

CURRICULUM VITAE

Lisa Opperman

Profession : Environmental and GIS Consultant at Savannah Environmental
Specialisation : Environmental Management and Geographical Information Systems (GIS)
Years experience : 2 Years

KEY RESPONSIBILITIES

- Execution of professional consulting services for a variety of projects
- Environmental Impact Assessment reporting
- GIS mapping
- Permitting reporting
- Public consultation
- Development of project proposals for procuring new work or projects

SKILLS BASE AND CORE COMPETENCIES

- GIS Mapping
- EIA Report Writing
- Conducting of public involvement processes.
- Administrative tasks
- Analysis and manipulation of geographical information and technical experience with the use of ArcGIS.

EDUCATION AND PROFESSIONAL STATUS

Degrees:

B.Sc. (Hons) Environmental Management (2014), North-West University, Potchefstroom.

B.A Psychology, Geography and Environmental Studies (2013), North-West University, Potchefstroom

Professional Society Affiliations:

IAIAsa (Membership number: 3719)

EMPLOYMENT

16 February 2015 – Current:

Savannah Environmental (Pty) Ltd: Environmental Assessment Practitioner and GIS consultant

PROJECT EXPERIENCE

Environmental Impacts Assessments

- Basic Assessment Reports for Harmony Gold 3x PV Facilities, Welkom (BBEntropie).
- Environmental Impact Assessment Reports for Buffels PV 1 & Buffels PV 2, near Orkney (Kabi Solar).
- Environmental Impact Assessment Reports for Woodhouse Solar 1 & Woodhouse Solar 2 PV Facilities, near Vryburg (Genesis Eco-Energy Developments).
- Environmental Impact Assessment Report for the Orkney Solar Farm (Genesis Eco-Energy Developments).
- Environmental Impact Assessment Report for the Metals Industrial Cluster near Kuruman (Northern Cape Department of Economic Development and Tourism).
- Environmental Management Programme for the Nxuba Wind Farm (ACED).
- Finalisation of the Final EIA Reports for the Tewa Isitha Solar 1 and Tewa Isitha Solar 2 PV facilities near Upington (AfriCoast Energy).
- Lamberts Bay Wind Farm Screening Assessment Report (Windy World).
- Juno Wind Farm Screening Assessment Report (AMDA)
- Basic Assessment Reports for the Neopak CHP Plant and Water Treatment Plant, Rosslyn (Neopak)
- Screening, Scoping and EIA Reports for the Richards Bay Combined Cycle Gas Turbine (CCGT) power plant, near Richards Bay (Eskom)

GIS Mapping (ArcGIS 10.2)

- The Woodhouse Solar 1 & Woodhouse Solar 2 PV Facilities, near Vryburg, North West Province.
- The Orkney Solar Farm, North West Province.
- The Gunstfontein Wind Energy Facility, Northern Cape Province.
- The proposed Komsberg substation Expansion, Northern Cape.
- The proposed Soetwater switching station, 132kV double circuit overhead power line and ancillaries near Sutherland, Northern Cape.
- The Ilanga 7 and 9 facilities as well as associated infrastructure within the Karoshoek Solar Valley Development, Northern Cape.
- The construction of the Soetwater facility substation complex and ancillaries near Sutherland, Northern Cape.
- The Camco PV, Gauteng Province.
- The Sol Invictus Solar PV Development near Aggeneys, Northern Cape.
- The 132kV power line associated with the Perdekraal Wind Farm, Western Cape Province.
- The 132kV power line and substation associated with the Golden Valley Wind Farm, Eastern Cape Province.
- The Acciona Nxuba temporary concrete tower plant, Eastern Cape.
- The Bon Espirange substation and 132kV overhead power line for the authorised Roggeveld Wind Farm.
- The Gunstfontein switching station and 132kV overhead power line for the proposed Gunstfontein Wind Farm near Sutherland, Northern Cape Province.

- The Skuitdrift Solar Energy Facility, Northern Cape Province.
- The Buffels Solar 1 and Buffels Solar 2 PV Facilities, North West Province.
- The Suurplaat Wind Energy Facility, Northern Cape Province.
- The Paulputs CSP Project, Northern Cape Province.
- The Doornkop Wastewater Treatment Works, Gauteng Province.
- The proposed Ilanga Tower 1 Project within the Karoshoek Solar Valley Park, Northern Cape.
- The proposed Ilanga CSP 2 Project within the Karoshoek Solar Valley Park, Northern Cape.
- The proposed Ilanga CSP 3 Project within the Karoshoek Solar Valley Park, Northern Cape.
- The proposed Ilanga CSP 4 Project within the Karoshoek Solar Valley Park, Northern Cape.
- The proposed Ilanga CSP 5 Project within the Karoshoek Solar Valley Park, Northern Cape.
- The Saldanha Bay Network Strengthening, Western Cape Province.
- The Nxuba Wind Farm Facility, Eastern Cape.
- The proposed construction of the Eskom Karusa Switching Station, 132kV Double Circuit Overhead Power Line and Ancillaries near Sutherland, Northern Cape.
- The Kuruman Industrial Cluster near Kuruman, Northern Cape Province.
- Aggeneys Solar Energy Facility near Aggeneys, Northern Cape Province.
- The proposed construction of a 132kV Overhead Power Line and Switchyard Station for the authorised Solis Power I CSP Project near Upington, Northern Cape Province.
- The Lamberts Bay Wind Farm, Western Cape.
- The Lethabo Solar Energy Facility, Free State Province.
- The Majuba Solar Energy Facility, Mpumalanga.
- The Tutuka Solar Energy Facility, Mpumalanga.
- The Juno Wind Farm, Western Cape.

CURRICULUM VITAE
TEBOGO MAPINGA

Profession : Principal Environmental Manager for Savannah Environmental Consultants
Specialisation : Environmental Management
Years of experience : 10 years

KEY RESPONSIBILITIES

- Project Management and client liaison;
- Report writing and review;
- Compliance monitoring and audit reporting;
- Development of Proposals and Tenders; and
- Staff monitoring.

SKILLS BASE AND CORE COMPETENCIES

- Report Writing, drafting proposals and tenders;
- Negotiating skill;
- Problem solving;
- Financial management and marketing;
- Compliance advice for financial closure project;
- Understanding of all Environmental Legislation (NEMA, NEM:BA, NEM:WA, NEM:AQA, NEM:PAA, etc) and all other relevant legislation;
- Ability to work independently and in a team;
- Verbal, written and good presentation skills;
- Time management and workload management;
- Facilitation skills; and
- Organizational, planning and analytic skills.

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- Bsc Degree majoring in Zoology, The University of Limpopo, 2006; and
- Honours in Environmental Management: University of South Africa (in progress).

Courses:

- Computer Literacy Course: University of Limpopo, 2005; and
- Environmental Impact Assessment Training: University of Pretoria, 2012.

EMPLOYMENT HISTORY

- *Principal Environmental Consultants: Savannah Environmental (Pty) Ltd (2014 – current)*
Tasks include: Compilation of Environmental Scoping Reports, Plan of Study, Environmental Impact Assessment Reports, Basic Assessments and Environmental management programmes; Environmental Screening Reports; Co-ordination of the public participation process; Project management; project proposals and tenders; Client liaison

and Marketing.

- *Environmental Scientist: GIBB Engineering and Science (Mega Projects) (1 June 2013- 31 March 2014) Tasks include:* Re-writing the Revised Draft EIR Version 2 Eskom Nuclear-1 EIA; and Liaison with the client and specialists.
- *Environmental Officer Specialist production: Department of Environmental Affairs (1 April 2010 until 1 June 2013) Tasks include:* Process EIA applications submitted to DEA within the stipulated legislated time frames; Implement the SID and ERP EIA guideline; Provide technical input into Appeal Response Report's (ARR's); Support Regulatory Services with compliance monitoring and enforcement; Implement DEA and Public Entity EIA forums; and Provide technical input into CD: IEA correspondence.
- *Environmental Project Manager: SEF (1 March 2009 until 31 April 2010) Tasks include:* Compilation of Environmental Scoping Reports, Plan of Study, Environmental Impact Assessments, Basic Assessments and Environmental management plans; Co-ordination of the public participation process; Project management, including specialists and other team members; Development of terms of reference, project proposals and tenders; *Client* liaison; Marketing; and Financial Management of projects.
- *Environmental Manager: SEF (1 April 2008 – 30 February 2009) Tasks include:* Compilation of Environmental Scoping Reports, Plan of Study, Environmental Impact Assessments, Basic Assessments and Environmental management plans; Co-ordination of the public participation process; Project management, including specialists and other team members; Development of terms of reference, project proposals and tenders; and Client liaison.
- *Environmental Practitioner/ Project Manager: Phaki Phakanani Environmental Consultants (January 2007 - March 2008) Tasks include:* Training of junior staff; Client Liaison; Project co-ordination and facilitation; Managing specialists; Report writing and presentations; Compiling Environmental Impact Assessment Reports (Basic and Scoping/EIA Report); and Facilitating the Public Participation Process.

PROJECT EXPERIENCE

ENVIRONMENTAL IMPACT ASSESSMENTS AND PUBLIC PARTICIPATION

- SolarReserve Kotulo Tsatsi PV 1 Facility (2016)
- SolarReserve Kotulo Tsatsi PV 2 Facility (2016)
- Roggeveld Wind Farm- EMPr Amendment (2016)
- Adams PV Facility (2016) - (All work required to reach financial close- permitting)
- Bellatrix PV Facility (2016) - (All work required to reach financial close- permitting)
- Ilanga CSP 1 Facility (2016)
- Ilanga CSP 2 Facility (2016)
- Ilanga CSP 3 Facility (2016)
- Ilanga CSP 4 Facility (2016)
- Ilanga CSP 5 Facility (2016)

- Ilanga CSP 7 Facility (2016)
- Great Karoo EA amendment (2016)
- Gunstfontein Wind Energy Facility (2015)
- Gunstfontein 132 kV Power Line and Switching Station (2016)
- Acwa Power Solar Reserve Redstone Solar Thermal Power Plant EMPr amendment (2015)
- Sirius Phase One Solar PV Facility (2015) (All work required to reach financial close-permitting)
- Nxuba Wind Farm (2015)- (All work required to reach financial close- permitting)
- Karusa Wind Farm (2015)- (All work required to reach financial close- permitting)
- Soetwater Wind Farm (2015) - (All work required to reach financial close- permitting)
- Upington Two CSP Facility (2015)
- Wesley Peddie Power Line Basic Assessment (2015)
- Pofadder Wind (3 Phases) and Solar Energy Facilities (2014-2015);
- Pofadder Power Line Basic Assessment Application (4 BAR's) (2014-2015)
- Castle Wind Energy Facility (2014-2015)
- Spitskop Wind Energy Facility (2014-2015)
- Bobididi Solar Facility-Environmental Screening (2014)
- Son Citrus Solar Energy Facility (2014)
- Nuclear- 1 EIA (2013)
- Langkuil Industrial Development, 2008 (Environmental Manager and Project Manager)
- Township Development in Reitfontein, 2008/2009
- Upgrading of the BP Golf Course, 2008
- Construction of the BP Soshanguve VV Filling Station, 2008
- Construction of the BP Soshanguve ZZ Filling Station, 2008
- Shell Filling Stations(Project Manager and Client Liaison), 2008/ 2009:
 - * Watloo Filling Station
 - * Chantelle Filling Station
 - * M2 East Filling Station
 - * Orlando Filling Station
 - * Equestria Willowglen Filling Station
 - * President Park Filling Station
 - * Capital Park
- Eskom- Komati Water Augmentation (2008)
- Rainbow Junction Residential Development (2008/ 2009)
- Township Development in Delmore Park Extension 7 (2008/ 2009)
- West Rand District Municipality- Bulk Water Supply (2009)
- West Rand District Municipality Air Quality Assessment (2009)
- Lonmin K4 Shaft Mine Upgrading (2008/2009)
- Westlake Residential Development (2008)
- Montana Spruit Upgrading (2008)
- Palm Ridge Township Development (2008)

- HM Pitjie Roads (2009)
- Vlaakplat S24G Application (Mokgale City Local Municipality) (2008)
- Rangeview Ext 2 S24G Application (Mogale City Local Municipality) (2008)
- Construction of Khetho Bridge, Greater Giyani Local Municipality (2007)
- Demolition and Relocation of Malamulele High School (2007)
- Construction of Malamulele Shopping Complex (2007)
- The Subdivision of land in Ellisrus, (2007)
- Construction of the Senwabarwane Filling Station (2007)
- Residential Development in Tlapeng Village (2007)
- Township Development in Maphosa Village (2007)
- Establishment of a Piggery in Mogalakwena Local Municipality (2007)
- Establishment of two Piggeries in Elias Motsoaledi Local Municipality (2007);
- Establishment of a Piggery in Modimolle Local Municipality (2007)
- Township Development in Rietfontein (2007)
- Public Participation and Section 24G Application for the National Taxi Scrapping Project (2007)
- Construction of a Shopping Complex in Zebediela (2007)
- Establishment of a Guest House (ECA application) (2008)
- Establishment of a Waste Management Depot in Rustenburg (2008)
- Establishment of a Waste Management Depot in Tzaneen and Nkowa-Nkowa (2008)

CURRICULUM VITAE
JO-ANNE THOMAS

Profession : Environmental Consultant
Specialisation : Environmental Management; Strategic environmental advice;
Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology and Overall Quality Representative.
Years experience : Nineteen (19) years in the environmental field

KEY RESPONSIBILITIES

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management; review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

EDUCATION AND PROFESSIONAL STATUS

Degrees:

B.Sc Earth Sciences, *University of the Witwatersrand, Johannesburg*, 1993

B.Sc Honours in Botany, *University of the Witwatersrand, Johannesburg*, 1994

M.Sc in Botany, *University of the Witwatersrand, Johannesburg*, 1996

Courses:

Environmental Impact Assessment, *Potchefstroom University*, 1998

Environmental Law, *Morgan University*, 2001

Professional Society Affiliations:

Professional Natural Scientist (Registration No 400024/00).

