assessments of payments for ecosystem services schemes for the proposed Ille Balkhash Nature Reserve, Kazakhstan. (2016)
- Assessment of the economic value associated with the Ethiopian protected areas system and the cost-benefit analysis of increased expenditure on protected areas development and management in Ethiopia. Conducted for the Ethiopian Wildlife Conservation Authority with GEF funding. (2015)
- Consultant to IUCN Netherlands drawing lessons from, and providing a training outline for, civil society involvement in ecosystem services assessment and valuation using The Economics of Ecosystems and Biodiversity (TEEB) approach (2015).
- Co-author and consultant to the formulation of the ValuES project initiated by GiZ focused on methods for integrating ecosystem services assessment and valuation into decision-making (2015). The project also resulted in a GiZ and Helmholtz Centre for Environmental Research publication entitled, "Increasing the Policy Impact of Ecosystem Service Assessments and Valuations: Insights from Practice."
- Assessment of the economic value associated with the Boulders Penguin Colony section of the Table Mountain National Park in Cape Town (2014).
- Second author of the guideline on conducting TEEB Country Studies focused on the value of ecosystem services. (2013)
- Reviewer and case study contributor to TEEB (The Economics of Ecosystems and Biodiversity) for local and regional policy makers. (2011)
- Part of team that completed a 'business case' for investment in the natural capital of the City of Cape Town for the City's Environmental Management Department. The study focused on quantifying the economic value of the City's natural capital / ecosystem services and comparison with expenditure on its enhancement and maintenance. (2009)
- Head researcher on a World Bank commissioned study aimed at determining (1) the current and potential future value of coastal resources in Namibia, (2) current government and donor funding for coastal resource management and (3) potential alternative mechanisms for the financing of coastal management. Also developed outcome indicators to measure the impacts of the World Bank funded Namib Coast Conservation and Management (NACOMA) Project. (2004)
- Part of research team assessing the environmental economic value and financial spin-offs from the Table Mountain National Park in Cape Town. (2004)

- Head researcher on a Gauteng Provincial Department of Agriculture, Conservation, Environment and Land Use project to evaluate the implications of the proposed development of a highly conservation worthy site for housing. Responsibilities included comparing indicative environmental values associated with conservation versus development in a cost-benefit framework and investigating the strategic importance of the site in a conserved state. (2003)
- Head researcher on a USAID funded project to estimate the value of carbon and non-carbon benefits (mainly ecosystem services such as reduced erosion, improved water flow, improved water quality & increased sustainable harvesting) associated with the rehabilitation of woodlands bordering on the Kruger National Park. Responsibilities included sub-contracting and co-ordinating the inputs of four other specialists needed to analyse the biophysical impacts of rehabilitation as well as attaching values to these impacts for inclusion in a cost-benefit analysis. (2002)
- Part of a research team on a Water Research Commission sponsored project aimed at determining the value of the ecosystem services provided by wetlands in the Upper Olifants catchment in Mpumalanga (2002)
- Part of research team that estimated the monetary values associated with open spaces/green belts in Cape Town and the implications of these values for land use decision-making for the City of Cape Town. Main responsibilities were study conceptualisation and calculation of the influence of open space on property prices using hedonic analysis. (2001)
- Assessment of the values associated with coastal resources in Cape Town for the CSIR (2001)

### ***Financial sustainability assessments, business planning and similar projects***

- Lead international consultant working with national consultants on protected areas finance baseline, finance needs assessment (FNA), gap analysis, sustainable finance plan and feasibility for finance options for the protected areas of Georgia conducted for CNF on behalf of UNDP Georgia (2019 to current).
- Lead international consultant of project to develop a concept for sustainable financing mechanisms for the National Parks network of Namibia for the Ministry of Environment and Tourism (MET) and KfW (2022).
- Lead consultant for South African Biodiversity Finance Initiative (BIOFIN) / Department of Forestry, Fisheries and Environment (DFFE) on setting up a framework and improving effectiveness of all fees for permits and licences under the National Biodiversity Act (2022).
- Comprehensive national review of protected area fees (for entrance, vehicles, camping, filming and activities) including national and international benchmarking, stakeholder engagement and site inspections to inform the revision of protected area fees in Botswana. For the Department of Wildlife Management and Parks as part of the Botswana Biodiversity Finance Initiative (BIOFIN) project (2019).
- National Parks and Conservation Sustainable finance plans for two RAMSAR sites in Mauritius forming part of their overall management plans developed by BIOTOPE for the Mauritian Service (2019).
- Lead international consultant working with national consultant on payments for ecosystem services (PES) feasibility study focused on Tsakhkadzor forest area in Armenia conducted for GiZ Armenia (2019).
- Lead international consultant tasked with drawing up a Biodiversity Finance Plan to form part of the Botswana Biodiversity Finance Initiative (BIOFIN) project (2019).
- Lead international consultant tasked with drawing up a Biodiversity Finance Plan to form part of the Georgian Biodiversity Finance Initiative (BIOFIN) project being undertaken by the Ministry of Environmental Protection and Agriculture (2018).
- International consultant on biodiversity conservation finance options for UNDP Cape Verde contributing to a GEF funding proposal for a project focused on managing multiple sector threats on marine ecosystems to achieve sustainable blue growth (2018).
- Lead consultant tasked with drawing up a Biodiversity Finance Plan to form part of the South African Biodiversity Finance Initiative (BIOFIN) project being undertaken by the Department of Environmental Affairs in partnership with the UNDP (2017).
- Assistance to the Namibian Nature Foundation for their inputs to the Biodiversity Resource Mobilisation projected under the MET and funded by GiZ (2017).
- Global review of resource mobilization for biodiversity conservation in German Development Cooperation to inform future strategy on sustainable financing of protected areas and biodiversity. Part of international team of experts appointed by GiZ. (2016)
- Financial cost-benefit analysis of a cable car or funicular to access Signal Hill in Cape Town to form part of an

- overall feasibility study for South African National Parks (2014).
- Financial sustainability modelling and economic impact assessment of biodiversity off-set options associated with the construction of the N2 Toll Highway in the Pondoland Region of the Eastern Cape Province (2014).
- Estimation of funding and financial set-asides required to build and sustainably operate a water treatment plant at the proposed Lusthof coal mine in Mpumalanga. (2013)
- Business plan and sustainable financing strategy for the Dorob National Park, Namibia. (2011)
- Development of detailed business/action plans for the achievement of City of Cape Town environmental agenda targets. (2010)
- Financial and economic review of the Ukuvuka Fire-stop Campaign aimed at preventing unwanted fires in Cape Town. (2004)
- Review of the validity of financial arguments in favour of the preferred technological option for the production of low sulphur diesel at the Caltex refinery in Cape Town. (2004)
- Part of research team that assessed the financial sustainability of various conservation projects forming part of the Cape Action Plan for the Environment (CAPE) programme which was seeking Global Environmental Facility funding. (2001)

***Economic and socio-economic impacts assessment, cost-benefit analysis and project appraisal***

- Lead international consultant to UNDP Mauritius assessing the economic impacts of Invasive Alien Species (IAS) in Mauritius to inform an IAS management strategy and motivate for the funding of the strategy (current).
- Cost-benefit analysis for UNDP India to form part of a GCF funding proposal focused on investment in coastal ecosystem restoration as a means to achieve climate change adaptation and livelihoods enhancement goals (2018).
- Consultant to WWF South Africa on a project to estimate fair share emissions pathways for South Africa, along with the likely net mitigation costs associated with reaching these pathways as an informant of the country's revised Nationally Determined Contribution (NDC) in the run-up to the 2018 COP (2017).
- Development of a decision-making tool for GreenCape to inform the allocation of industrial water in the Saldanha Bay Local Municipality based on socio-economic and other key factors (2016).
- Strategic review for LTS Kenya of cost-benefit analyses of climate change adaptation measures forming part of a funding application to the Green Climate Fund (GCF) (2016).
- Economic impact assessment component to form part of feasibility studies for six Special Economic Zones (SEZs) throughout the country commissioned by the Department of Trade and Industry (2014).
- Lead author of socio-economic cost-benefit analysis of baboon management measures in the South Peninsula area of Cape Town (2013).
- Socio-economic assessment of impacts on surrounding farmers associated with mine dewatering at Sishen iron ore mine, Northern Cape. (2012)
- Cost-benefit analysis of Biodiversity Offset options for Transnet's inland fuel terminal near Heidelberg, Gauteng. (2011)
- Assessment of the local economic impacts of the closure of Exxaro's Zincor plant near Springs, Gauteng (2011).
- Economic impact assessment of the proposed Eden Island residential and tourism development in the Seychelles. Project included measuring likely contribution to the local economy and liaison with senior government officials, the IMF Country Assessment team and the Standard&Poors rating team. (2006)
- Part of University of Cape Town Graduate School of Business study for the Airports Company of South Africa to examine the economic impacts associated with Cape Town International Airport. (2004)
- Part of a research team that analysed the costs and benefits of air pollution abatement measures in the industrial, household, electricity generation and transport sectors throughout South Africa for the national consultative forum for the government, business and labour sectors (NEDLAC). Responsibilities include assisting with structuring the model for the analysis, assessing the availability of data and report writing. (2003)
- Part of a CSIR team that conducted an environmental economic assessment of the impacts of alternative route alignment of the proposed Gautrain rapid rail link. (2003)

- Part of UCT Graduate School of Business study of the economic benefits associated with the Joint Marketing Initiative aimed at the consolidation of the marketing of the City of Cape Town and the Western Cape. (2003)
- Head researcher in a team of three researchers on a Water Research Commission project aimed at the formulation of an economic evaluation framework for the evaluation of water demand management and water conservation measures. Roles included providing strategic direction to the study and co-ordinating the inputs of the other researchers. (2001)
- Part of USAID funded team that formulated a cost-benefit evaluation framework for the assessment of Working for Water alien vegetation clearing projects. (2001)
- Evaluated the socio-economic impacts of Consolidated Municipal Infrastructure Programme funded infrastructure developments for the Western Cape provincial government in association with the Institute for Development Services. The socio-economic impacts of storm water, sewage and road infrastructure projects were evaluated using guidelines agreed on with the provincial government. (2000)
- Economic evaluation input on a Cape Metropolitan Council project aimed at developing a decision making framework for the evaluation of mega projects in the Cape Metro area. (2000)
- Development of guidelines for the cost-benefit analysis of water projects and policies in the Western Cape for the Palmer Development Group. (2000)
- Head consultant commissioned by the Cape Metropolitan Council to conduct a study on economic and social impact assessment methods focusing on their basic workings, strengths, weaknesses, areas of optimal application and the resources needed for their application. (1998)