EMPLOYMENT

Current: Director of Savannah Environmental (Pty) Ltd. Independent specialist environmental consultant

October 1997-November 2005: Bohlweki Environmental (Pty) Ltd: Senior Environmental Scientist; Environmental Management and Project Management

January to July 1997: Junior Science Teacher, Sutherland High School, Pretoria

PROJECT EXPERIENCE

Compliance Advice and Due Diligence

- First annual Environmental and Social Monitoring Report for the Upton Airport 10MW PV Plant (for Sublunary Trading)
- Compliance Advice for Financial Close (including environmental permits) of the Ilanga CSP Facility (for Ilangethu Solar)
- Compliance Advice for Financial Close (including biodiversity permits) of West Coast One Wind Energy Facility (for Moyeng Energy)
- Compliance Advice for Financial Close of Tsitsikamma Wind Energy Facility (for Cennergi)
- Support to Financial Close (including biodiversity permits) for the Kathu CSP Facility (for GDF Suez)
- Support to Financial Close (including biodiversity permits) for the Kathu PV Facility (for Building Energy / REISA)
- Support to Financial Close (including biodiversity permitting) for the Lephalale Solar Energy Facility (for Exxaro)
- Support to Financial Close (including biodiversity permitting) for the Kleinbegin PV Facility (for MedEnergy)
- Support to Financial Close (including biodiversity permitting) for the Sirius PV Plants (for Aurora Power Solutions)
- Support to Financial Close (including biodiversity permitting) for the Excelsior Wind Energy Facility (for BioTherm Energy)
- Support to Financial Close (including biodiversity permitting) for the Aggeneys Solar Farm Wind (for BioTherm Energy)
- Support to Financial Close (including biodiversity permitting) for the Konkoonsies Solar Farm (for BioTherm Energy)

- Environmental Due Diligence of a wind energy facility in the Western Cape (for EDPR Renewables)
- Environmental Due Diligence of a wind energy facility on the West Coast of the Western Cape (for ILF&S)

Compliance Monitoring

- Project manager and auditor - ECO compliance monitoring for the construction of the De Hoop Dam and the deviation of the R555 (for Department of Water Affairs)
- Project manager – ECO compliance at Kathu Solar Energy Facility (for GDZ Suez)
- Project manager – ECO compliance at West Coast One Wind Energy Facility (for Aurora Wind Power)
- Project manager – ECO compliance at Sishen Solar Energy Facility (for Windfall59)
- Project manager – ECO compliance monitoring for the expansion of Waterval WCW (for BPC Palace JV)
- Project manager - ECO compliance monitoring for the Mine Water Recovery Project at Duvha Power Station (for Eskom Generation)
- Project manager – ECO compliance at Dorper Wind Energy Facility (for Dorper Wind Farm)
- Project manager – ECO compliance monitoring for the !Khe CSP Facility (for Abengoa Solar)
- Project manager – ECO compliance at Gouda Energy Facility
- Project manager – ECO compliance monitoring for the KaXu! CSP facility (for Acciona)
- Project manager – ECO compliance monitoring for the Upington Airport PV facility (for ACSA)
- Project manager – ECO compliance at RustMo1 Solar Energy Facility (for Momentous Energy)
- Project manager – Environmental Officers for Gamma-Kappa 765kV power line between Laingsburg and Beaufort West (for Trans-Africa Projects on behalf of Eskom)

Electricity Sector Projects: Coal-fired Power Stations

- Project manager for the EIA undertaken in support of a NEMA authorisation and waste management license for the proposed Independent power Producer (IPP) Coal-fired Power Station and associated infrastructure near Lephalale within the Waterberg District Municipality (for Cennergi)
- Project manager for the EIA undertaken in support of a NEMA authorisation and waste management license for the proposed Umbani Coal-fired Power Station and associated infrastructure near Kriel (for ISS Global Mining)
- Project manager for the EIA undertaken in support of a NEMA authorisation and waste management license for the proposed Transalloys Coal-fired Power Station and associated infrastructure (for Transalloys)

Electricity Sector Projects: Wind Energy

- Project manager for the EIA undertaken for the EXXARO West Coast Wind Energy Facility (for EXXARO Resources)
- Project manager for the EIA undertaken for the Oyster Bay wind energy facility, (for Renewable Energy Resources Southern Africa)
- Project manager for the EIA undertaken for the Spitskop Bay wind energy facility (for Renewable Energy Resources Southern Africa)
- EIA and EMP for the wind energy facility at a site within the Western Cape (for Eskom Generation)
- EIA and EMP for the wind energy facility at a site near Hopefield, (for Umoya Energy)
- Project manager for the Klipheuwel/Dassiesfontein wind energy facility at a site within the Overberg area (for BioTherm Energy)
- Project manager for the Rhebokfontein wind energy facility (for Moyeng Energy)
- Project manager for the Suurplaat wind energy facility (for Moyeng Energy)
- Project manager for the West Coast One wind energy Facility (for Moyeng Energy)
- Basic Assessment for Wind Monitoring Masts on a site North of Koekenaap (for EXXARO Resources)
- Basic Assessment for wind monitoring masts on a site in the Overberg area (for BioTherm Energy)

- Basic Assessment for wind monitoring masts on a site near Beaufort West (for Umoya Energy)
- Basic Assessment for wind monitoring masts on a site near Laingsburg (for Umoya Energy)

Electricity Sector Projects: Solar Energy

- Project manager for the EIA and EMP for two PV sites within the Western and Northern Cape Provinces (for INCA Energy)
- Project manager for the Basic Assessment and EMP for PV site within the Northern Cape Province (for INCA Energy)
- Project manager for the Basic Assessment and EMP for a PV site near Rustenburg (for Momentous Energy)
- Project manager for the EIA and EMP for the Project Ilanga (125MW CSP facility) near Upington (for Ilangethu Energy)
- Project manager for the EIA and EMP for two PV sites within the Northern Cape Province (for MedEnergy Global)
- Project manager for the Basic Assessment and EMP for PV sites within 4 ACSA airports within South Africa (for ACSA PV)
- Project manager for the EIA and EMP for the Waterberg PV plant (for Thupela Energy)

Electricity Sector Projects: Eskom

- Project manager for the EIA and EMP for the Mokopane Integration Project (for Eskom Transmission)
- Project manager for the transmission lines from the Koeberg-2 Nuclear Power Station site (for Eskom Transmission)
- Project manager for the Tshwane strengthening project, Phase 1 (for Eskom Transmission)
- Project manager for the EIA and EMP for the Kyalami Strengthening Project (for Eskom Transmission)
- Project manager for the EIA and EMP for the Steelpoort Integration Project (for Eskom Transmission)
- Project manager for the EIA and EMP for the conversion of the existing Open Cycle Gas Turbine (OCGT) Ankerlig Power Station (located in Atlantis Industria) to a Combined Cycle Gas Turbine (CCGT) power station, and the associated 400 kV transmission power line between Ankerlig Power Station and the Omega Substation (for Eskom Generation)
- Project manager for the EIA and EMP for the proposed conversion of the existing Open Cycle Gas Turbine (OCGT) Gourikwa Power Station (located near Mossel Bay) to a Combined Cycle Gas Turbine (CCGT) power station, and the associated 400 kV transmission power line between Gourikwa Power Station and the Proteus Substation (for Eskom Generation)
- Project manager for the EIA and EMP for the Majuba Power Station PV Installations (for Eskom Transmission)
- Project manager for the EIA and EMP for the Lethabo Power Station PV Installations (for Eskom Transmission)
- Project manager for the EIA and EMP for the Tutuka Power Station PV Installations (for Eskom Transmission)

Infrastructure Projects

- Project manager for the EIA and EMP for the bridge across the Ngotwane River located on the border of South Africa and Botswana

Strategic and Regional Assessments

- Strategic Assessment for the location of wind energy facilities within the Western Cape Province (for Western Cape Department of Environmental Affairs and Development Planning)
- Regional Assessment for wind energy developments within an identified area on the West Coast of the Western Cape (for Investec Bank Limited)
- (for Investec Bank Limited)

- Regional Assessment for wind energy developments within an identified area on the West Coast of the Western Cape (for Eskom Holdings Limited)
- Regional Assessments for wind energy developments within identified areas in the Overberg Area (for BioTherm Energy)
- Regional Assessment for wind energy developments within an identified area in the Sutherland Area

Environmental Management Tools

- Review the effectiveness and efficiency of the environmental impact management (EIA) system in South Africa (for the Department of Environmental Affairs and Tourism)
- Development of a comprehensive site-specific EMP for the construction and operation of the Braamhoek Integration Project (for Eskom)
- Compilation of Provincial Guidelines for off-road routes (for the Western Cape Province Department of Environmental Affairs and Development Planning)
- Environmental Risk Analysis (for Salbro Property Holdings)
- Water use permit applications for water use at Tiffindell Ski Resort (for Tiffindell Ski)
- Project integration and compilation of a Strategy for Sustainable Development for Gauteng Province
- Advice regarding environmental compliance of existing and future development at Tiffindell Ski (for Tiffindell Ski)
- Advice regarding environmental compliance at Salberg factory (for Salberg Concrete Products)

Peer Review

- Review of EIAs submitted in terms of the ECA for the Northern Cape Department of Tourism, Environment and Conservation, including:
 - * EIA for a new wastewater treatment works in Warrenton
 - * EIA for chicken layer houses in Kimberley
 - * EIAs for the upgrading of petrol stations in Kimberley
 - * EIA for a new up-market residential development in Kathu
 - * EIA for residential development in Kimberley
- Review of EIA and EMP for the proposed Waterfall Wedge development, Gauteng Province

Mining Sector Projects

- Amendment of Environmental Management Programme for the Waterberg (Sekoko Resources)
- Amendment of EMPR for Grootegeluk Coal Mine , to include coal transportation infrastructure between the mine and Medupi Power Station (for Eskom)
- Environmental Impact Assessment and Environmental Management Programme in terms of the MPRDA for the Elitheni Coal Mine near Indwe (for Elitheni Coal)
- Environmental Management Programmes for three borrow pits associated with the Groot Letaba River Development Project (for Iliso)

Water resources Projects

- Project manager for the EIA and EMP for the modification of the existing Hartebeestfontein Water Care Works(for ERWAT)
- Project manager for the EIA and EMP for the expansion of the existing Welgedacht Water Care Works(for ERWAT)

Projects undertaken on behalf of Bohlweki Environmental include:

Specialist projects

- Development of an Environmental Policy for the Ekurhuleni Metropolitan Municipality
- Development of an Integrated Environmental Policy for the City of Tshwane Metropolitan Municipality Environmental Opportunities and Constraints Assessment for the Wonderboom Airport
- Review of the State of the Environment Report for the North West Province

Transport sector projects

- Environmental Impact Assessment for the proposed Platinum Highway from Warmbaths via Pretoria to Skilpadhek (on the South Africa-Botswana border), including obtaining all environmental permits required.
- Environmental input to the Ekurhuleni transportation corridors study
- Environmental input to the Denneboom Local Integrated Transport Plan
- Environmental Impact Assessment and Environmental Management Plan for the proposed N2 Wild Coast Toll Road between East London (Eastern Cape) and Durban (KwaZulu-Natal)
- Environmental Scoping Study and public participation process for the upgrading of Provincial Main Road 100 between the intersection with Main Road 521 and Ndwedwe
- Environmental Management Plan for repairs of portions of the N3 and N1, Gauteng
- Environmental Scoping Study and public participation process for the Kingsway Relief Road in Maseru, Lesotho

Electricity Sector projects

- Project manager for the undertaking of an EIA and compilation of an EMP for the proposed Open Cycle Gas Turbine (OCGT) Power Station and associated 400 kV Transmission lines and substation at Atlantis, Western Cape Province
- Environmental Scoping Study for a new coal-fired power station in the Lephalale area, Limpopo Province
- Project manager for the undertaking of Environmental Scoping Study and compilation of an Environmental Management Plan for various 132 kV Sub-Transmission lines and substations within the Mpumalanga Province
- Detailed Environmental Scoping Study and public participation for the proposed Capacity Increase Project at Arnot Power Station, Mpumalanga Province
- Project manager for the undertaking of an Environmental Scoping Study and EMP for the proposed 132 kV sub-Transmission line between the GaRankuwa and Dinaledi substations, North West Province
- Project manager for the undertaking of an EIA for the proposed 765 kV Transmission line between the existing Hydra Substation (near De Aar) and the proposed Gamma Substation (near Victoria West), Northern Cape Province
- EIA & public participation for the proposed 3rd 400 kV Transmission line between the Poseidon and Grassridge Substations in the Eastern Cape Province
- EIA & public participation for the proposed new 400 kV Transmission line between Matimba Substation (near Lephalale) and Witkop Substation (near Polokwane), Limpopo Province
- EIA & public participation for the proposed new Ikaros Substation and associated 400 kV Transmission line infrastructure, North West Province
- Environmental Scoping Study public participation for the Establishment of Eskom Infrastructure for Power Supply to the C-Cut Development at Premier Mine, Cullinan, Gauteng Province
- Environmental Impact Study and public participation for the proposed 2nd 400 kV Transmission line between the Grassridge Substation and the Poseidon Substation in the Eastern Cape.

- Public Participation Process for the proposed Return-to-Service of the Camden Power Station, Mpumalanga Province
- Detailed Environmental Scoping Study and public participation for the Breyten Strengthening Project: proposed new Breyten Substation and associated 88 kV Distribution line, Mpumalanga Province
- Environmental Pre-Scoping Study for the proposed Concentrating Solar Plant, in the Northern Cape Province
- Environmental Impact Assessment public participation for the proposed new nine 132 kV power lines between the Grassridge Substation and the Coega Industrial Development Zone, Eastern Cape Province

Pipelines

- Environmental Impact Assessment for the proposed Petronet New Multi-Products Pipeline (NMPP) between Durban and Gauteng Province
- Exemption application for the construction of a gas pipeline between Majuba Mine and Majuba Power Station, Mpumalanga Province.
- Exemption application for the construction of an emergency water supply pipeline from Mamelodi to Ekandustria via Cullinan, Gauteng Province.
- Environmental Scoping Study for the installation of a new water supply pipeline from Centurion to Diepsloot, Gauteng Province.

EIAs for Technology projects

- Environmental Impact Assessment for the proposed Alternative Fuels and Resources Project at Alpha's ULCO Plant near Kimberley in the Northern Cape Province
- Environmental Impact Assessment for the proposed Alternative Fuels and Resources Project at Dudfield Plant, North West Province
- Environmental Impact Assessment for the proposed Blending Platform to be established within the Gauteng Province
- Investigation of possible alternative Scrap tyre collection and disposal strategies in Gauteng, South Africa

Mining sector projects

- Environmental Management Programme Report (EMPR) for the proposed small-scale kaolin clay mine near Ndwedwe, KwaZulu-Natal Province
- Environmental Management Programme Report (EMPR) for prospecting activities within the Premier Mine Game Farm, Cullinan for De Beers Consolidated Mines Limited
- Environmental Management Plan for the Proposed C-Cut Development at Premier Mine, Cullinan
- Environmental Management Programme Report for the Proposed C-Cut Development at Premier Mine, Cullinan
- Environmental Impact Assessment and public participation process for the Proposed C-Cut Development at Premier Mine, Cullinan

Development projects

- A detailed Environmental Scoping Study and public participation process for the Thaba ya Batswana Development on portions of the Farm Rietvlei 101 IR, Gauteng
- Environmental Scoping Report and public participation process for the development of a Community Safety Centre in Khutsong-South, Carletonville

Water resources projects

- A detailed Environmental Impact Assessment of new regional water care infrastructure in the DD5A sub-drainage district in Eastern Gauteng (adjacent to the Blesbokspruit Ramsar Site) for the East Rand Water Care Company (ERWAT)

CURRICULUM VITAE

GABRIELE WOOD

Profession : Public Participation and Social Consultant
Specialisation : Public Participation Process Implementation
Years experience : 10 years

KEY RESPONSIBILITIES

Specific responsibilities as a Public Participation and Social Consultant include professional execution of public participation consulting for a variety of projects. This includes managing and coordinating public participation processes for Environmental Impact Assessments (EIA).