### ***Analysis and strategic inputs to policy***

- Lead international consultant for drawing up biodiversity offsets guidelines for Kazakhstan under UNDP project for the Ministry of Ecology, Geology and Natural Resources (2021).
- Part of study team contracted by the Department of Environmental Affairs and the Economic Development Department to conduct a National Employment Vulnerability Assessment (NEVA) and draw up associated Sectoral Job Resilience Plans (SJRP) for climate change in South Africa. Role focused on analysis of climate change adaptation measures (2017).
- Consultant to UNDP Russia focused on (1) estimating the economic value of the ecosystem services associated with the Karakan Ridge Nature Reserve in Kemerovo and (2) making inputs to a national biodiversity offsets guideline for the energy and mining sector focused on the use of ecosystem services assessment and valuation (2017).
- Specialist resource economics inputs to a South African National Biodiversity Institute (SANBI) project document submitted to the Global Environmental Facility (GEF) for funding of a project aimed at Mainstreaming Biodiversity into Land Use Regulation and Management at the Municipal Scale (2014).
- Second author on Gauteng City-Region Observatory (GCRO) project focused on incorporating green infrastructure and ecosystem services into municipal finance and accounting practices. (2013)
- Project leader and lead author of Financial Provisions for Rehabilitation and Closure in South African Mining: Discussion Document on Challenges and Recommended Improvements. (2011)
- Part of study team that formulated guidelines for the Western Cape Provincial Government on the use of biodiversity offsets. (2007)
- Conducted economic research to inform the Environmental Goods and Services Industry strategy for the National Department of Trade and Industry. Work focused on analysing the size and composition of the industry in South Africa. (2005)
- Part of research team that investigated the potential for, and institutional constraints to, the sustainable commercialisation of natural products that rely on local biodiversity for the National Department of Environmental Affairs and Tourism (project sponsored by USAID). (2001)
- Part of research team in a National Department of Environmental Affairs and Tourism projects sponsored by USAID investigating the Clean Development Mechanism and emissions trading as options for meeting climate change goals in South Africa. (2001)
- Head researcher on two World Wide Fund for Nature studies aimed at estimating the external environmental costs associated with coal mining and water supply and use. These projects involved investigating the environmental impacts associated with the sectors concerned and attaching values to the externalities they generate based on the available information. (2000)

- Expert reviewer for the National Department of Water Affairs and Forestry Wastewater Charges Strategy project. (2000)
- Part of an Applied Fiscal Research Centre review of the national energy white paper. (1997)
- Assisted African Environmental Solutions with environmental economics input for their work on a sustainability framework for the National Water Tariff Policy Review. (1996)

### Peer Reviewed Publications

1. Cumming, T., Seidl, A., Emerton, L., Spenceley, A., Golden Kroner, R., Uwineza, Y and van Zyl, H. 2021. Building sustainable finance for resilient protected and conserved areas: lessons from COVID-19. *International Journal of Protected Areas and Conservation (PARKS)*, Vol. 27 (Special Issue), March 2021.
2. Van Zyl, H.W., Kinghorn, J.W. and Emerton, L. 2019. National Park Entrance Fees: A Global Benchmarking Focused on Affordability. *International Journal of Protected Areas and Conservation (PARKS)*, Vol. 25.1, May 2019.
3. Lindsey, P.A., Jennifer R. B. Miller, Lisanne S. Petracca, Lauren Coad, ....., Riko Stevens, Hugo W. Van Zyl, Luke T. B. Hunter. 2018. More than \$1 billion needed annually to secure Africa's protected areas with lions. *Proceedings of the National Academy of Sciences Oct 2018*, 201805048; DOI:10.1073/pnas.1805048115.
4. van Zyl, H.W., Lewis, Y., Kinghorn, J. and Reeler, J. 2018. The cost of achieving South Africa's 'fair share' of global climate change mitigation. *Climate Policy* DOI: 10.1080/14693062.2018.1437019
5. Berghöfer, A., Emerton, L., Moreno Diaz, A., Rode, J., Schröter-Schlaack, C., Wittmer, H., van Zyl, H. 2017. Sustainable financing for biodiversity conservation – a review of experiences in German development cooperation. Study commissioned by GIZ and KfW. Full report published as: UFZ Discussion Paper 1/2017. UFZ - Helmholtz Centre for Environmental Research GmbH, Leipzig, Germany.
6. van Zyl, H.W., Fakir, S., Leiman, A. and Standish, B. 2016. Impacts on the Economy. In Scholes, R., Lochner, P., Schreiner, G., Snyman-Van der Walt, L. & de Jager, M. (eds.). 2016. Shale Gas Development in the Central Karoo: Shale Gas Development in the Central Karoo: A Scientific Assessment of the Opportunities and Risks. CSIR/IU/021MH/EXP/2016/003/A, ISBN 978-0-7988-5631-7, Pretoria: CSIR. Available at <http://seasgd.csir.co.za/scientific-assessment-chapters/>
7. Wittmer, H., van Zyl, H.W., Brown, C., Rode, J., Ozdemiroglu, E., Bertrand, N., ten Brink, P., Seidl, A, Kettunen, M., Mazza, L., Manns, F., Hundorf, J., Renner, I., Christov, S. and Sukhdev, P. 2013. TEEB (The Economics of Ecosystems and Biodiversity): Guidance Manual for TEEB Country Studies. TEEB, Geneva. Available at <http://www.teebweb.org/publication/guidance-manual-teeb-country-studies-4/>
8. De Wit, M., van Zyl, H.W., Blignaut, J., Crookes, D., Jayiya, T., Goiset, V. & Mahumani, B. 2012. Including the economic value of well-functioning urban ecosystems in financial decisions: Evidence from a process in Cape Town. *Ecosystem Services*, Vol. 2, pg. 38-44.
9. Robrecht, H., Lorena, L., Muhlmann, P., Mader, A, Calcaterra, E., Nel, J., Hammerl, M., Moola, F., Ludlow, D., Wackernagel, M., Teller, A., De Wit, M., Van Zyl, H. & Berghofer, A. 2012. Ecosystem services in cities and public management. In: *The Economics of Ecosystems and Biodiversity in Local and Regional Policy and Management*, edited by Wittmer, H. & Gundimeda, H. London, Washington, D.C.: Earthscan.
10. Leiman, A., Standish, B., Boting, A. & van Zyl, H.W. 2007. Reducing the Healthcare Costs of Urban Air Pollution: The South African Experience. *Journal of Environmental Management*, Vol. 84, pg. 27-37.
11. Standish, B. & van Zyl, H.W. 2007. Assessing the Economic Impact of Roads Passing Through Ecologically Sensitive Areas: A Case Study in Cape Town, South Africa. *Impact Assessment and Project Appraisal*, Vol. 25, Nr 2.
12. Leiman, A. & van Zyl, H.W. 2004. A Small-sample Approach to Hedonic Valuation of the Environment: A Case Study at Zandvlei, Cape Town. In: Blignaut, J & de Wit, M. (Eds) *Sustainable Options: Development Lessons from Applied Environmental Economics*. UCT Press, Cape Town.
13. De Wit, M., van Zyl, H.W. & King, N. 2004. The Cost of Noise Pollution. In: Blignaut, J & de Wit, M (Eds). *Sustainable Options: Development Lessons from Applied Environmental Economics*. UCT Press, Cape Town.
14. Leiman, A. & van Zyl, H.W. 2004. Economics in Impact Assessment: The role of Environmental and Resource Economics. In: Blignaut, J & de Wit, M (Eds). *Sustainable Options: Development Lessons from Applied Environmental Economics*. UCT Press, Cape Town.