SKILLS BASE AND CORE COMPETENCIES

- Public Participation, Stakeholder Engagement and Stakeholder Management
- Environmental Impact Assessment (Social Processes)
- Public Speaking and Presentation Skills
- Facilitation (workshops, focus group meetings, public meetings, public open days, committees)
- Social Research (Qualitative and Quantitative)
- Social Assessments (Stakeholder Analysis / Stakeholder Mapping)
- Survey Design and Sampling
- Monitoring and Evaluation
- Community Needs Assessments
- Environmental and Social Policy
- IFC Performance Standards
- Equator Principles
- Report Writing and Quality Control

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- B. Hons. Anthropology (Cum Laude): University of Johannesburg (2004 – 2005)
- B.A. Psychology: University of Johannesburg (2002 – 2004)

Courses:

- International Association for Public Participation (IAP2) Certificate in Techniques for Effective Public Participation (2015)
- International Association for Public Participation (IAP2) Certificate in Foundations of Public Participation (Planning and Communication for Effective Public Participation) (2015)
- South African Advertising Research Foundation (SAARF) living Standards Measure (LSM) Training (2010).
- Certificate in Focus Group Moderation Skills, Market Research for Africa (2007)
- Prestige Diploma in Public Relations: Allenby Campus Boksburg now Damlin College (2001)

EMPLOYMENT

May 2012 – Current: Savannah Environmental (Pty) Ltd: Public Participation and Social Consultant

March 2007 – April 2012: NMA Effective Social Strategists (Pty) Ltd: Assistant Project Manager: Public Participation and Social Research

January 2005 – March 2007 (Part-time): University of Johannesburg: Department of Anthropology and Development Studies: Student Tutor and Research Assistant

PROJECT EXPERIENCE

COAL FIRED POWER STATIONS:

- Thabametsi Coal Fired Power Station – EIA & CCIA (for Thabametsi Power Company)
- Transalloys Coal Fired Power Station – EIA (for Transalloys)
- Umbani Coal Fired Power Station – EIA (for ISS Global Mining)
- Tshivhaso Coal Fired Power Station – EIA (for Cennergi)
- H2 Energy Power Station – EIA (for H2 Clean Energy)

INTEGRATED WASTE WATER MANAGEMENT PLANS AND WATER USE LICENSE APPLICATIONS:

- IPP Thabametsi Coal Fired Power Station – IWWMP AND WULA (for Thabametsi Power Company)
- Yzermyn Coal Mine - IWWMP AND WULA (for Atha Africa Group)

GRID INFRASTRUCTURE CONNECTIONS AND SUBSTATIONS:

- Cuprum-Burchell and Burchell to Mooidraai – BA (for Eskom)
- Blackwood Power Line and Substation – BA (for VentuSA Energy)
- Iziduli Power Line and Substation – BA (for Windlab)
- 132kV Power Line for the authorised Excelsior Wind Farm (for Amstilinx)
- Saldanha Bay Network Strengthening project – EIA (for Eskom)
- Olifantshoek Substation and Power Line – BA (for Eskom)

RENEWABLE ENERGY PROJECTS:

- Garob Wind Energy Facility – EIA (for juwi Renewable Energy)
- Tatuka PV Solar Energy Facility – EIA (for Eskom)
- Majuba PV Solar Energy Facility – EIA (for Eskom)
- Lethabo PV Solar Energy Facility – EIA (for Eskom)
- Karreebosch Wind Energy Facility – EIA (for G7 Energies)
- SolarReserve Kotulo Tsatsi Energy CSP Facilities – EIA (for SolarReserve & Kotulo Tsatsi Energy)
- Buffels Solar 1 & 2 Energy Facilities – EIA (for Kabi Solar)
- Woodhouse Solar 1 & 2 Energy Facilities – EIA (Genesis Eco Energy Developers)
- Gunstfontein Wind Energy Facility – EIA (for Gunstfontein Wind Farm)
- Ilanga CSP 7, 8 and 9 Solar Facilities – EIA (for Emvelo Eco Projects)
- Sol Invictus 1 – 4 PV Solar Energy Facilities – EIA (for Cyracraft)
- 150MW Noupoot Concentrated Solar Power (CSP) Project – EIA (for CRESCO Energy)
- Hartebeest Wind Farm – EIA (for juwi Renewable Energy)

Andrew Husted

M.Sc Aquatic Health (Pr Sci Nat)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979

Profile Summary

Extensive experience with many mining projects in South Africa, parts of Africa and also Europe, providing specialist input into ESHIAs and EMPs.

Considerable experience with the project management of national and international multi-disciplinary projects.

Specialist guidance, support and facilitation for the compliance with legislative processes, in South Africa as well as with IFC and the Equator principles.

Expertise with Instream Flow and Ecological Water Requirements.

Provide specialist and technical input for faunal, aquatic ecology and wetland studies.

Areas of Interest

Mining, Renewable Energy & Infrastructure Development Projects, Sustainability and Conservation.

Publication of scientific journals and articles.

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Fish population structure assessments
- The use of macroinvertebrates to determine water quality
- Aquatic Ecological Assessments
- Aquaculture
- Monitoring Programmes

Countries worked in

Botswana
Cameroon
Democratic Republic of Congo
Ghana
Ivory Coast
Liberia
Mali
Mozambique
Republic of Armenia
Senegal
Sierra Leone
South Africa

Nationality

South African

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondri Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 Accredited – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

RELEVANT PROJECT EXPERIENCE

Project Name: An aquatic and wetland specialist baseline and impact assessment for the proposed Onshore 2D seismic Survey in Block P5-A, in Maputo and Gaza Provinces.

Client: Impacto.

Personal position / role on project: Wetland / Aquatic Specialist.

Location: Maputo & Gaza Provinces, Mozambique (2016).

Main project features: To conduct a dry season (Winter) ecological baseline and impact assessment of the watercourses for the proposed Delonex Energy project.

Project Name: The ecological constraints mapping and Critical Habitat re-evaluation for the Anadarko LNG project: Specialist Consultant to conduct Ecological Studies (Fauna and Habitat) and the delineation of wetland systems.

Client: Anadarko.

Personal position / role on project: Wetland Specialist.

Location: Afungi, Mozambique (2015).

Main project features: To identify and map the ecological constraints is to support contractor activities. To redefine the critical habitats within the project area

Project Name: A Joint Basin Survey of the Upper Orange, Lower Orange and Vaal catchments to determine the current status of the systems: Specialist Consultants to conduct Ecological Studies (Fish, Macroinvertebrate, Diatoms, Water Quality and Habitat) and report on the current status (defining system trends).

Client: ORASECOM.

Personal position / role on project: Specialist Ichthyologist.

Location: South Africa (including Namibia, Botswana & Lesotho) (2015).

Main project features: To determine the current status of the catchments and to discuss the temporal and spatial trends of the monitoring reaches.

Project Name: Ecological baseline assessment of local river systems for the Ntem Iron Ore Mine: Specialist Consultants to Undertake Baseline Studies (Fish, Macroinvertebrate, Water Quality and Habitat).

Client: IMIC.

Personal position / role on project: Senior Ichthyologist.

Location: Cameroon (2013).

Main project features: Establishment of the ecological baseline status and functioning assessment of the local river systems.

Project Name: Instream Flow Requirement determination study for the Kibali River hydropower project: Specialist Consultants to Undertake Baseline Studies (Flow, Water Quality and Geomorphology) and Instream Flow Requirement (IFR) Assessment.

Client: Randgold Resources.

Personal position / role on project: Ichthyologist and IFR.

Location: DRC (2012).

Main project features: Establishment of the ecological flow requirements of fishes within the Kibali River.

Project Name: Cost analysis, including the current and potential earning potential of an aquaculture facility: Specialist Consultants to determine the Cost (Current & Potential Earnings) and the Construction of an identical facility (Physical Costs).

Client: Goldstone Resources.

Personal position / role on project: Ichthyologist.

Location: Ghana (2012).

Main project features: Conduct a detailed costs analysis of an aquaculture facility for the compensation for the

removal of the operation.

Project Name: Instream Flow Requirement determination study for the Nzoro River hydropower project: Specialist Consultants to Undertake Baseline Studies (Flow, Water Quality and Geomorphology) and Instream Flow Requirement (IFR) Assessment.

Client: Randgold Resources.

Personal position / role on project: Ichthyologist and IFR.

Location: DRC (2011).

Main project features: Establishment of the ecological flow requirements of fishes within the Nzoro River.

Project Name: Environmental study to establish the baseline biological and physical conditions of the Letsibogo Dam.

Client: European Union

Personal position / role on project: Ichthyologist.

Location: Selebi-Phikwe, Botswana (2007 - 2009).

Main project features: Evaluation of the existing fish communities within the Letsibogo Man-made lake with specific consideration of the threats of alien invasive fishes in the lake. The study resulted in the publication of two peer-reviewed papers titled: Comparative behavioural assessment of an established and a new Tigerfish *Hydrocynus vittatus* population in two man-made lakes in the Limpopo (O'Brien et al., 2013) and First observation of Africa Tigerfish (*Hydrocynus vittatus*) predating on Barn Swallows (*Hirundo rustica*) in flight (O'Brien et al., in press).

Project Name: Environmental and Social Impact Assessment of the Kazungula Bridge on the Zambezi River.

Client: Loci on behalf of the Government of Botswana.

Personal position / role on project: Ichthyologist.

Location: Botswana, Zambia, Namibia and Zimbabwe (2009-2010).

Main project features: Evaluation of the current ecological integrity status of various living and non-living components of the Zambezi River ecosystem and the potential ecological and social consequences of the construction and use of the Kazungula Bridge. The study showed that although water quality and habitat modification impacts will occur as a result of the construction and use of the bridge the long term impacts associated with the operation of the bridge should not result in any major impacts to the local aquatic ecosystem.

ACHIEVEMENTS

- Co-founded The Biodiversity Company in 2015 to provide scientific technical services and policy advice to various sectors.
- Successfully tasked by Digby Wells Environmental to establish and develop a company presence in the United Kingdom. This included the staffing and development of offices in London and Jersey.
- Designed and implemented numerous "specific" turnkey items for clients, these have included the design of plant nurseries, aquaculture projects, search and rescue of select flora, re-introduction of fish species into systems and tree marking and counting.
- Managed and developed the Biophysical Department at Digby Wells Environmental to consist of four specialist units, namely: Fauna & Flora, Pedology, Wetlands & Aquatics as well as Rehabilitation.
- The establishment and growth of the Rehabilitation Unit at Digby Wells Environmental which now offers specialist services for all levels of rehabilitation, from management plans, off-set strategies to implementation.

OVERVIEW

An overview of the specialist technical expertise include the following:

- Aquatic ecological state and functional assessments of rivers and dams.
 - Instream Flow Requirement or Ecological Water Requirement studies for river systems.
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- Ecological wetland assessment studies, including the integrity (health) and functioning of the wetland systems.
 - Wetland offset strategy designs.
 - Wetland rehabilitation plans.
 - Monitoring plans for rivers and other wetland systems.
 - Toxicity and metal analysis of water, sediment and biota.
 - Bioaccumulation assessment of fish communities.
 - Fish telemetry assessment that included the translocation of fish as well as the monitoring of fish in order to determine the suitability of the hosting system.
 - Faunal surveys which includes mammals, birds, amphibians and reptiles.
 - The design, compilation and implementation of Biodiversity and Land Management Plans and strategies.

TRAINING

Some of the more pertinent training undergone include the following:

- Wetland and Riparian Delineation Course for Consultants (Certificate of Competence) – DWAF 2008
- The threats and impacts posed on wetlands by infrastructure and development: Mitigation and rehabilitation thereof – Gauteng Wetland Forum 2010
- Ecological State Assessment of Lentic Systems using Fish Population Dynamics – University of Johannesburg/Rivers of Life 2010
- Soil Classification and Wetland Delineation – Terra Soil Science 2010
- Wetland Rehabilitation Methods and Techniques - Gauteng Wetland Forum 2011
- Application of the Fish Response Assessment Index (FRAI) and Macroinvertebrate Response Assessment Index (MIRAI) for the River Health Programme 2011
- Tools for a Wetland Assessment (Certificate of Competence) – Rhodes University 2011

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (December 2014 – Present)

I co-founded The Biodiversity Company in 2015, consisting of experienced ecologists who provide technical expertise and policy advice to numerous sectors, such as mining, agriculture, construction and natural resources. The team at The Biodiversity Company have conducted stand-alone specialist studies, and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

EMPLOYMENT: Digby Wells Environmental (October 2013 – December 2014)

Digby Wells assigned me to the role of Country Manager for the United Kingdom. This was a new endeavour for the company as the company's global footprint continues to increase. The primary responsibilities for the role included the following:

- **Client liaison** to be able to interact more efficiently and personally with current mining clients, mining industry service providers, legal firms and banking institutions in order to introduce Digby Wells as a services provider with the aim of securing work.
 - **Project management** for international projects which may require a presence in the United Kingdom, this was dependent on the location and needs of the client. These projects would mostly be based on the Equator Principles (EP) and International Finance Corporation (IFC) Performance Standards.
 - **Technical input** to provide specialist technical expertise for projects, this included fauna, aquatic ecology, wetlands and rehabilitation. Continued with the design and implementation of Biodiversity and Land Management Plans to assist clients with managing the natural resources. Responsibilities also included the mentorship and management (including reviewing and guiding) other expertise such
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as flora, fauna and pedology.

EMPLOYMENT: Digby Wells Environmental (March 2012 – September 2013)

Manager of a multi-disciplinary department of scientists providing specialist services in support of national and international requirements as well as best practice guidelines, primarily focussing on the mining sector. In addition to managing the department, I was also expected to contribute specialist services, most notably focusing on water resources. Further responsibilities also included the management of numerous projects on a national or international scale. A general overview of the required responsibilities are as follows:

- **Project management** for single as well as multi-disciplinary studies on a national and international scale. This included legislation and commitments for the respective country being operated in, as well as included the World Bank (WB), EP and IFC requirements.
- **Individual and/or team management** in order to provide mentoring and supportive structures for development and growth in support of the company's strategic objectives.
- **Scientific report writing** to ensure that the relevant standards and requirements have been attained, namely local country legislation, as well as WB, EP and IFC requirements.
- **Report reviewing** in order to ensure compliance and consideration of relevant legislation and guidelines and also quality control.
- **Specialist management** to facilitate the collaboration and integration of specialist skills for the respective projects. This also included the development of Biodiversity and Land Management Plan for clients.
- **Client Resource Manager** for numerous clients in order to establish as well as maintain working relationships.

An overview of the tenure working with the company is provided below:

- **October 2013 – December 2014: London Operations Manager** – Deployed to establish a presence for the company (remote office) in the United Kingdom by means of generating project work to support the employment of staff and operation of a business structure.
- **March 2012 – September 2013: Biophysical Department Manager** – Responsible for the development and growth of the department to consist of four specialist units. This included the development of a new specialist unit, namely Rehabilitation.
- **January 2011 - February 2012: Ecological Unit Manager** – In addition to implementing aquatic and wetland specialist services, the role required the overall management of additional specialist services which included fauna & flora.
- **June 2010 - December 2010: Aquatic Services Manager** – This required the marketing and implementation of specialist programmes for the client base such as biomonitoring and wetland off-set strategies. In addition to this, this also included expanding on the existing skill set to include services such as toxicity, bioaccumulation and ecological flow assessments.
- **August 2008: Aquatic ecologist** – Employed as a specialist to establish the aquatic services within the company. In addition to this, wetland specialist services were added to the existing portfolio.

PREVIOUS EMPLOYMENT: Econ@UJ (University of Johannesburg)

- June 2007 – July 2008: Junior aquatic ecologist
 - Researcher
 - Technical assistant for fieldwork
 - Reporting writing
 - Project management

GENERAL SKILLS

Literacy

Read, write and speak English fluently. Read, write and speak Afrikaans.

	Basic German.
Generic	Advanced user of Microsoft Office applications.
Mapping	Introductory skill level for ArcGIS and Quantum GIS.
ADDITIONAL EXPERIENCE	
Compliance audits	Conducting site investigations in order to determine the level of compliance attained, ensuring that the client maintains an appropriate measure of compliance with environmental regulations by means of a legislative approach
Control officer	Acting as an independent Environmental Control Officer (ECO), acting as a quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts
Screening studies	Project investigations in order to determine the level of complexity for the environmental and social studies required for a project. This is a form of risk assessment to guide the advancement of the project.
Public consultation	The provision of specialist input in order to communicate project findings as well as assist with providing feedback if and when required.
Water use licenses	Consultation with the relevant authorities in order to establish the project requirements, as well as provide specialist (aquatics/wetland) input for the application in order to achieve authorisation.
Closure	Primarily the review of closure projects, with emphasis on the closure cost calculations. Support was also provided by assisting with the measurements of structures during fieldwork.
Visual	The review of visual studies as well as the collation of field data to be considered for the visual interpretation for the project.

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2009): MAGISTER SCIENTIAE (MSc) - Aquatic Health:

Title: *Aspects of the biology of the Bushveld Smallscale Yellowfish (Labeobarbus polylepis): Feeding biology and metal bioaccumulation in five populations.*

Rand Afrikaans University (RAU), Johannesburg, South Africa (2004): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Rand Afrikaans University (RAU), Johannesburg, South Africa (2001 - 2004): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Botany.

PUBLICATIONS

Tate RB and Husted, A. 2015. Aquatic Biomonitoring in the upper reaches of the Boesmanspruit, Carolina, Mpumalanga, South Africa. African Journal of Aquatic Science.

Tate RB and Husted A. 2013. Bioaccumulation of metals in *Tilapia zillii* (Gervai, 1848) from an impoundment on the Badeni River, Cote D'Ivoire. African Journal of Aquatic Science.

O'Brien GC, Bulfin JB, Husted A. and Smit NJ. 2012. Comparative behavioural assessment of an established and new Tigerfish (*Hydrocynus vittatus*) population in two manmade lakes in the Limpopo catchment, Southern Africa. African Journal of Aquatic Science.

Tomschi, H, Husted, A, O'Brien, GC, Cloete, Y, Van Dyk C, Pieterse GM, Wepener V, Nel A and Reisinger U.

2009. Environmental study to establish the baseline biological and physical conditions of the Letsibogo Dam near Selebi Phikwe, Botswana. EC Multiple Framework Contract Beneficiaries.8 ACP BT 13 – Mining Sector (EDMS). Specific Contract N° 2008/166788. Beneficiary Country: Botswana. By: HPC HARRESS PICKEL CONSULT AG

Husted A. 2009. Aspects of the biology of the Bushveld Smallscale Yellowfish (*Labeobarbus polylepis*): Feeding biology and metal bioaccumulation in five populations. The University of Johannesburg (Thesis).

Wayne Jackson

B.Sc Hydrology & Soil Science

Cell: +27 82 055 3815
Email: wayne@thebiodiversitycompany.com
Identity Number: 8401175127085
Date of birth: 17 January 1984

Profile Summary	Key Experience	Nationality
<p>Extensive experience with a wide range of projects in many sectors across South Africa, and parts of Africa, providing specialist input into ESHIAs, WULAs and EMPs.</p> <p>Skilled and experienced in four (4) specialist fields including Soil Science, Wetlands, Hydropedology, and Hydrology.</p> <p>Experience in large post-mining rehabilitation projects, providing specialist inputs on land capability and soil utilisation.</p> <p>Knowledge and know how on how soils, wetlands and hydrology are linked in the landscape and how activities could impact all these aspects.</p> <p>The ability to monitor (ECO) large sensitive projects with strict adherence to EMP and the guidance of contractors to solutions/outcomes that are practical and environmentally friendly.</p>	<ul style="list-style-type: none">• Wetland Assessments• Wetland Offset Strategies• Hydropedological Assessments• Soil, Land Capability, and Land Use Assessments• Soil Stripping Ratios• Agricultural Potential Assessments• Floodline Determination• Irrigation Design• Environmental Control Officer (ECO)• Rehabilitation Plans	South African
Areas of Interest	Countries worked in	Qualifications
<p>Further understanding and developing the links between hydrology, soils, and wetlands.</p> <p>The simplification of wetland rating systems.</p>	<p>Cameroon</p> <p>Democratic Republic of Congo</p> <p>Liberia</p> <p>Tanzania</p> <p>South Africa</p>	<ul style="list-style-type: none">• BSc (University of KwaZulu-Natal) – Hydrology & Soil Science.• Certificate of Competence: Grass ID Course• Certificate of Competence: Water Resource Yield Modelling (DWAF)• Certificate of Competence: 2D Flow Modelling using HEC-RAS

SELECTED PROJECT EXPERIENCE

Project Name: Feasibility study for the establishment and design of an 8 000ha irrigation development project at Lavumisa in Swaziland.

Client: SWADE.

Personal position / role on project: Soil Scientist/ Irrigation Design/ Crop water demand/ Bulk water distribution.

Location: Lavumisa, Swaziland (2010).

Main project features: To conduct a feasibility study and pre-design of the sugarcane irrigation scheme.

Project Name: A Hydropedological Assessment for the Chelmsford Colliery near Newcastle in KwaZulu-Natal.

Client: Future Coal.

Personal position / role on project: Hydropedology Specialist.

Location: Newcastle, KwaZulu-Natal (2016).

Main project features: To determine the required buffers zones from a Hydropedological perspective for the opencast mining project.

Project Name: New Liberty Opencast Gold Mine and Related Infrastructure EIA in Libaria.

Client: Aureus.

Personal position / role on project: Soil Scientist.

Location: Liberia (2014).

Main project features: To determine the Soil, Land Capability, and Current Land Use Impacts of the proposed mining project.

Project Name: Sasol Sigma Underground Ash Backfilling EIA.

Client: Sasol.

Personal position / role on project: Wetland Specialist.

Location: Mpumalanga, South Africa (2015).

Main project features: To delineate the wetlands and identify any possible impacts.

Project Name: Mhlabatshane Dam Design and Construction Project for Ugu District Municipality

Client: Ugu District Municipality.

Personal position / role on project: Hydrologist.

Location: Mshlabatshane, KwaZulu-Natal

Main project features: water resource assessment, Yield analysis (for optimal dam size as well as modelling the best design for reliability of supply to local households) and flood hydrology.

Project Name: 1:50 and 1:100 Year Floodline Assessment for Droogvalley Colliery.

Client: Geo Soil & Water.

Personal position / role on project: Hydrologist.

Location: Mpumalanga (2015).

Main project features: Conduct a 1:50 and 1:100 year Floodline Assessment.

Project Name: Croc Farm Estates Development Design and Layout.

Client: Croc Farm Estates.

Personal position / role on project: Hydrologist.

Location: KwaZulu-Natal (2010).

Main project features: Storm water design of attenuation ponds as well as drainage from key areas of the estate.

Project Name: Ergo Relocation of Old Tailings EIA

Client: Ergo

Personal position / role on project: Soil Scientist.

Location: Gauteng (2015).

Main project features: Conducted the Soils, Land Capability, and Current Land Use Impact Assessment.

Project Name: Environmental Monitoring for the Eros-Oribi 132kV Double Circuit Powerline and Substations.

Client: Eskom.

Personal position / role on project: ECO.

Location: KwaZulu-Natal (2009).

Main project features: Fulfilled the ECO role for the sensitive Powerline crossing at Oribi Gorge.

ACHIEVEMENTS

- Assigned by The Biodiversity company to manage the Soils, Wetlands, and Hydrological services. The role includes business support in the form of marketing and managing the client base in KwaZulu-Natal.
- Co-founded The Earth Water Environmental Science Company in 2015 to provide Specialist environmental services to environmental consultancies, the services included: Soils, Hydrology, Wetlands, Geohydrology, Hydropedology, and Rehabilitation.
- Successfully conducted and improved land capability assessments whilst at Digby Wells.
- Completed numerous Hydropedological assessments for clients and have become one of a few specialists capable of conducting these studies, as a result of my background and experience in the fields of Soils, Wetlands, and Hydrology.
- Completed large portions of feasibility studies for crop production, where I was tasked with: Identifying suitable soils, Yield Estimates, Crop Water demand analysis, temporary storage identification, sizing and design, Bulk water distribution, Irrigation design and layout.
- Completed large international mining projects within Africa, from exploration projects to fully operational mining sites.

OVERVIEW

An overview of the specialist technical expertise include the following:

- Soil, Land Capability, and Current Land use Assessments for mining, energy and construction industry.
- Wetland Delineation, Wetland Health and Integrity Assessments as per the Department of Water and Sanitation requirements.
- Hydropedological assessments to determine the linkages between the wetland systems and the hillslope Hydrology.
- Wetland offset strategy designs.
- Wetland rehabilitation plans.
- Monitoring plans for wetland systems.
- Hydrological assessments, including dam design, dam break analysis, and floodlines.
- Agricultural potential assessments for construction projects on agricultural lands.
- Crop yield estimation and fertiliser recommendations for agricultural projects.
- Environmental Control Officer (ECO) experience on large sensitive projects.

TRAINING

Some of the more pertinent training undergone include the following:

- Water Resource Yield Modelling for dam supply assurance modelling (DWAF 2009)
 - BASOS certification for fertiliser recommendation – (BASOS 2011)
 - Grass Identification course (Certificate of Competence) – (UKZN 2016)
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- 2D – free Surface Flow Modelling (HEC-RAS) – (Enterprise University of Pretoria 2016)
- Basic Environmental Law Course – (Eskom 2011)
- Land Rehabilitation Society of South Africa (LARSA) conference attendance (2013 & 2015)
- Water Use Licence amendments workshop held by DWS – UKZN 2015

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (December 2016 – Present)

The Biodiversity Company assigned me to the role of Senior Soil and Wetland Specialist. My roles include

- Management of Soils, Wetlands, Hydropedology, and Hydrology Services.
- Mentoring and management of staff in these fields.
- KwaZulu-Natal client management and marketing.
- Specialist inputs to the above mention services.
- Improvement of quality and efficiency of the above services.

PREVIOUS EMPLOYMENT: Earth Water Environmental Science Company (November 2015 – November 2016)

Co-founded The Earth Water Environmental Science Company in 2015 to provide Specialist environmental services to environmental consultancies, the services included: Soils, Hydrology, Wetlands, Geohydrology, Hydropedology, and Rehabilitation.

The Earth Water Environmental Science Company assigned me to the role of Senior Soil and Wetland Specialist. My roles include

- Management of Soils, Wetlands, Hydropedology, and Hydrology Services.
- Project management of various specialist studies.
- Client management and marketing.
- Day to day management of the business.
- Specialist inputs to the above mention services.
- Improvement of quality and efficiency of the above services.

PREVIOUS EMPLOYMENT: Digby Wells Environmental (October 2012 – October 2015)

Digby Wells assigned me to the role of Soil Scientist and my roles included:

- Management and conducting Soils and land capability assessments.

PREVIOUS EMPLOYMENT: Farm Secure (March 2012 – September 2012)

Farm Secure assigned me to the role of Soil Scientist and my roles included:

- Precision farming soil surveys and recommendations.

PREVIOUS EMPLOYMENT: Department of Hydrology (UKZN) (March 2011 – February 2012)

UKZN assigned me to the role of Hydrological Field Technician.

PREVIOUS EMPLOYMENT: Stemele Basch Africa (January 2009 – February 2011)

Stemele Bosch Africa assigned me to the role of Graduate Hydrologist, Natural Scientist, and Civil Engineering Technical Assistant.

GENERAL SKILLS

<i>Literacy</i>	Read, write and speak English fluently. Read, write and speak Afrikaans. Basic Zulu
<i>Generic</i>	Advanced user of Microsoft Office applications.
<i>Mapping</i>	Introductory skill level for ArcGIS and Quantum GIS.

ACADEMIC QUALIFICATIONS

University of KwaZulu-Natal, Pietermaritzburg, South Africa (2008): Bachelor of Science (BSc) –
Hydrology & Soil Science

Curriculum Vitae

Name	Theresa (Terri) Leigh Bird
Date of Birth	8 November 1976
Nationality	South African
Employer	Airshed Planning Professionals (Pty) Ltd
Position	Senior Consultant
Years with Employer	4 years

MEMBERSHIP OF PROFESSIONAL SOCIETIES

- National Association for Clean Air (NACA), 2012 to present
- South African Council for Natural Science Professions (Pr.Sci.Nat.), 2016

EXPERIENCE

At her current employer, Airshed Planning Professionals (Pty) Ltd, Terri has contributed to projects assessing the impact of various operations on air quality. Responsibilities include: compiling project information requests; summarising and interpreting ambient air quality data; collating technical information for emissions quantification; preparations, analysis and write-up of meteorology for dispersion modelling; setup, extraction and presentation of dispersion modelling results; report write-up; and presentation of findings at specialist workshops. The scope of project experience is detailed below.

Projects contributing to Environmental Impact Assessments	
<u>Project type</u>	<u>Experience</u>
Mining (including coal, platinum, tin and rare earth minerals)	<ul style="list-style-type: none"> ▪ At least five proposed open-cast coal mining projects, mostly on the Mpumalanga Highveld. ▪ Air quality assessment for the expansion of an underground platinum mine to include a concentrator facility and tailings facility. ▪ Assessment of underground mining of cassiterite (the mineral ore mined for tin) in the Democratic Republic of Congo. The project included the assessment of emissions along a long-distance haul road from the mine to Mombasa for export. ▪ Three rare earth mineral mining projects included dispersion model runs to assist the radiation specialist assessment of impact of radioactive compounds.
Power Stations	<ul style="list-style-type: none"> ▪ A project assessing the impact of Namibian coal-fired power station on urban air quality, in the context of many small industrial sources. ▪ The assessment of retrofitting improved particulate emission controls on an existing coal-fired power station on the Mpumalanga Highveld. ▪ The assessment of impact of a floating power plant, fuelled by various potential liquid fuels, docked in a port servicing an industrial development zone. ▪ Professional opinion on the impact of solar power facilities (one concentrated solar power (CSP) and one photovoltaic (PV)) on ambient air quality. ▪ The assessment of three coal-fired power stations in Botswana, including two projects where the assessment assessed the combined impact of an open-cast coal mine and the associated coal-fired power station.
Ash disposal	<ul style="list-style-type: none"> ▪ Conducted the assessment of impact of ash disposal facilities coal-fired power

Curriculum Vitae

Projects contributing to Environmental Impact Assessments	
<u>Project type</u>	<u>Experience</u>
facilities for coal-fired power stations	stations requiring additional disposal area. Assessment included the estimation of increased life-time cancer risk as a result of exposure to carcinogenic metals in the wind-blown dust from the disposal facilities.
Tyre pyrolysis plant	<ul style="list-style-type: none"> Assisted on an assessment of a plant that will use waste tyres as raw material to produce machine and vehicle oils.
Domestic waste landfill	<ul style="list-style-type: none"> Assessing the health and odour impacts of a domestic waste landfill to support residential development plans for the area.
Marine Repair Facility	<ul style="list-style-type: none"> The project quantified the impact on air quality of a marine vessel repair facility in the context of a busy port which includes an iron-ore transfer yard.

Air Quality Management Plans (AQMP)	
<u>Project type</u>	<u>Experience</u>
Provincial Level AQMP	<ul style="list-style-type: none"> Involvement included: <ul style="list-style-type: none"> baseline assessment of climatic conditions and ambient air quality across the Province; collation of questionnaires from point-source emission; point-source emissions inventory database management Assisted with quantification of vehicle emissions and with dispersion modelling of baseline emissions. Main contributor to management plan write-up. The management intervention strategies proposed in the AQMP were a collaborative effort of the technical project team, which included the client and consultants.
Metropolitan city level AQMP	<ul style="list-style-type: none"> Contributed to the emission inventory of industrial sources Collaborative project with the Council for Scientific Research (CSIR)
Platinum smelter complex	<ul style="list-style-type: none"> Fugitive dust emissions from ground-level sources and materials handling were a concern for a platinum smelter complex. The project scope included the identification of all sources; the quantification and ranking of emissions; and proposed management strategies. A risk assessment model was used to assess where the variability of emission sources would constitute a risk if improperly managed.
Diamond mine	<ul style="list-style-type: none"> The project scope for a Botswana-based diamond mine approaching end-of-life required the assessment of current and future impacts of operations on the ambient air quality; including the development of an air quality management plan and the proposal of an ambient air quality monitoring network, based on the findings of the impact assessment.