15. Turpie, J.K. & van Zyl, H.W. 2002. Valuing the Environment in Water Resources Management. Pp 85-110, in: Hirji, R., Johnson, P., Maro, P. & Matiza Chiuta, T. (eds) Defining and mainstreaming environmental sustainability in water resources management in southern Africa. SADC, IUCN, SARDC, World Bank: Maseru/Harare/Washington DC.
16. Van Zyl, H.W. & Leiman, A. 2002. Hedonic Approaches to Estimating the Impacts of Open Spaces: A Case Study in the Cape. South African Journal of Economics and Management Science, Vol. 5(2). June.
17. Van Zyl, H.W., Store, T. & Leiman, A. 2000. Africa Region Case Studies. Chapter In: Rietbergen-McCracken, J. & Abaza, H. (Eds) Environmental Valuation: A Worldwide Compendium of Case Studies. Earthscan, London.

### Provision of training

- Training on ecosystem services values and associated resource mobilization for biodiversity conservation provided by GiZ in Namibia for African countries in preparation for the Convention on Biodiversity COP (2019).
- Training on ecosystem services valuation and biodiversity finance options by GiZ Armenia to government officials, NGOs and other interested stakeholders (2018).
- Introduction to TEEB (The Economics of Ecosystems and Biodiversity) and scoping of potential uses of ecosystem services assessment and valuation as inputs to the water allocation plan for the Ziway-Shalla Sub-Basin, Ethiopia (2017).
- Introduction to ecosystem services assessment and valuation for the Summer School Course at the Namibia University of Science and Technology supported by GiZ through the ValuES project. (2016)
- Input on The Economic Value and Service Delivery Potential of Wetland Ecosystem Services as part of ICLEI's 'Wetlands for Prosperity' project for local government focused in this case on the Mogalakwena Local Municipality (2015).
- Resource person on regional capacity building workshops for ministries in the Middle East and Sub-Saharan Africa presented by The Economics of Ecosystems and Biodiversity (TEEB) in collaboration with the UN Convention on Biodiversity (2012).
- Co-presenter of one week introduction to environmental resource economics course for the Namibian Coastal Conservation and Management Project (2009).
- Presenter on three day Payments for Ecosystem Services (PES), Forests, and Climate Change course presented to USAID staff in Africa and organised by CIFOR, Forest Trends and the Katoomba Group (2009).
- Lecturer for Rhodes University on annual course focused on the application of environmental economics and economic specialist inputs to EIAs (2005, 2006, 2007).
- Presented two day courses on the theory and application of environmental economics for the environment departments of the Gauteng and Western Cape provincial governments (2004).
- Co-presented course on environmental economics and its practical application to National Department of Water Affairs and Forestry staff (2003).

### Language Ability

	<i>SPEAK</i>	<i>WRITE</i>	<i>READ</i>
<b>ENGLISH</b>	excellent	excellent	excellent
<b>AFRIKAANS</b>	excellent	good	excellent
<b>DANISH</b>	basic	-	basic


### References


Ms Tracey Cumming BIOFIN Technical Advisor UNDP tracey.cumming@undp.org +27 827761765	Prof. Anthony Leiman Senior Lecturer School of Economics, University of Cape Town Private bag, Rondebosch, 7700, South Africa <a href="mailto:tony.leiman@uct.ac.za">tony.leiman@uct.ac.za</a>	Mrs Tamar Pataridze Consultancy Program Manager Caucasus Nature Fund Tbilisi, Georgia tpataridze@caucasus-naturefund.org Tel.: +995 32 2295636
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# James Kinghorn

Applied Environmental Economics Researcher

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

I conduct applied environmental economics research. My interests include ecosystem services, wellbeing conceptualisation and measurement, sustainable livelihoods, markets and value chains, as well as climate and biodiversity finance.