Atmospheric Impact Reports (AIR)	
<u>Project type</u>	<u>Experience</u>
Coal-to-liquid fuel refineries	<ul style="list-style-type: none"> Postponement application included four sites with multiple point-sources and modelling iterations for all sources emitting at four different levels for multiple pollutants. A collaborative project where my responsibilities included: model simulations, post-processing and extractions; management of model extractions and

Curriculum Vitae

Atmospheric Impact Reports (AIR)	
Project type	Experience
	<p>management of file transfer for peer review process; graphic summaries results; mapping of results; and, graphic presentation of measured ambient air quality. My contributions to the written report included: report template sections (as per Government Gazette No. 36904: 747); summary of meteorological data used in the assessment; measured ambient air quality; results analysis, interpretation and write-up; and, a literature review of potential impacts of the operations on the environment.</p> <ul style="list-style-type: none"> ▪ The assessment of impact of petroleum storage tanks storing products of the tar process on the ambient air quality, especially with respect to total volatile organic compounds (TVOCs).
Crude oil refinery	<ul style="list-style-type: none"> ▪ Postponement application included emissions from multiple point-sources, and fugitive emissions from storage tanks; modelling iterations for all sources emitting at two different levels for sulfur dioxide [from point sources] and total volatile organic compounds (TVOCs) [from tanks]. ▪ A collaborative project where I focused on the point-sources, including the model simulations; post-processing and extractions; graphic results summaries; and, graphic presentation of measured ambient air quality. Contributions to the written report included: report template sections; summary of meteorological data used in the assessment; measured ambient air quality; results analysis, interpretation and write-up.
Fertilizer production	<ul style="list-style-type: none"> ▪ Assessment report (prepared as AIR) included emissions from multiple point-sources; modelling iterations for all sources emitting at two different levels for particulate matter and ammonia emissions. ▪ A collaborative project where my responsibilities included: model simulation setup, post-processing and extractions; graphic summaries results; mapping of results; and, graphic presentation of measured ambient air quality. My contributions to the written report included: report template sections (as per Government Gazette No. 36904: 747); summary of meteorological data used in the assessment; measured ambient air quality; results analysis, interpretation and write-up.
Platinum smelter	<ul style="list-style-type: none"> ▪ Postponement application included emissions from the smelter furnace and converter; modelling iterations for the sources emitting at two different levels where the pollutant of concern was sulfur dioxide.
* all projects listed above supported the application for postponement of stricter Minimum Emissions Standards applicable to Listed Activities	
Veterinary waste incinerator	<ul style="list-style-type: none"> ▪ New Atmospheric Emissions License (AEL) application for a State Veterinary incinerator. The assessment included calculating emission rates from the incinerator; dispersion modelling; preparation of an AIR (as per Government Gazette No. 36904: 747); and completing the technical sections of the AEL application.
Galvanizing plant	<ul style="list-style-type: none"> ▪ The project assessed the impact of a steel galvanising plant on air quality in a developing industrial development zone. Pollutants of concern included hydrochloric acid (HCl).
Secondary Aluminium Smelter	<ul style="list-style-type: none"> ▪ A project involving the assessment of a secondary aluminium smelter in an already developed urban industrial area

Curriculum Vitae

Ambient air quality monitoring projects	
<u>Project type</u>	<u>Comments regarding project details and involvement</u>
Ferrochrome smelter complex	<ul style="list-style-type: none"> Compiled reports for the dustfall monitoring campaign for a period of 12 months. Results were compared with the relevant legislation and recommendations made for source management as required.
Platinum smelter complex	<ul style="list-style-type: none"> Project scope required monthly reports of the ambient sulfur dioxide concentrations downwind of a platinum smelter complex, for a 12 month reporting period. Report preparation included: data cleaning and filtering; data analysis, presentation; and report write-up.
Dustfall monitoring	<ul style="list-style-type: none"> Collate, summarise and report on dustfall rates, and metal content, after laboratory analysis. Project contract for 12 months for the proposed expansion of a coal mine in Botswana.

Air quality training	
<u>Training organisation</u>	<u>Details of involvement</u>
National Association for Clean Air (NACA)	<ul style="list-style-type: none"> Presenting the module regarding the Development of Air Quality Management Plans Module forms part of a 5-day course presented annually
Centre for Environmental Management (CEM), University of the North-West (Potchefstroom)	<ul style="list-style-type: none"> Presented two modules: <ol style="list-style-type: none"> Development of Air Quality Management Plans Air Pollution Meteorology Modules forms part of a 2-day course presented annually, or at special request

SOFTWARE PROFICIENCY

- Atmospheric Dispersion Models: AERMOD, CALPUFF, ADMS (United Kingdom), CALINE, GASSIM
- Graphical Processing: Surfer, ArcGIS (basic proficiency)
- R, especially with the package "openair"
- Other: MS Word, MS Excel, MS Outlook

Curriculum Vitae

EDUCATION

University of the Witwatersrand	
Ph.D. (School of Animal, Plant and Environmental Sciences) (2006 - 2011)	Thesis title: Some impacts of sulfur and nitrogen deposition on the soils and surface waters of the Highveld grasslands, South Africa.
M.Sc. (School of Animal, Plant and Environmental Sciences) (1999 – 2001).	Dissertation title: Some effects of prescribed understory burning on tree growth and nutrient cycling, in <i>Pinus patula</i> plantations.
B.Sc. (Hons) (Botany) (1998)	Project title: The rate of nitrogen mineralization in plantation soils, in the presence of <i>Eucalyptus grandis</i> wood chips. Courses: Wetland ecology, Ecophysiology and Environmental studies.
B.Sc. (1995 – 1997)	Botany III, Geography III, Zoology II.

COUNTRIES OF WORK EXPERIENCE

South Africa, Botswana, Mozambique, Democratic Republic of Congo, Namibia,

LANGUAGES

	Speak	Read	Write
English	Excellent	Excellent	Excellent
Afrikaans	Fair	Fair	Fair

REFERENCES

Name	Position	Contact Number
Dr. Hanlie Liebenberg Enslin	Managing Director at Airshed Planning Professionals	+27 (83) 416 1955 hanlie@airshed.co.za
Dr Lucian Burger	Director at Airshed Planning Professionals	+27 (11) 805 1940 lucian@airshed.co.za

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications and my experience.



23 November 2016

CURRICULUM VITAE

ELIZE BUTLER

PROFESSION: Palaeontologist

YEARS' EXPERIENCE: 24 years in Palaeontology

EDUCATION: B.Sc Botany and Zoology, 1988
University of the Orange Free State

B.Sc (Hons) Zoology, 1991
University of the Orange Free State

Management Course, 1991
University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009
University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

Registered as a PhD fellow at the Zoology Department of the UFS

2013 to current

Dissertation title: A new gorgonopsian from the uppermost *Daptocephalus* *Assemblage Zone*, in the Karoo Basin of South Africa

MEMBERSHIP

Palaeontological Society of South Africa (PSSA)

2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant

Department of Zoology & Entomology
University of the Free State Zoology
1989-1992

Part time laboratory assistant

Department of Virology
University of the Free State Zoology
1992

Research Assistant

National Museum, Bloemfontein 1993
– 1997

Principal Research Assistant
Bloemfontein

National Museum,

and Collection Manager

1998 – currently

TECHNICAL REPORTS

1. **PIA desktop:** Palaeontological Impact Assessment of the proposed development of private dwellings on portion 5 of farm 304 Matjesfontein Keurboomstrand, Knysna District, Western Cape Province. 2014.
2. **PAI site visit and report:** Palaeontological Impact Assessment for the proposed upgrade of existing water supply infrastructure at Noupoot, Northern Cape Province. 2014.
3. **PIA desktop:** Palaeontological impact assessment of the proposed consolidation, re-division and development of 250 serviced erven in Nieu-Bethesda, Camdeboo local municipality, Eastern Cape. 2015.
4. **PAI site visit and report:** Palaeontological impact assessment of the proposed mixed land developments at Rooikraal 454, Vrede, Free State. 2015.
5. **PIA exemption report:** Palaeontological exemption report of the proposed truck stop development at Palmiet 585, Vrede, Free State. 2015.
6. **PAI site visit and report:** Palaeontological impact assessment of the proposed Orange Grove 3500 residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape. 2015
7. **PAI site visit and report:** Palaeontological Impact Assessment of the proposed Gonubie residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape Province. 2015.
8. **PAI site visit and report:** Palaeontological Impact Assessment of the proposed Ficksburg raw water pipeline. 2015
9. **PAI site visit and report:** Palaeontological Heritage Impact Assessment report on the establishment of the 65 mw Majuba Solar Photovoltaic facility and associated infrastructure on portion 1, 2 and 6 of the farm Witkoppies 81 HS, Mpumalanga Province. 2015.
10. **PAI site visit and report:** Palaeontological Impact Assessment of the proposed township establishment on the remainder of portion 6 and 7 of the farm Sunnyside 2620, Bloemfontein, Mangaung metropolitan municipality, Free State, Bloemfontein. 2015.

11. **PIA desktop:** Palaeontological Impact Assessment of the proposed Woodhouse 1 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. 2015.
12. **PIA desktop:** Palaeontological Impact Assessment of the proposed Woodhouse 2 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. 2015.
13. **PIA desktop:** Palaeontological Impact Assessment of the proposed Orkney solar energy farm and associated infrastructure on the remaining extent of Portions 7 and 21 of the farm Wolvehuis 114, near Orkney, North West Province. 2015.
14. **PIA desktop:** Palaeontological Impact Assessment of the proposed Spectra foods broiler houses and abattoir on the farm Maiden Manor 170 and Ashby Manor 171, Lukhanji Municipality, Queenstown, Eastern Cape Province. 2015.
15. **PIA desktop:** Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoot concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoot, Northern Cape. Prepared for Savannah Environmental. 2016.
16. **PIA site visit and report:** Palaeontological Impact Assessment of the proposed Woodhouse 1 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. 2016.
17. **PIA site visit and report:** Palaeontological Impact Assessment of the proposed Woodhouse 2 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. 2016.
18. **PIA Desktop:** Proposed 132kV overhead power line and switchyard station for the authorised Solis Power 1 CSP project near Upington, Northern Cape. 2016.
19. **PIA site visit and report:** of The Proposed Senqu Pedestrian Bridges in Ward 5 of Senqu Local Municipality, Eastern Cape Province. 2016.
20. **Recommended Exemption** From Further Palaeontological Studies: Proposed Construction Of The Modderfontein Filling Station On Erf 28 Portion 30, Founders Hill, City Of Johannesburg, Gauteng Province. 2016.
21. **Recommended Exemption** From Further Palaeontological Studies: Proposed Construction Of The Modikwa Filling Station On A Portion Of Portion 2 Of Mooihoek 255 Kt, Greater Tlhabathe Local Municipality, Limpopo Province. 2016.

22. **Recommended Exemption** From Further Palaeontological Studies: Proposed Construction Of The Heidedal Filling Station On Erf 16603, Heidedal Extension 24, Mangaung Local Municipality, Bloemfontein, Free State Province. 2016.
23. **Recommended Exemption** from further Palaeontological studies: Proposed Construction of the Gunstfontein Switching Station, 132kv Overhead Power Line (Single Or Double Circuit) and ancillary infrastructure for the Gunstfontein Wind Farm Near Sutherland, Northern Cape Province. 2016.
24. **PIA site visit and report** of the proposed Galla Hills Quarry on the remainder of the farm Roode Krantz 203, in the Lukhanji Municipality, division of Queenstown, Eastern Cape Province. 2016.
25. **PIA monitoring**: Chris Hani District Municipality Cluster 9 water backlog project phases 3a and 3b: Palaeontology inspection at Tsomo WTW. 2016.
26. **PIA Site visit and Report**: Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoot concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoot, Northern Cape. 2016.
27. **PIA site visit and report**: Palaeontological Impact Assessment of the proposed upgrading of the main road MR450 (R335) from the Motherwell to Addo within the Nelson Mandela Bay Municipality and Sunday's river valley Local Municipality, Eastern Cape Province. 2016.
28. **PIA site visit and report**: Palaeontological Impact Assessment construction of the proposed Metals Industrial Cluster and associated infrastructure near Kuruman, Northern Cape province. 2016.
29. **PIA site visit and report**: Palaeontological Impact Assessment for the proposed construction of up to a 132kv power line and associated infrastructure for the proposed Kalkaar Solar Thermal Power Plant near Kimberley, Free State and Northern Cape Provinces. 2016.
30. **PIA site visit and report**: Palaeontological Impact Assessment of the proposed development of two burrow pits (DR02625 and DR02614) in the Enoch Mgijima Municipality, Chris Hani District, Eastern Cape. 2016.
31. **PIA desktop**: Ezibeleni waste Buy-Back Centre (near Queenstown), Enoch Mgijima Local Municipality, Eastern Cape. 2016

32. **PIA desktop:** Palaeontological Impact Assessment for the proposed construction of two 5 Mw Solar Photovoltaic Power Plants on Farm Wildebeestkuil 59 and Farm Leeuwbosch 44, Leeudoringstad, North West Province. 2016.
33. **PIA desktop:** Palaeontological Impact Assessment for the proposed development of four Leeuwberg Wind farms and basic assessments for the associated grid connection near Loeriesfontein, Northern Cape Province. 2016.
34. **PIA desktop:** Palaeontological impact assessment for the proposed Aggeneys south prospecting right project, Northern Cape Province. 2016.
35. **PIA desktop:** Palaeontological impact assessment of the proposed Motuoane Ladysmith Exploration right application, Kwazulu Natal. 2016.
36. **PIA desktop :** Palaeontological impact assessment for the proposed construction of two 5 MW solar photovoltaic power plants on farm Wildebeestkuil 59 and farm Leeuwbosch 44, Leeudoringstad, North West Province. 2016.
37. **PIA desktop:** Palaeontological desktop assessment of the establishment of the proposed residential and mixed use development on the remainder of portion 7 and portion 898 of the farm Knopjeslaagte 385 jr, located near Centurion within the Tshwane Metropolitan Municipality of Gauteng Province. 2016.
38. **PIA desktop:** Palaeontological impact assessment for the proposed development of a new cemetery, near Kathu, Gamagara local municipality and John Taolo Gaetsewe district municipality, Northern Cape. 2017.
39. **PIA desktop:** Palaeontological Impact Assessment Of The Proposed Development Of The New Open Cast Mining Operations On The Remaining Portions Of 6, 7, 8 And 10 Of The Farm Kwaggafontein 8 In The Carolina Magisterial District, Mpumalanga Province. 2017.
40. **PIA desktop:** Palaeontological Desktop Assessment for the Proposed Development of a Wastewater Treatment Works at Lanseria, Gauteng Province. 2017.
41. **PIA desktop:** Palaeontological Scoping Report for the Proposed Construction of a Warehouse and Associated Infrastructure at Perseverance in Port Elizabeth, Eastern Cape Province. 2017.
42. **PIA desktop:** Palaeontological Desktop Assessment for the Proposed Establishment of a Diesel Farm and a Haul Road for the Tshipi Borwa mine

- Near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. 2017.
43. **PIA desktop:** Palaeontological Desktop Assessment for the Proposed Changes to Operations at the UMK Mine near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. 2017.
 44. **PIA site visit and report:** Palaeontological Impact Assessment for the Development of the Proposed Ventersburg Project-An Underground Mining Operation near Ventersburg and Henneman, Free State Province. 2017.
 45. **PIA desktop:** Palaeontological desktop assessment of the proposed development of a 3000 mw combined cycle gas turbine (CCGT) in Richards Bay, Kwazulu-Natal. 2017.
 46. **PIA site visit and report:** Palaeontological Impact Assessment for the Development of the Proposed Revalidation of the lapsed General Plans for Elliotdale, Mbhashe Local Municipality. 2017.
 47. **PIA site visit and Report:** Palaeontological assessment of the proposed development of a 3000 MW Combined Cycle Gas Turbine (CCGT) in Richards Bay, Kwazulu-Natal. 2017.
 48. **PIA site visit and Report:** Palaeontological Impact Assessment of the proposed development of the new open cast mining operations on the remaining portions of 6, 7, 8 and 10 of the farm Kwaggafontein 8 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. 2017.
 49. **PIA site visit and Report::** Palaeontological Impact Assessment of the proposed mining of the farm Zandvoort 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. 2017.
 50. **PIA desktop:** Palaeontological Desktop Assessment for the proposed Lanseria outfall sewer pipeline in Johannesburg, Gauteng Province. 2017.
 51. **PIA desktop:** Palaeontological Desktop Assessment of the proposed development of open pit mining at Pit 36W (New Pit) and 62E (Dishaba) Amandelbult Mine Complex, Thabazimbi, Limpopo Province. 2017.
 52. **PIA site visit and Report:** Palaeontological impact assessment of the proposed development of the sport precinct and associated infrastructure at Merrifield Preparatory school and college, Amathole Municipality, East London. 2017.

53. **PIA site visit and Report:** Palaeontological impact assessment of the proposed construction of the Lehae training and fire station, Lenasia, Gauteng Province. 2017.

CONFERENCE CONTRIBUTIONS

NATIONAL

PRESENTATION

Butler, E., Botha-Brink, J., and F. Abdala. A new gorgonopsian from the uppermost *Dicynodon Assemblage Zone*, Karoo Basin of South Africa.18 the Biennial conference of the PSSA 2014.Wits, Johannesburg, South Africa.