My goal is to conduct research to inform policy in key areas including poverty and inequality, biodiversity loss and climate change. I use participatory, qualitative and quantitative approaches. I am building skills in econometrics and experimental programme design. I enjoy working with a wide range of associates and stakeholders, strive for co-creation of knowledge and integration with adjacent disciplines.

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## 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

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## Experience

### **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

### **Programme Manager** **Samaritan's Purse International Relief, 2013 – 2019**

- Managed South Sudan's largest general food distribution contract under the World Food Programme (WFP)
- Deployed as part of Disaster Assistance Response Teams (DARTs) in Dominica, Greece, Mozambique and Nepal with grants from WFP, USAID/OFDA, Start Network, in collaboration with ICRC, MSF and other partners

**Other roles include Intern; Research Assistant; Processing Clerk**  
**Programme, HSBC Plc, 2005 – 2012**

**SANParks, SAIAB, RU Fisheries**

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## Selection of Projects

### 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); Bannaba 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

### Economic appraisal and evaluation

#### **Ecosystem and livelihoods resiliency: climate change risk reduction through ecosystem-based adaptation in South Africa and Botswana's communal rangelands (2021 and ongoing)**

- Conducted financial analysis in support of a Green Climate Fund (GCF) funding proposal focussed on livestock-sector interventions in improved rangeland management and monopsony disruption in beef markets
- Used cost-benefit analysis to assess wider economic costs and benefits including climate change mitigation and promotion of livestock-based value chains
- Presently conducting research into wellbeing, governance and natural resource management to ensure Meat Naturally Pty implementation sites meet Climate, Community and Biodiversity Standards (CCB) for gold-star certification of carbon credits under the Verified Carbon Standard (VCS)

### **Economic analysis of the costs and benefits associated with St. John's Sewerage Infrastructure and Treatment Facility, Antigua and Barbuda (2020)**

- Led a discrete cost-benefit analysis to enable the Ministry of Finance to make the case for the financing of a centralised waste treatment facility
- Engaged with key sectors to map out and quantify the linkages between wastewater treatment and public health, fisheries, tourism, agriculture and commerce
- Generated report outlining strong economy-wide benefits associated with the public provision of wastewater treatment services

### **Peru's Natural Legacy – Amazon Climate: Effective Management of the Peruvian Amazon Protected Areas for Climate Change Mitigation (ongoing)**

- Conducted financial analysis for a GCF proposal focuses on climate change mitigation and adaptation
- Results fed iteratively into the development of adaptation interventions to foster resilience in the production practices used by indigenous communities
- Appraised project through economic cost-benefit analysis with a focus on the catchment-scale ecosystem services generated by protected areas

### **Heritage Colombia (HECO): Maximizing the contributions of Sustainably Managed Landscapes in Colombia for achievement of Climate Goals (ongoing)**

- Ran a cost-benefit analysis of a GCF funding proposal to enhance climate information systems and reduce deforestation in Protected Areas and adjacent landscapes
- Used a range of methods to estimate shadow values, including ecosystem services valuation and avoided damages estimation techniques
- Assessed distributional impacts in terms of costs and benefits to different sectors of society

### **Climate resilient development in refugee camps and host communities in Kigoma region, Tanzania (2021)**

- Enhanced existing economic and financial analysis of a GCF funding proposal through a restructuring of models and addition of ecosystem services values and shadow prices

### **Economic inputs to a Feasibility Study of interventions to advance Rwanda's National Adaptation Planning Process (2020)**

- Contributed guidance on the use of cost-benefit analysis as a tool to inform financial and economic feasibility of Global Environment Facility (GEF)-funded adaptation interventions
- Guidance included a framework for analysis of costs, benefits and impacts, ways to explicitly account for ecosystem services and shadow values.

### **Enhancing the Climate Resilience of India's Coastal Communities (2017)**

- Conducted ecosystem services valuation of coral reef and seagrass systems to generate values for use in the appraisal of a GCF funding proposal, through cost-benefit analysis

### **Strengthening Climate Service and Multi-hazard Early Warning for Resilience in Sudan (2020)**

- Used cost-effectiveness analysis to analyse interventions proposed as part of a GCF funding proposal focused on early warning systems in Sudan
- Project targets were used alongside data on climate hazard impacts to determine the project's potential to reduce fatalities of people and livestock, as well as damage to crops and houses

## Biodiversity and ecosystem services

### **Biodiversity Finance Initiative (BIOFIN): Research to improve effectiveness of fees for biodiversity permits and licenses in South Africa (ongoing)**

- Worked with stakeholders from four national-level sub-directorates and all nine provinces to develop a framework for updating permit fees in the areas of threatened or protected species, alien invasive species, and bioprospecting access and benefit sharing
- Framework allows for fee setting to be done in a transparent way, making explicit the inclusion of factors including cost-recovery, affordability and equity
- Currently applying framework to update permit fees associated with Threatened or Protected Species regulations

### **Biodiversity Finance Initiative (BIOFIN): Biodiversity Expenditure Review and Finance Plans, South Africa and Botswana (2017)**

- Conducted national-level reviews of biodiversity expenditure for South Africa and Botswana
- Reviews included government expenditure with a focus on key ministries and departments, as well as Official Development Assistance from donors and civil society organisations
- Contributed to the development of South Africa's Biodiversity Finance Plan through a series of key informant interviews and the iterative prioritization of identified biodiversity finance solutions

### **Biodiversity Finance Initiative (BIOFIN): Revision of Protected Area Entrance Fees, Botswana (2018)**

- Contributed to the revision of protected area entrance fees in Botswana through a regional benchmarking exercise.
- Conducted a global benchmarking of protected area entrance fees, codeveloped an Index of Affordability to establish the affordability of entrance fees using a composite index of prices, incomes and purchasing power.

### **The economic value of ecosystem services from the Karakan Ridge Reserve, Russia (2016)**

- Provided an outline of the values associated with ecosystem services in the Karakan Ridge Reserve, a protected area located in a high-intensity coal mining region in Siberia
- Findings served to highlight the importance of this centre of endemism and provide key info into the opportunity costs of competing land uses.

### **The economic value and contribution of Simon's Town Penguin Colony (2018)**

- Quantified the economic value of the Simon's Town Penguin Colony to the local economy through an analysis of the tourism sector
- Demonstrated the substantial value of the Colony to the local economy, providing justification for investments to safeguard this endangered species and facilitate the continued development of sustainable tourism in the area.

### **Discussion Document on the use of the Economic Valuation of Ecosystem Services (EVES) in Environmental Impact Assessment (EIA) (2016)**

- Contributed to the compilation of a report to outline the present state of knowledge surrounding the incorporation of the ecosystem services framework, as well as ecosystem services valuation, into environmental impact assessment.

### **Business Case and Ecosystem Services Valuation inputs to Biodiversity Offsets Guidelines (2016)**

- Helped to build a business case for why voluntary biodiversity offsets should be considered by companies operating in the Russian minerals extraction and energy sectors.

## Climate change policy and finance

### **Development of a climate finance tracking framework for South Sudan (2020)**

- Led a study using the Climate Public Expenditures and Institutional Review (CPEIR) typology to identify existing climate finance within government spending and official development assistance
- Analysed funding flows in terms of their alignment with national goals to fight poverty and achieve greater gender equality
- Provided training to cross-ministerial team mandated to track ongoing deployment of climate finance

### **The cost of achieving South Africa's fair share of global climate change mitigation (2018)**

- Worked as an analyst within a team of economists, industrial specialists and engineers to estimate the net costs of achieving South Africa's 'fair share' of climate change mitigation
- Project considered reduced greenhouse gas emissions in energy production and industry more broadly
- Demonstrated that a rapid decarbonisation pathway would result in net benefits for South African industry and was a prudent development pathway from a financial perspective
- Results published in the journal *Climate Policy*

### **South African National Employment Vulnerability Assessment (NEVA) (2017)**

- Provided inputs to the NEVA through a review of nationally-determined climate change adaptation measures
- Used available literature and secondary data to estimate impacts of measures on employment in key sectors including agriculture, manufacturing, mineral resources and energy generation



## SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

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

- 2016-2021 -Director and principal scientist at 3Foxes Biodiversity Solutions (Pty) Ltd. Providing specialist ecological studies for EIA's, Ecological Monitoring, Management Plans etc.
- 2009 – 2016 – 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.

### **Power Lines & Associated Infrastructure**

- Beaufort West Wind Farm Substation and Associated Infrastructure Project. Fauna & Flora Specialist Study. SLR, 2021.
- Grid Connection Infrastructure for the Proposed Sadawa & Kolkies Series of PV Projects. Fauna and Flora Specialist Studies. Savannah Environmental 2021.
- Grid Connection Infrastructure for the Namas Wind Farm, Northern Cape. Fauna and Flora Specialist Study. Savannah Environmental 2019.
- Grid Connection Infrastructure for the Zonnequa Wind Farm, Northern Cape. Fauna and Flora Specialist Study. Savannah Environmental 2019.
- Wind Relic MTS Substation near Cookhouse. Fauna and Flora Specialist Study. Savannah Environmental 2021.
- Impofu 132kV Grid Connection from Oyster Bay to Port Elizabeth. Fauna and Flora Specialist Study. Zutari 2019.
- Nuweveld Grid Connection and Associated Infrastructure. Fauna and Flora Specialist Study. Zutari 2021.
- Grid Connection Infrastructure for the Mainstream Sutherland Wind Energy Facilities. Fauna and Flora Specialist Study. CSIR 2019.
- Proposed Letsoai and Enamandla 400kv Grid Connection, Aggeneys, Northern Cape. Fauna & Flora Specialist Study, Biotherm Energy 2016.
- Juno-Aurora 765kV Power Line in the Western Cape: Fauna & Flora Specialist Report. Nzumbulolo Heritage Solutions 2015.
- Mookodi Integration Phase 2 132kV Power Lines and Ganyesa Substation near Vryburg, North West Province: Fauna & Flora Specialist Report. Sivest 2014.