INTERNATIONAL

Attended the Society of Vertebrate Palaeontology 73th Conference in Los Angeles, America. October 2012.

CONFERENCES: POSTER PRESENTATION

NATIONAL

Butler, E., and J. Botha-Brink. Cranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. University of the Free State Seminar Day, Bloemfontein. South Africa. November 2007.

Butler, E., and J. Botha-Brink. Cranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle.14th Conference of the PSSA, Matjesfontein, South Africa. September 2008:

Butler, E., and J. Botha-Brink. The biology of the South African non-mammaliaform cynodont *Galesaurus planiceps*.15th Conference of the PSSA, Howick, South Africa. August 2008.

INTERNATIONAL VISITS

Natural History Museum, London

July 2008

Paleontological Institute, Russian Academy of Science, Moscow

November 2014

CURRICULUM VITAE

MORNE DE JAGER

M2 Environmental Connections cc

Founding member of the Closed Corporation

SKILLS BASE AND CORE COMPETENCIES

- Water monitoring programme design
- Water Quality Analysis and Modelling
- Environmental Auditing,
- Noise Monitoring, Modelling and Control
- Biological Monitoring
- Environmental Impact Assessment and Management
- IT skills (software as well as hardware)
- Conflict resolution and stakeholder facilitation.

TERTIARY EDUCATION

B.Eng (Chem) (University of Pretoria)

EMPLOYMENT HISTORY

- Department of Water Affairs and Forestry (1998 – 2001; Pollution Control Officer)
- EcoSat (2001 – 2002; Environmental Monitoring, Control and Management)
- Menco (2002 – current; See above)
-

SELECTED RELEVANT PROJECT EXPERIENCE

- Noise Impact Assessment for Skychrome (Pty) Ltd (A Ferro-chrome mine)
- Noise Impact Assessment for Mooi-nooi Chrome Mine (Western Chrome Mines)
- Noise Impact Assessment for Buffelsfontein East and West (Western Chrome Mines)
- Noise Impact Assessment for Elandsdrift (Sylvania)
- Noise Impact Assessment for Jagdlust Chrome Mine (Eastern Chrome Mines),
- Noise Impact Assessment Apollo Brick (Pty) Ltd (Clay mine and brick manufacturer).



Geo Hydraulic and Environmental Technology (Pty) Ltd

Geohydrological and Environmental Consultants

25 Trichy Road, Raisethorpe, Pietermaritzburg, 3201, South Africa.

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www.get-sa.co.za

John Kalala Ngeleka Pr.Sci.Nat.

Bsc (Hons) Geology/ Msc Geohydrology

Senior Geohydrologist / Director

Citizenship

South African Permanent Resident

ID

6605256121187

Year of Experiences

19 years

Registration and Professional

SACNASP (Water Resources Science)
Registration Number: 114752

Specialisation

- * Groundwater development, supply and management;
- * Contaminated site management; environmental site assessment;
- * Site geological and hydrogeological characterization;
- * Geophysical and hydrogeochemical investigations; and
- * Geohydrological Specialist investigations for regulatory compliance.

EDUCATION

Msc. (hydrogeology)

Institute for groundwater studies (IGS). University of the Free State, South Africa, 2010;

Bsc. Hons. (Applied Geology)

University of Kinshasa, DRC Congo, 1999;

Bsc. (Geology)

University of Kinshasa, DRC Congo, 1993;

High School Diplomas (Mathematics/Physics)

John XXIII College/Lualaba, Kolwezi, D.R.Congo, 1986.

CERTIFICATION

Hydro-pedological characterisation of degraded soils	Institut de Recherche pour le developpement (IRD) at University of Kwazulu Natal, Pietermaritzburg; 2007
Consulting Skill Training	Environmental Resources Management (ERM) Southern Africa, 2013
Engen Petroleum Health and Safety Level 2 Permit Issuer.	TRAINRITE CC, Durban, South Africa

SUMMARY OF WORK EXPERIENCES

02/2015 - Present	Geo Hydraulic and Environmental Technology (PTY) Ltd, South Africa. Senior Geohydrologist
08/2014 - 02/2015	Groundwater Environmental Management – Gpt (Pty) Ltd. Short Term contract Independent Hydrogeologist.
01/2013 – 08/2014	Environmental Resources Management (ERM) Southern Africa. Contaminated Site Management (CSM) Project Manager
06/2010 - 12/2012	Groundwater Consulting Services (Pty) Ltd Field Hydrogeologist
02/2004 - 06/2010	School of Bioresources Engineering and Environmental Hydrology at University of Kwazulu Natal, Pietermaritzburg, South Africa. Field Technical researcher
02/2002- 08/2002	Diamond Company SMD, Kinshasa, DRC Consulting Geologist
04/1996 - 10/2002	Marble-Cutting of Congo, Kinshasa, DRC Engineering Geologist

SUMMARY OF WORK EXPERIENCES

Ngeleka has over 19 years of fieldwork experience in the research, mining, oil and gas sectors, firstly as a geologist in DRC Congo and following completion of his MSc in South Africa, as hydrogeologist.

He was a Field Technical Researcher at the School of Bioresources Engineering and Environmental Hydrology at University of KwaZulu-Natal and joined Groundwater Consulting Services (GCS) as a Field hydrogeologist and ERM Southern Africa as a Project Manager prior to recently join Geo hydraulic and Environmental Technology (GET) Pietermaritzburg office.

Ngeleka gained extensive experience in groundwater development and supply, monitoring and management, geophysical surveys, drilling supervision and quality control, contaminated sites management, aquifer testing and data interpretation and in developing geological and hydrogeological conceptual models. He managed various hydrogeological investigations for contaminated site assessments, environmental impact assessments, wellfield development for water supply to Mines in South Africa, DRC Congo and Mauritania. Clients worked for include AngloGold Ashanti, Richards Bay Mineral (Rio Tinto), Tasiast Mauritania Mine (Kinross), Xstrata Coal Mine, Tenke Fungurume Mine (Freeport-McMoRan Copper & Gold), Shell South Africa, Engen South Africa, Sasol South Africa, Sapref, Mondi Ltd, Sappi Saiccor.

Ngeleka has experience in conducting geophysical surveys using Electrical Resistivity Tomography (Imaging), magnetic and Electromagnetic techniques (EM 31, 34, 38); Installation and maintenance of hydrometers, data collection and database management for monitoring Hydrological processes in the catchments.

Ngeleka is originally from DRC Congo and is fluent in both English and French.

Key Projects:

Desktop Geohydrological Specialist Assessment for the Proposed New Convenience development near Nagle Dam (off the MR566 Road), Ethekwini Municipality Northern Kwazulu-Natal. Project from the department of Economic Development, Tourism and Environmental Affairs done as Senior Geohydrologist at GET (Pty) Ltd.

The geohydrological specialist investigation aimed to review and to assess the baseline groundwater and surface water conditions and to identify potential impacts and assess risks that the proposed filling station poses to the receiving environment and to advise mitigation measures accordingly as part of the EIA process.

Groundwater resources assessment at Fountain Hill Farm, near Wartburg, Kwazulu Natal.

The project consisted of assessing the available capacity for use of groundwater within the farm area. Project received from SRK consultant (Pty) Ltd, done as Senior Geohydrologist at GET (Pty)Ltd.

Groundwater supply feasibility study and Drilling of a New Borehole at Nocomboshe Clinic in Msinga Local Municipality Northern Kwazulu-Natal. Project from Church of Scotland Hospital, Department of Health done as Senior Geohydrologist at GET (Pty) Ltd.

The borehole was site using magnetometer and the borehole drilled yielded 24 000l/hour which exceeded the clinic expectation.

Tenke Fungurume Mine (DRC) / Freeport-McMoRan Copper & Gold, Extension of mine groundwater monitoring network. Project done as Project Manager at ERM Southern Africa (Pty) Ltd.

The Project consisted of drilling, installation of monitoring wells. Sampling of groundwater monitoring wells using Hydrasleeves, near Kwatebala, Fungurume hills and Mwadinkomba.

Contaminated site investigation at Jeffrey's Bay Service Station, Eastern Cape South Africa. Shell Project done as Project Manager at ERM Southern Africa (Pty) Ltd.

The project consisted of soil and groundwater impact assessment, aiming to understand the source-pathway-receptor (S-P-R) connection.

Environmental Site Assessment at Total Service Station-Eshowe KZN. Total Project done as independent hydrogeologist consultant/ GEM-GPT (Pty) Ltd.

The project consisted of soil and groundwater impact assessment, aiming to understand the source-pathway-receptor (S-P-R) connection.

Ashanti_Public Hazardous Assessment: Investigation on the impacts of mine radioactive waste on groundwater and surface water quality. AngloGold Ashanti Project done as Field Hydrogeologist Consultant at GCS (Pty) Ltd.

The project consist of hydrochemistry analysis of groundwater and surface water samples. Data was interpreted and reported.

Kinross-Tasiast Well Field Expansion Project: Drilling supervision of groundwater supply Boreholes and quality control; aquifer testing and data analysis; Groundwater monitoring using Divers; Groundwater Management System. (Mauritania). Kinross Project done as Field Hydrogeologist Consultant at GCS (Pty) Ltd.

The project consisted of Wellfield design and development, groundwater monitoring and management. Hydrogeological and geological conceptual models and aquifer testing data were fed into wellfield groundwater numerical model and reported in both in French and in English to the Mine.

Field investigations to study the fate and transport of Light Non-Aqueous Phase Liquids (LNAPLs) in groundwater using geophysical methods. Case of East London fuel. Water Research Commission Project done as Msc Student (Geohydrology) (UFS).

In this investigation one of the geophysical methods, Electrical Resistivity Tomography (ERT) was tested to characterize the Joint Fuel Depot site geology units, aquifer setting and LNAPLs preferential flow pathways, as well as to establish its ability to identify LNAPLs contaminant plumes.

Paardekop and Amersfoort Basic Groundwater Assessment. Xstrata Coal Mines project done as Field Hydrogeologist Consultant at GCS (Pty) Ltd.

This project consisted of Hydrogeological investigations as component of EIA/EMP application for the proposed Xstrata's Paardekop and Amersfoort Coal Mines.

Geophysical Investigation for Agroforestry Activities at Fountainhill Estates, Wartburg in Pietermaritzburg. WRC Project done for the Institute of Natural Resources (INR) as Senior Geohydrologist at GET (Pty) Ltd.

Electrical Resistivity Tomography (ERT) technique was applied to agroforestry trial sites to set up a series of water distribution transects in time in order to learn about the seepage, uptake and lateral flow characteristics during the trial. To monitor bi-annual soil moisture in the field in order to reveal contrasting water depletion patterns under intercropping systems.

CURRICULUM VITAE

JONATHAN H. MARSHALL

Landscape Architect and Environmental Assessment Practitioner for Environmental Planning & Design cc

SKILLS BASE AND CORE COMPETENCIES

- Chartered Landscape Architect (UK).
- Certified Environmental Assessment Practitioner of South Africa.
- Visual Impact Assessment utilising the the Government of the Western Cape Guideline for Involving Visual and Aesthetic Specialists in EIA Processes and the Landscape Institute and Institute of Environmental Management and Assessment (UK) Guidelines for Landscape and Visual Impact Assessment.

EMPLOYMENT HISTORY

- Landscape Assistant, WS Atkins (UK) 1979 – 1981.
- Landscape Architect, Brian Clouston and Partners (Hong Kong) 1981 – 1989.
- Director, Brian Clouston and Partners (Australia) 1989 - 1990.
- Principal Landscape Architect, Gillespies (UK) 1990 – 1992.
- Principal, Opus Environment (UK) 1992 – 1995.
- Director, Environmental Design Partnership (SA) 1995 – 1998.
- Principal, Environmental Planning and Design (SA) 1998 – present.

TERTIARY EDUCATION

- Diploma in Landscape Architecture, Gloucestershire College of Art and Design, UK (1979).
- Environmental Law Short Course, University of KZN (1997)

SELECTED RELEVANT PROJECT EXPERIENCE

Visual impact assessments for developments in the Hong Kong, the UK, Ghana Guinea, Gauteng, Free State, KwaZulu-Natal, Mpumalanga. Examples of larger projects include:

- Solar plant projects including photovoltaic and concentrating solar power plants – Numerous projects for Eskom and private clients in the Northern Cape, Limpopo, Mpumalanga and the Free State.
- Proposed new mines and tailings facilities associated with existing mines in Ghana and Guinea.
- Four major shopping centre developments including projects in the UK and South Africa.
- A new international airport development to the north of Durban.
- Heavy industrial developments including a ferrochrome smelter in Richards Bay.
- Numerous new road and road upgrade proposals including projects in Hong Kong, the UK and South Africa.
- Long term landfill planning in the Durban area.
- Numerous power line proposals including projects for Eskom in the Free State and KwaZulu Natal.
- Aesthetic guideline documents including building massing in Hong Kong, development around estuaries in KwaZulu Natal.
- The provision of visual impact assessments as evidence for legal processes including parliamentary debate (UK), public enquiry (UK) and planning appeal (South Africa)
- Review of specialist reports prepared by other experts.

CURRICULUM VITAE

JACO VAN DER WALT

Profession : Archaeologist

Specialisation : Cultural Resource Management and Iron Age Archaeology

Work experience : 10 years

SKILLS BASE AND CORE COMPETENCIES

- Archaeological Impact Assessments
- Heritage Impact Assessments
- Heritage Management Plans
- Archaeological research projects
- Cultural resource management
- Phase II cultural resource management projects: archaeological excavations
- Grave relocation
- Project Management

TERTIARY EDUCATION

- 2001, BA Archaeology (Cultural Heritage Tourism), University of Pretoria (SA)
- 2002, BA Archaeology (Hons) , University of Witwatersrand (SA)
- Present, Masters Archaeology, University of Witwatersrand (SA)

EMPLOYMENT HISTORY

- 2011 – Present: Founder and owner of Heritage Contracts and Archaeological Consulting CC.
- 2007 – 2010: CRM Archaeologist, Managed the Heritage Contracts Unit at the University of the Witwatersrand
- 2005 - 2007: CRM Archaeologist, Director of Matakoma Heritage Consultants
- 2004: Technical Assistant, Department of Anatomy University of Pretoria
- 2003: Archaeologist, Mapungubwe World Heritage Site Archaeological Rehabilitation Project
- 2001 - 2002: CRM Archaeologists, For R & R Cultural Resource Consultants, Polokwane
- 2000: Museum Assistant, Fort Klapperkop, Pretoria

SELECTED RELEVANT PROJECT EXPERIENCE

- Archaeological Impact Assessment for the Chronimet Underground Mine, Opencast mine, process plant, Amandelbult, Limpopo Province.
- Archaeological And Palaeontological Impact Assessment For The Updated EMP for Trans Hex Mining Operations, Richtersveld, Northern Cape
- Archaeological Impact Assessment for Sasol's project Mafuta, Lephalale, Limpopo Province.
- Archaeological and Heritage Statement for the Proposed Lg5 Opencast Mining Area, North West Province
- Field supervisor at Mapungubwe (World Heritage Site) Archaeological Rehabilitation project
- Field Director for Iron Age mitigation for chrome Mining by Hernic Ferrochrome, North West Province.
- Field Director phase 2 documentation for The Heads Trust, Heritage Assessment, and monitoring for Lydenburg Ext 38 housing development, Lydenburg, Mpumalanga, principle investigator Prof. T. Huffman
- Field Director phase 2 documentation for Sterkspruit housing development, Lydenburg, Mpumalanga.

- Field Director Middle Iron Age Mitigation For Wesizwe Platinum mining, principle investigator.
- Field Director Phase 2 documentation of Khoni Iron Age Settlement Lydenburg.
- Field Director for the Archaeological Mitigation For Booyendal Platinum Mine, Steelpoort, Limpopo Province.
- Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline from Jhb to Durban
- Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province.