- Transnet 7km 50 kV Power Line from Eskom Juno Substation to the proposed new Transnet Juno Traction Feeder Substation. Nsovo Environmental Consulting. 2014.
- Transnet 5km 50 kV Power Line from Eskom Aries Substation to the proposed new Transnet Aries Traction Feeder Substation. Nsovo Environmental Consulting. 2014.
- Transnet 15km 50 kV Power Line from Eskom Helios Substation to the proposed new Transnet Helios Traction Feeder Substation. Nsovo Environmental Consulting. 2014.
- Burchell-Caprum-Mooidraai 132kV Power Line - Fauna & Flora Specialist Report. Savannah Environmental 2014.
- Proposed Re-Alignment of The Koeberg – Ankerlig Power Line: Fauna & Flora Specialist Report. Savannah Environmental 2014.
- Grid Connection for Redstone Solar Thermal Energy Plant- Redstone Solar Thermal to Olien Mts: Fauna & Flora Specialist Report. SiVest 2014.
- Grid Connection for Mainstream South Africa Perdekraal Wind Energy Facility. Fauna & Flora Specialist Report. ERM 2014.
- Karoshoek Grid Integration Infrastructure. Fauna & Flora Specialist Report. Savannah Environmental. 2012.
- Garob to Kronos Power Line - Fauna & Flora Specialist Report. Savannah Environmental. 2012.
- Loeriesfontein Wind Energy Facility – Substation & Grid Connection. Fauna & Flora Specialist Report. Savannah Environmental. 2012.
- Gouda Wind Energy Facility – Grid Connection. Walk-Through of Overhead Power Line - Gouda WEF to Eskom Windmill Substation. Savannah Environmental. 2012.
- Kappa-Omega 765 kV Transmission Line. Fauna, Flora & Ecology Walk-Through Report. Specialist Report for ACER Africa. 2013.

#### **Wind Farms and Associated Infrastructure**

- Ishwati Emoyeni WEF near Murraysburg. Fauna and Flora Specialist Study. CSIR 2014.
- Mainstream Victoria West WEF. Fauna and Flora specialist study. ERM 2011.
- Noblesfontein Wind Energy Facility, Victoria West. Ecological Walk-Through Report. Savannah Environmental 2012.
- Wind Garden Wind Energy Facility near Makhanda, Eastern Cape. Fauna and flora specialist study. Savannah Environmental 2021.
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- Highlands Wind Energy Facilities near Somerset East, Eastern Cape. Fauna and Flora species studies. Arcus, 2017.
- Wind Energy Facility near Paternoster, Western Cape. Fauna and Flora Impact Assessment. Savannah Environmental 2019.
- Elandsbay Wind and Aquaculture Facility, Western Cape. Faunal Impact Assessment. Anchor Environmental. 2019.

- Nuweveld East, West and North Wind Farms, Western and Northern Cape. Fauna & Flora Specialist Assessment. Aurecon 2020.
  - Namas Wind Energy Facility, Northern Cape. Fauna and Flora Specialist Study. Savannah Environmental 2018.
  - Zonnekwa Wind Energy Facility, Northern Cape. Fauna and Flora Specialist Study. Savannah Environmental 2018.
  - Kap Vley Wind Energy Facility, Northern Cape - Fauna and Flora Specialist Study. CSIR 2018.
  - Tooverberg Wind Energy Facility, Tankwa Karoo, Western Cape. Fauna and Flora Specialist Study. SiVest 2018.
  - Kuruman Wind Energy Facility, Northern Cape. Fauna & Flora Scoping & EIA assessment. CSIR 2019.
  - Phezekomoya and San Kraal Wind Energy Facilities and associated grid connection, Northern Cape. Fauna and Flora specialist studies. Arcus Consulting 2018.
  - Kokerboom Wind Energy Facilities (1-4) and associated grid connections, Northern Cape. Fauna and Flora specialist studies. Aurecon 2017.
-



**herewith certifies that**

**Simon Wallace Todd**

Registration Number: 400425/11

**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 **2 November 2011**

Expires **31 March 2023**



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

Chairperson

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

Chief Executive Officer



## APPENDIX 3 - CURRICULUM VITAE

### ATHOL SCHWARZ Pr Tech Eng

#### Independent Author

Athol, is a Professionally Registered Civil Engineering Technologist with more than 35 years of experience, specialising in Civil and Structural Engineering services for renewable energy facilities and infrastructure. These services range from the concept phase all the way through to project close-out, including inter alia: design, contract and construction management phases.

Since 2010, Athol was employed by Hatch, as a Civil Engineering Author working on numerous infrastructure and renewable energy projects (including wind farms, fixed and rotating PV solar plants, CPV solar plants) for various Independent Power Producers (IPP) / Developers.

Athol has experience in traffic impact assessments, transportation route analysis, infrastructure development and design, construction and project management (NEC), with a keen eye for detail.