Date of Birth: 11 September 1980
 Designation: Unit Manager: Innovation & Sustainable Development
 Profession: Senior Development Economist
 Specialisation: Sustainable Development Specialist
 Years within Firm: 12 Years
 Nationality: Russian
 Years of Experience: 12 Years
 HDI Status: White Female



Education:

University of Pretoria - 2011	MSc (Technology Management)
University of Pretoria - 2007	BScHons (Technology Management)
Parkland College, USA - 2004	Computer Integrated Accounting
Parkland College, USA - 2004	Independent Business
Parkland College, USA - 2003	Intermediate Accounting
Parkland College, USA - 2003	Records Management
Parkland College, USA - 2003	Financial Accounting
Parkland College, USA - 2003	Managerial Accounting
Nizhny Novgorod University, Russia - 2002	BComHons (Economics)

Professional Membership:

SAPOA Urban-Econ Development Economists (Pty) Ltd

Language Proficiency:	Reading	Writing	Speaking
English	Excellent	Excellent	Excellent
Russian	Excellent	Excellent	Excellent

Work Experience:

2004 - Current	Urban-Econ Development Economists
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Key Qualification:

Elena Broughton completed her BComHons in Economics in Russia, at Nizhny Novgorod State University in 2002 specialising in regional economics. At the same time, she completed an additional degree as Translator/Interpreter in Professional Orientated Communication. After completion of her Honours degree in Economics, Elena moved to the USA and stayed there for 1.5 years. During her stay in the USA, she completed a number of Accounting and Business courses at Parkland College, Illinois. In 2007, she obtained her BScHons in Technology Management (Cum Laude) at the University of Pretoria and later received her MSc in Technology Management (2011) from the same university.

Elena Broughton is a senior professional at Urban-Econ and has an extensive knowledge in various fields of economic development, including impact assessments, investment strategy formulation, strategic decision analysis, and monitoring and evaluation. She is experienced in developing input-output and SAM-based models, as well as development and application of other econometric techniques. Elena has a special interest in project evaluation and decision-making framework, with the latter being the focus of her Master's dissertation. Over the past few years, she was able to extend her experience in these fields working on projects for both government and the private sector. Elena is managing the Innovation & Sustainable Development Unit and has successfully completed various energy and innovation projects in this capacity.

Experience Record:

Project:	The Localisation Potential of Photovoltaics (PV) and a Strategy to support large scale roll-out in South Africa
Year:	June 2012 – March 2013
Location:	National
Client:	WWF S, South African Photovoltaic Industry Association (SAPVIA), and the Department of Trade and Industry, RSA
Project Features:	
Activities Performed:	<ul style="list-style-type: none"> Describing of the global PV industry and its trends Profiling of the local PV industry

	<ul style="list-style-type: none"> ▪ Analysing of the local PV value chain considering three market segments, i.e. rooftop, commercial and utilities ▪ Analysing of financial dynamics of the market and standardisation requirements ▪ Determining the potential for localisation in the country ▪ Developing a strategy for the future roll-out <p>Policy environment review, market segments analysis, demand analysis, value chain analysis, pricing of components, local content analysis, potential for localisation assessment, strategy formulation</p> <p>The goal of the study was to describe the global and local PV industry trends and dynamics, and to develop localisation scenarios for the purposes of providing recommendations with respect to the future roll-out of the industry.</p>
Project: Year: Location: Client: Project Features:	<p>Feasibility study into establishing CSP component manufacturing facilities in South Africa</p> <p>November 2012 – February 2013</p> <p>National</p> <p>The Industrial Development Corporation, RSA</p> <ul style="list-style-type: none"> ▪ The identification of various CSP technologies and systems that are promoted internationally ▪ And various designs and configuration of each technology. ▪ An overview of the international and local CSP market, the major materials and components of CSP with a view of establishing a local manufacturing base of CSP systems and components ▪ The identification of key technical and technology partner in the development of the manufacturing facility ▪ Engagement with the potential technical partner to determine whether the IDC can capacitate the supplier to manufacture components and systems locally ▪ Identification of a suitable location for the new facility or expansion of existing local CSP component manufacturing facilities in South Africa ▪ The amount of potential jobs that will be created from expansion or creation of a new facility, preliminary financial model and CAPEX budget.
Activities Performed:	Global CSP industry analysis, value chain analysis, local industrial capabilities assessment, demand analysis, job creation potential analysis
Project: Year: Location: Client: Project Features:	<p>Northern Cape Renewable Energy Strategy</p> <p>November 2012 – June 2013</p> <p>National</p> <p>The Northern Cape Department of Economic Development and Tourism, RSA</p> <ul style="list-style-type: none"> ▪ Description of the status and potential of the local renewable energy sector ▪ Investigation of the potential to establish clean and green sustainable development projects in the Province in line with the optimal mix identified. ▪ Identification of income generation opportunities for the purpose of revitalising rural communities ▪ Assessment of the institutional capacity and capability ▪ Strategy and implementation plan formulation
Activities Performed:	Policy environment analysis, renewable energy industry profiling, desired state of industry analysis, market segmentation and demand analysis, stakeholder analysis and institutional structures review, strategy formulation
Project: Year: Location: Client: Project Features:	<p>A study of the factors contributing to successful technology commercialization</p> <p>March 2015-September 2015</p> <p>National</p> <p>The dti</p> <ul style="list-style-type: none"> • Current context and framework for technology commercialisation in South Africa • Identification of critical factors and resources required for successful commercialisation • On-line survey • Interviews with numerous stakeholders (universities, businesses, government organisations) • Case study analysis of policies and interventions in other countries • Profiling of the current policy environment, funding mechanisms and stakeholders • Identification of mechanisms and interventions to assist in commercialisation of technologies • Formulation of a guide for commercialisation
Activities Performed:	Project management and quality control, presentation of study findings
Project: Year:	<p>Assessment of policy to enable the implementation of energy efficiency in the building sector</p> <p>December 2014-April 2015</p>

Location: Client: Project Features:	National SANEDI/Department of Energy <ul style="list-style-type: none"> Assessment of existing national and local government policy frameworks (legislations, standards, policy, building codes etc.) with respect to constraints and opportunities created for implementation of energy efficiency in the building sector Interview various stakeholders Review of interventions and support mechanisms Undertake case studies Provide policy recommendations
Position held: Activities Performed:	Project manager Project management and quality control, presentation of study finding
Project: Year: Location: Client: Project Features:	A Study of the Economic Impact of load shedding on the City of Johannesburg with or without Kelvin Power Station January 2015 – June 2015 City of Johannesburg City of Johannesburg Metro <ul style="list-style-type: none"> Developing a model of electricity usage by various economic sectors based on information supplied by City Power Profiling economic structure of City of Johannesburg regions Modelling of the potential economic impact on the City with and without Kelvin Power Station, in the short-term and the impact of outages on the City as a whole over the medium-term; Interview large electricity users in the City Interpreting economic effects of load shedding derived from the modelling exercise in the context of the CoJ economy, and specifically its implications on the production, Gross Domestic Product per region (GDP-R), and employment
Position held: Activities Performed:	Senior economist Economic modelling, report quality control, presentation of findings
Project: Year: Location: Client: Project Features:	Global Energy Efficiency options: Energy efficient technologies, policy and institutional requirements for adoption in South Africa July 2015 – February 2016 National The dti/the Industrial Development Corporation <ul style="list-style-type: none"> Profiling of full range of Energy Efficiency options currently being utilised globally in the building and industrial/mining sectors Assessment of technologies favoured by countries that have successfully implemented EE measures Explore policy initiatives and incentives that contribute to both the greening of industries and the establishment of new green industries Developing a cost and savings potential model to evaluate technologies
Position held: Activities Performed:	Project manager Project management and quality control, presentation of study findings, costing and saving model development
Project: Year: Location: Client: Project Features:	Feasibility study of high temperature applications for South Africa October 2014 – February 2015 National CSIR/the Department of Science and Technology <ul style="list-style-type: none"> Profile HTA technologies Assess South Africa's readiness and need for HTA Assess the current and projected future requirements for HTA Evaluating the prospects (technical and economic) of HTA in South Africa Determine RDI opportunities for the country Formulate and action plan and providing recommendations appropriate for the implementation programme
Position held: Activities Performed:	Project manager Project management and quality control, engagement with industry stakeholders

Other Projects:

- Go-to-Market Strategy for a PV/Panel Manufacturer: Urban-Econ together with EScience Associates and Tracy Stewart Consulting was appointed by the CEF to undertake a Go-to-Market Strategy for a PV panel manufacturing facility. The project consisted of two major parts. The first component included the analysis of the market and opportunities presented in the market, as well as identification of the needs, affordability levels and requirements by all groups of stakeholders in the industry's value chain. The second part of the study included the formulation of the strategic plan that outlined various target markets to be pursued, value proposition to be offered, market channels to be considered for entering the market and activities to be implemented during the product pre-launch, launch and post-launch phases.
- High-tech bio-sciences incubator feasibility study: The study focused on the assessment of the feasibility of establishing a physical high-tech bio-sciences incubator at the Innovation Hub in Gauteng, South Africa. It involved the investigation into the most feasible location, market viability, service offerings, operational requirements, and seed funding requirements.
- High-tech chemical sector incubator feasibility study: The study focused on the assessment of the feasibility of establishing a high-tech chemical sector incubator in Gauteng, South Africa. It involved the investigation into the most feasible location, market viability, service offerings, operational requirements, and seed funding requirements.
- Promotion of Decent work in Southern African Ports (phase ii): The study focused on the independent assessment of progress to date of the project across all the outcomes; assessing performance as per the foreseen targets and indicators of achievement at output level, strategies and implementation modalities chosen, partnership arrangements, constraints and opportunities in both Mozambique and South Africa. It provided strategic and operational recommendations as well as highlighted lessons to improve performance and delivery of project results. to port workers.
- A feasibility study and a business plan for downstream beneficiation of fly ash in the Nkangala District Municipality: Large volumes of coal fly ash (CFA) are being produced at power stations in Mpumalanga. CFA is already used as a cement extender by local cement factories; however, CFA has numerous other applicants that are not properly explored. The study therefore aimed at investigating all possible opportunities that could be derived from CFA beneficiation and identification of those that could be realised in Nkangala.
- Matjhabeng Solar Park: Socio Economic needs analysis and plan formulation: The study focused on the community of Matjhabeng, the Free State Province. It involved the identification of the socio-economic needs and priorities for the local communities, creating an inventory of social facilitates and small enterprises, and running a skills registrar. Aside from the secondary data review, 100 households were surveyed, 35 social facilities were profiled, and 30 businesses were audited. a skills development, a social facilitates, and enterprise development investment plans for the project developer were formulated.
- Examining the possibility of attracting corporate social investment (CSI) into water research and development: The study aimed at obtaining feedback from a sample of corporate representing a variety of industries with regard to the possibility and appetite to invest CSI funds in deploying water and sanitation related solutions in communities targeted by them.
- Go-to-Market Strategy for a PV/Panel Manufacturer: Urban-Econ together with EScience Associates and Tracy Stewart Consulting was appointed by the CEF to undertake a Go-to-Market Strategy for a PV panel manufacturing facility. The project consisted of two major parts. The first component included the analysis of the market and opportunities presented in the market, as well as identification of the needs, affordability levels and requirements by all groups of stakeholders in the industry's value chain. The second part of the study included the formulation of the strategic plan that outlined various target markets to be pursued, value proposition to be offered, market channels to be considered for entering the market and activities to be implemented during the product pre-launch, launch and post-launch phases.
- SunCorp Socio-Economic and Enterprise Development Plan Formulation: Urban-Econ was appointed by SunCorp to develop a Socio-Economic Development and Enterprise Development Plan for a Solar PV project in the Free State. The plans were devised in line with the DOE requirements outlined for the bidding phase.
- Savanna Cookware Manufacturing Facility Pre-Feasibility Study: Urban-Econ undertook a pre-feasibility study for a manufacturing facility planned to produce luxurious stainless steel cookware in South Africa. The pre-feasibility study focused on determining the need and desirability for the proposed manufacturing facility considering the defined

primary and secondary markets, the key prerequisites for the viability of the proposed venture and the most optimal location for the proposed manufacturing facility.

- **An Opportunity Cost Assessment for the proposed Labonte 5 Mining Project:** The purpose of the study was to investigate the opportunity cost of the proposed sand mining project to determine the implications on the local economy dynamics and the impact on the major infrastructure projects implemented in the Lephalale area if the proposed project is not approved.
- **Saldanha Bay Separation Plant Economic Impact Assessment:** The project involved undertaking an Economic Impact Assessment study for the proposed construction and operation of a Rare Earth Elements (REE) Separation Plant on Portion 6 of the Farm Langeberg 188 in Saldanha, in the Western Cape Province. The study formed part of the Environmental Impact Assessment process as prescribed in the National Environmental Management Act (NEMA) of 1998 and its subsequent amendments.
- **Zandkopsdrift Rare Earth Elements (REE) Project Economic Impact Assessment:** The project involved undertaking a Socio-Economic Impact Assessment study for the proposed the Zandkopsdrift Rare Earth Elements (REEs) Project near Garies in the Northern Cape Province of South Africa. The study formed part of the Environmental Impact Assessment process as prescribed in the National Environmental Management Act (NEMA) of 1998 and its subsequent amendments.
- **Balmoral EIA:** The study involved undertaking a Socio-Economic Impact Assessment as an input into a Basic Impact Assessment Study for the proposed Balmoral X5 Township Development in the Ekurhuleni Metropolitan Municipality (EMM).
- **Green Building Market Entry Study:** The Embassy of the Kingdom of the Netherlands in Pretoria appointed Urban-Econ to undertake a market entry study for the Green Building Industry of South Africa. The document was compiled for the purpose of guiding the existing or prospective Dutch companies in expanding or involving themselves in the South African Green Building Industry. The report contained information on the policy and regulatory environment that drives the development of this sector in the country and the broad overview of the status of the construction industry with the focus on the green building industry. The document also encompassed information on the state of development and industry maturity of selected green building sub-sectors that are aligned with the expertise of the Dutch companies. Information on doing business in South Africa as far as procurement and tendering practices, business funding and other support offered by South Africa and Netherlands, was also provided.
- **Royal Bafokeng Mining Procurement Study:** The study identified business opportunities that can be established in the area leading to the localisation of mining inputs. It was based on a comprehensive assessment of the selected mine's contract-based procurement practices.
- **Ventersburg Business Development Concept:** The study focused on the identification of business development opportunities that could be pursued in the town of Ventersburg based on the traffic derived in the area from the N1 highway and other regional roads. The study involved a comprehensive assessment of the target markets induced by traffic, economic base of the area, current business offerings and derived opportunities. It concluded with a presentation of business development concept scenarios and associated socio-economic benefits.
- **Eskom CSP (Solar 1) Macroeconomic Impact Assessment:** The study involved the identification of potential localisation opportunities for various components of the project and modelling of the socio-economic impact.
- **Proposed Exxaro IPP Coal-Powered Power Station - Lephalale Scoping Inputs:** Urban-Econ was appointed to undertake a Socio-Economic Scoping Study and Land-Use Impact Study for the proposed Exxaro Coal-Powered Power Station near the town of Lephalale, Limpopo Province.
- **Mafube Nooitgedacht and Wildfontein EIA/EMP Sustainable Development Investigation Study:** Urban-Econ was appointed to undertake an investigation into sustainable development options associated with the proposed project. The results of this study aimed at informing the decision makers of socio-economic trade-offs related to each option analysed and the preferred alternative.
- **Thaba Metsi Sustainable Development Investigation Study:** The objective of the Thaba Metsi Project is to mine coal via opencast and underground mining methods for supply to the Independent Power Producer (IPP) coal-fired power station, to be developed by Exxaro, north of the proposed Thaba Metsi project. Urban-Econ provided a specialist input into the sustainable development Investigation aimed at quantifying and assessing various options associated with the development and post-mining land uses that formed part of an input into the EIA report.
- **Eskom Sere Wind (WEF1) Macro-Economic Impact Assessment:** The project entailed the strategic assessment of the proposed facility on the macro-economic situation with respect to the impact on the balance of payments, supply of

energy, demand for water, and achievement of strategic government objectives. It also entailed the assessment of the proposed project on the regional and local economies.