#### SPECIFIC RELEVANT EXPERIENCE

- Red Cap Energy (Pty) Ltd - Impofu Wind Farms consisting of Impofu North Wind Farm, Impofu West Wind Farm and Impofu East Wind Farm
- juwi Renewable Energies (Pty) Ltd – Paulputs Traffic Impact Assessment
- CPV1 Solar - Touwsriver Solar, Western Cape, 36 MW Concentrated Photovoltaic Plant (1500 trackers), supervised civil infrastructure activities
- juwi Renewable Energies (Pty) Ltd - Moorreesberg Wind Energy Facility, Moorreesberg, Western Cape, consisting of 25 wind Turbine Generators - feasibility study for the routing of the access roads.
- juwi Renewable Energies (Pty) Ltd - Garob Wind Farm, Copperton, Northern Cape, consists of 46 Acciona 3.0 MW Wind Turbine Generators - conducted a hydrological study to determine the potential impact of the flood levels on the development,
- juwi Renewable Energies (Pty) Ltd - Wolf Wind Farm, Kleinpoort, Eastern Cape, consisting of 28 Wind Turbine Generators - identify the most viable access point onto the property and internal access road.
- Scatec Solar AS (Norway) - Dreunberg Filter Yard (Capacitor bank), 75 MW Single-axis PV plant – Burgersdorp, Eastern Cape – Quality control of civil activities.
- Scatec Solar AS (Norway) - Linde Filter Yard (Capacitor bank), 36.8 MW Single-axis PV plant – Hanover, Northern Cape – Quality control of civil activities.
- Scatec Solar AS (Norway) - Kalkbult Filter Yard (Capacitor bank), 75 MW Single-axis PV plant – De Aar, Northern Cape – Quality control of civil activities.
- juwi Renewable Energies (Pty) Ltd - Keiskammahoek Wind Farm, King William's Town, Eastern Cape, consisting of 16 Wind Turbine Generators - feasibility study to minimise the impact on the commercial plantation due to the development of Keiskammahoek Wind Farm
- South Africa Mainstream Renewable Power De Aar PV (Pty) Ltd - 50 MW PV Plan – De Aar, Northern Cape – clients engineer
- South Africa Mainstream Renewable Power Droogfontein PV (Pty) Ltd – 50 MW PV Plan – Kimberly, Northern Cape – clients engineer
- juwi Solar ZA Construction 3 (Pty) Ltd - Aries, 9.7 MW PV Plant – Kenhardt, Northern Cape - civil author services and Traffic Impact Assessment
- juwi Solar ZA Construction 3 (Pty) Ltd - Konkoonsies, 9.7 MW PV Plan – Pofadder, Northern Cape - civil author services and Traffic Impact Assessment
- juwi Renewable Energies (Pty) Ltd - Namies Wind Energy Facility, near Aggeneys, Northern Cape, consists of between 46 and 58 wind turbine generators - transportation route assessment



#### EDUCATION

Master's Diploma in Technology – Civil: Structures (1989)

National Higher Diploma (1987)

National Diploma (1986)

#### LANGUAGES

- English
- Afrikaans
- French (limited)

#### PROF AFFILIATIONS

- ECSA - Professional Engineering Technologist,
- SAICE - South African Institution of Civil Engineering - Member

#### COMPETENCES

- Structural Design (concrete and steel),
- Project and Construction Management

#### SOFTWARE

- MS Office
- MS Projects
- Micro Station and Autocad
- Prokon
- Model Maker

- *juwi Renewable Energies (Pty) Ltd - Outeniqua Wind Farm (North), Uniondale, Western Cape - transportation route assessment*
- *juwi Renewable Energies (Pty) Ltd - Wolf Wind Farm, Kleinpoort, Eastern Cape consisting of 25 Wind Turbine Generators - feasibility study for the access routes*
- *juwi Renewable Energies (Pty) Ltd - Outeniqua Wind Farm (South), Uniondale, Western Cape, 16 Wind Turbine Generators - feasibility study for the access routes*
- *UMOYA ENERGY (Pty) Ltd - Hopefield Wind Farm, approximately 6 km south-east of the town of Hopefield, Western Cape, consisting of 37, Vestas 1.8 MW WTG – ACS HV Yard and Substation.*
- *South Africa Mainstream Renewable Power Jeffreys Bay (Pty) Ltd - Jeffreys Bay Wind Farm, Humansdorp, Eastern Cape, consists of 60 Siemens 2.3 MW WTG - review the foundation design for the wind towers - review the designs for compliance to the national standards.*
- *juwi Solar ZA Construction 3 (Pty) Ltd - RustMo1, 6.8 MW PV Plant – Rustenburg, North-West - author services regarding access and internal gravel roads*
- *Barrick Africa (Pty) Ltd - Buzwagi Gold Mine in Tanzania – a feasibility study.*
- *juwi Renewable Energies (Pty) Ltd - Garob Wind Farm, Copperton, Northern Cape, consists of 46 Acciona 3.0 MW Wind Turbine Generators - transportation management plan.*
- *Slim Sun Swartland Solar Park - SlimSun Solar - 5 MW PV Plant – Malmesbury, Western Cape – ACS for HV Yard and Substation.*
- *Cennergi (Pty) Ltd - Kopleegte Switching Station at Amakhala Emoyen Phase 1, Bedford, Eastern Cape, consisting of 56 Nordex, 2,4 MW Wind Turbines Generators- ACS for HV Yard and Substation.*
- *EXXARO Resources Ltd And Watt Energy (Pty) Ltd - Wittekleibosch Switching Station at Tsitsikamma Community Wind Farm, Tsitsikamma, Eastern Cape, consists of 31 Vestas 3.0 MW WTG - ACS for HV Yard and Substation.*
- *Windlab Developments South Africa (Pty) Ltd - AMAKALA EMOYENI – Phase 2, Bedford, Eastern Cape, consisting of 66 WTG - feasibility study for access and internal road network*
- *Windlab Developments South Africa (Pty) Ltd – Phase 1, Bedford, Eastern Cape, consisting of 56 Nordex, 2,4 MW Wind Turbines Generators - feasibility study for access and internal road network*
- *IBEDRROLA - Klip Heuwel Switching Station at Caledon Wind Farm, Caledon, Western Cape, consisting of 9, Sinovel 3.0 MW Wind Turbines Generators – ACS for HV Yard and Substation.*
- *EXXARO Resources Ltd - Lephalale 60 MW PV Plant, 13 km north-west of the town of Lephalale, Limpopo - ACS for HV Yard and Substation.*
- *SASOL Technology - 3.6 MW PV Demonstration Plant – civil author services*
- *Solafrica Pty (Ltd) - Bokpoort CSP Project, a 50 MW Concentrating Solar Thermal Power Station (CSP – parabolic trough) located approximately 80 km east-south-east of Upington, Northern Cape - prepared enquiry documentation for the geotechnical investigation and topographic survey*