- **Evaluation of Energy-Related Proposals for the Department of Science and Technology:** Urban-Econ was appointed to undertake an evaluation of six energy-related proposals submitted to the DST SBS. The objective of the evaluation is to advise the Department on whether the projects described in the proposals should be funded or not. The assessment takes into account operational and financial feasibility of projects, alignment thereof with government objectives, economic benefits derived from the project, ability of the organisations to implement the projects successfully and a risk assessment. The project also involved the development of a decision framework based on a Multi-Criteria Decision Method to be used to compare proposals and determine suitability for funding and prioritisation.
- **Independent Evaluation of the Wireless Mesh Network in Government Broadband:** Urban-Econ was appointed to undertake an independent evaluation of the Community Wireless Mesh Networks in the Government Broadband project. Urban-Econ's responsibility was to evaluate the progress of the project and provide recommendations that can be implemented to improve its design and execution.
- **Eskom Ariadne-Eros Power Lines Economic & Agricultural Impact Assessment:** Urban-Econ was appointed to undertake an Agricultural Potential and Economic Impact Assessment for the proposed Ariadne-Eros Transmission Power Line and expansion and upgrade of the related substations in KwaZulu-Natal.
- **Eskom Ingula Pumped Storage Scheme Regional Economic Impact Assessment:** The purpose of the study was to present an assessment of socio-economic impact of the Ingula Pumped Storage Scheme on the national and regional economies.
- **Gauteng Infrastructure Renewal and Investment Plan (GIRIP):** The study involved the formulation of an Infrastructure and Renewal Plan up to 2025 that would transform Gauteng into a competitive Global City-Region. As part of the study a regional model with necessary demographic and economic projects was developed that assisted in identifying future infrastructural needs in the Province.
- **De Hoop Dam Economic Impact Monitoring Framework:** Urban-Econ was approached to develop and set up an integrated and coherent monitoring and evaluation reporting system which will primarily be based on a regional impact assessment model framework to monitor and evaluate the regional socio-economic impacts due to the development of the De Hoop Dam.
- **North West Cluster Performance Analyses:** Urban-Econ was appointed by the North West Office of the Premier to undertake the analysis of statistics tables for six clusters (Human Resource Development, Physical Assets, Resource Base, Governance and Protection, Economic and Social), identify areas that require interventions and propose possible solutions to address the key challenges.
- **Mopani Investment Strategy:** Urban-Econ was appointed by the Mopani District Municipality to formulate an investment strategy for the region with a focus of promoting integrated and sustainable development in the local economy.
- **Socio-Economic Impact Assessment - Proposed Route Operator Business in Mpumalanga:** The project entailed assisting with the preparation of the response to the Request for Applications in respect of Limited Pay-out Machine Licences in the Mpumalanga Province. The study encompassed a macro-level socio-economic analysis of the proposed route operator business in Mpumalanga with a focus on: (a) benefits to the economy in terms of gross geographical product ("GGP"), employment creation, increased household income, skills development and small, medium, micro enterprise ("SMME") development and (b) potential social impact of gaming in the Province.
- **N3 Highway Economic Impact Assessment:** Urban-Econ was appointed to determine the Socio-Economic Impact of the proposed re-routing of the N3 highway around Harrismith and the current link with the N5 Route towards Lesotho and Mangaung.
- **The Mandela Bay Precinct Economic Impact Assessment:** The study entailed conducting an economic-impact assessment of the proposed Mandela Bay Precinct Development in Port Elizabeth. The proposed project was a mixed use development with the main component being a Regional Shopping Centre that will be surrounded by high density residential property, filling stations, light industrial space, a hospital, and a hotel and office space.
- **The City of Windhoek Draft SME Policy:** Urban-Econ was appointed by the City of Windhoek (COW) Local Authority to develop a Draft SME Development Policy Directive to guide future SME promotion and development in the City of Windhoek

- **Harrismith Logistics Hub Impact Assessment:** Urban-Econ Development Economists was appointed to undertake a rapid economic impact assessment study of the proposed Harrismith Freight Logistics Hub ("HLH"). The aim of the study was to determine potential benefits that could be created by the HLH in terms of unlocking the latent development of the area. This technical memorandum presents the results of the study.
- **Megamall Economic Impact Assessment:** Urban-Econ was requested to undertake an economic impact study for the Megamall project to be developed in the Mogale City Local Municipality. The aim of the study was to determine the potential economic impacts emanating from the proposed development. This study involved assessment of socio-economic impacts the proposed project could have on the local economy which could be used in application for funding from commercial banks and government.
- **Coega Ridge Economic and Social Impact Assessments:** Urban-Econ was appointed to undertake an economic and social impact assessment of the proposed Coega Ridge development. The aim of the development was to create a unique and sustainable residential enclave encompassing a "live, work, play and shop" environment including components such as affordable housing, shopping centre, office park, industrial park, community and social facilities, bulk service infrastructure, and public open space.
- **Amanzi Economic & Social Impact Assessment:** Urban-Econ was requested to undertake an economic and social impact study for the proposed Amanzi Estate that included the original homestead of Sir Percy Fitzpatrick, author of Jock of the Bushveld.
- **Limpopo Industrial Parks Resuscitation Assessment:** Urban-Econ was appointed to assess the feasibility of resuscitation of the selected industrial parks in the Limpopo Province. The study included analysis of the economic potential of the selected areas, development of scenarios and formulation of recommendations. Urban-Econ managed the team of sub-consultants.
- **North West PGDS Monitor:** The study encompasses a comprehensive analysis and projections of the achievement of the PGDS targets, reviewing the performance of the Working Groups and providing recommendations regarding actions needed to be taken to address the shortfalls.
- **Sedibelo Economic Impact Assessment:** The study involved conducting an economic-impact assessment of the proposed development utilising, an Input/output model.
- **Hanglip Sustainability Model:** Urban-Econ was appointed to develop a model that could assist decision makers in identifying the most preferred alternative/s for the Hanglip Development. The model was based on the Multi-Criteria Decision-making process.
- **Emalahleni Investment Incentive Package:** Urban-Econ was appointed by the Emalahleni Local Municipality to update the Investment Incentive Package for the Emalahleni Local Municipality.
- **Eastern Cape Industrial Sector Study:** Urban-Econ was appointed by the Eastern Cape Socio-Economic Consultative Council (ECSECC) to undertake an industrial sector study for the Eastern Cape Province. The study provided inputs to the Provincial Industrial Strategy. The focus of the strategy was on provision of support to sectors with the potential for job creation in the Province. In this context, this study aims at identifying the sectors that have the highest potential for uplifting the second economy in the Province and highlighting their growth barriers.
- **Socio-Economic Impact Assessment of the Proposed New Eskom Power Stations in the Witbank Area and Northern Free State:** The study involved conducting a socio-economic impact assessment of the proposed developments utilising an Input/Output model.
- **Sedibeng Investment Incentive Package:** The study encompasses a formulation of an incentive package that would enhance development and investment in the area, as well as promote economic growth. A comprehensive socio-economic analysis of the Sedibeng DM and its Local Municipalities, including growth potential was performed.
- **North West Sustainable Development Indicators Pilot Project:** After completing the North West Sustainable Development Indicators, Urban-Econ was appointed to execute of the pilot project of population the framework. Urban-Econ has been appointed by the North West Province's Office of the Premier to formulate a Sustainable Development Indicator Framework for the North West Provincial Administration. The purpose of the framework is to assist the provincial government authority in the monitoring and evaluation of their progress towards achieving sustainable growth and development.
- **Polokwane Trade Hub:** Urban-Econ assisted by Nyeleti Consulting Engineering, was appointed by Polokwane Municipality to undertake a Polokwane Trade Hub Feasibility study. The feasibility study included investigation of the

potential of Polokwane to develop into a regional trade hub, implications associated with its development and the initiatives, including programs and projects that need to be implemented to realise the vision of Polokwane as a regional trade hub.

- Mpumalanga Job Creation Budget: The project involved an assessment of the provincial budget with respect to its impact on job creation and identification of opportunities to enhance sustainable job creation in the Province.
- Joburg BPO Zone: Urban-Econ was appointed to provide an urban-economic rationale and motivation for the selection of a BPO Precinct in the Joburg Inner City.
- Bekkersdal Skills and Entrepreneurship Development Strategy: The Bekkersdal Skills and Entrepreneurship Development Strategy provides the reader with thorough data on the existing pool of enterprises and entrepreneurs, services and products and existing skills in Bekkersdal, which can be utilised by public and private entities. The document includes Skills Audit and Business Audit Databases in Access format.
- Baralink Economic and Market Study: Urban-Econ has been appointed by Urban Dynamics to undertake an economic and market study of four areas, namely, Baralink, JP's Town, Orange Farm, and Kwadzudza and provide the feedback on potential economic activates that can be introduced to the area in regard to promotion of sustainable livelihoods. This study forms a part of a comprehensive analysis of the abovementioned areas, the purpose of which is to compile a strategy for sustainable housing development, according to the new housing policy, in different regions of Johannesburg Metropolitan area.
- Business Improvement District Strategy for Bekkersdal: Due to the low levels of consumer and business confidence in the Bekkersdal CBD, this project required the formulation of a strategy for the establishment and implementation of a BID for the CBD area of Bekkersdal.
- Expansion of Holcim Cement Plant- Economic Impact Assessment: Urban-Econ has been appointed to assess economic impact of the expansion of Holcim Cement plant in Roodepoort.
- Madiba Bay Leisure Park Regional Mall Market Study: Urban-Econ was commissioned by East Cape Showcase (Ltd.) to conduct empirical market research and compile a specialist market study for the proposed regional retail mall within the North Gate precinct of the Madiba Bay Leisure Park project.
- Social and Labour Plan for Brandbach Mine, Cullinan: In order to insure sustainable development of the industry in the future along with the implementation of national visions on skills development, poverty alleviation, BEE and employment creation, the government has introduced a Skills and Labor Plan, preparation of which became a prerequisite for every mine in the country. Urban-Econ has been appointed to develop such plan for the Brandbach Mine in Cullinan.
- NIPS for POPS Economic Impact: Urban-Econ has been appointed as part of a specialist team to undertake the economic impact assessment of Infrastructure related to Persistent Organic Pollutants (POPS) in South Africa. The focus of the assessment is to formulate clear strategic guidelines related to the impacts of POPS and or their removal/eradication for the Development of National Implementation Plans (NIPS) of the Stockholm Convention on POPS.
- Other Socio-Economic and Economic Impact Assessment Studies for Renewable Energy Projects conducted as part of the Environmental Impact Assessment Processes
- Arriesfontein Solar Energy Park :near Danielskuil in the Northern Cape (100 MW CSP-Tower facility and 225 MW PV solar facility)
- Humansrus Solar Energy Facility: near Postmasburg in the Northern Cape (100 MW CSP-Tower facility)
- Rooipunt Solar Energy Park: near Upington in the Northern Cape (100 MW CSP-Tower facility and 215 MW PV solar facility)
- Farm 198 PV Solar Energy Facility: north of Kimberley in the Northern Cape (210 MW PV solar facility)
- Wag'nbiekiespan PV Solar Energy Facility: near Boshof, the Free State Province (75 MW PV solar facility)

Countries of Work Experience:

- South Africa
- Russia
- Zambia

References:

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ANITA RAUTENBACH (Pr.Sci.Nat)

Gender	Female
Date of Birth	18 March 1971
Languages	Afrikaans and English
Driver's license	Code 08
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Email	rabiobiodiversity@gmail.com & akkedis1@gmail.com
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BACKGROUND

Anita graduated with a Master's degree in Biological Science from the School of Life Sciences, University of KwaZulu-Natal Durban. Her Master's dissertation investigated patterns and processes of rodent and shrew assemblages in the Savanna Biome of KwaZulu-Natal. Her main interest involves fauna taxonomy, distribution patterns and ecology. She has been involved in various research projects and ecological assessments in southern Africa. Anita has approximately 10 years of in the environmental field and is currently registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

ACADEMIC QUALIFICATION

University of KwaZulu Natal – MSc. Biological Science, Durban.

SKILLS

- Fauna assessments;
- Threatened species assessments;
- Small mammal assessments, trapping and identification,
- Desk-based assessments;
- ISO 14001 Legal Compliance Monitoring and auditing (Construction)
- Training – small mammal trapping, handling of live specimens, processing and identification;
- Sample design set-up;
- Data collection and analyses;
- Radiotracking;
- GIS Mapping.

EXPERIENCE THAT HAS A BEARING ON THE SCOPE OF WORK

- Proposed Ingogo Dams Development
Ecological assessment – KwaZulu-Natal
- Proposed housing Development – Kingsburg housing Development
Ecological assessment – KwaZulu-Natal
- Proposed open-cast mining development – Mdzonyane
Ecological assessment – Limpopo Province
- Proposed bridge construction – Standerton
Development of construction work method statements for in-stream works across water courses – Mpumalanga Province
- Proposed housing development – Amaoti
Ecological assessment – KwaZulu-Natal
- Proposed upgrade of road infrastructure
Avian assessment - Ladysmith
- Proposed development of the Mkhuhlu Quarry
Ecological survey - Mpumalanga
- Proposed development of the Shixini 3 Macadamia Orchard
Ecological Assessment – Eastern Cape
- Proposed construction of Ilanga Secondary School, Nkomazi Municipality
Ecological assessment - Mpumalanga

- Illovo Sugar Cane Estate, Illovo Sugar Ltd.
Biodiversity assessment – KwaZulu-Natal
- University of KwaZulu-Natal
Small mammal assessment – KwaZulu-Natal
- Proposed development of a township on the Farm Impala, Nkomazi Municipality
Ecological assessment – Mpumalanga Province
- Buffelsdraai Landfill site, University of KwaZulu-Natal
Small mammal assessment – KwaZulu-Natal
- Proposed development of Mapulaneng hospital, Bushbuckridge Municipality
Ecological assessment – Mpumalanga Province
- Proposed development of a housing Estate, Coral Lagoon (Pty) Ltd
Threatened species assessment – Black headed dwarf chameleon - KwaZulu-Natal
- Proposed development of an Eco-housing Estate
Ecological assessment – Mpumalanga Province
- Proposed construction of a bridge, Umjindi Municipality
Ecological assessment – Mpumalanga Province
- Proposed construction of the Frank Maghinyane School, Bushbuckridge Municipality
Ecological assessment – Mpumalanga Province
- Upgrade of Queen Nandi, Kwamashu and Inanda Interchanges, SANRAL
Fauna assessment – KwaZulu-Natal
- Proposed development of a new dig-out Port in Durban, Transnet Capital Projects
Mammal assessment – KwaZulu-Natal
- Proposed development of a new mine, Base Titatium
Mammal assessment – Kenya
- Bioblitz, Operation Wallacea
Small mammal assessment, Mkhuze Game Reserve – KwaZulu-Natal
- University of KwaZulu-Natal
Small mammal assessment – KwaZulu-Natal
- University of Swaziland - Swaziland
Radio tracking of Wahlberg's epauletted fruit bat - Swaziland
- Durban Natural Science Museum
Bat assessment Paradise Valley – KwaZulu-Natal
- Durban Natural Science Museum
Small mammal assessment – Madagascar
- &Beyond
Small mammal assessment - Phinda Private Game Reserve – KwaZulu-Natal
- Phelindaba – Gauteng
Rodent assessment - Gauteng
- Durban Natural Science Museum
Small mammal assessment - Albert Falls Dam – KwaZulu-Natal
- Durban Natural Science Museum
Small mammal assessments – Ecorat - Swaziland

EMPLOYMENT HISTORY

Rautenbach Biodiversity Consulting – Durban (*Independent Specialist Consultant*)

March 2015 – present (full-time)

- Fauna Assessments;
- Ecological Assessments;
- Biodiversity Assessments;
- Threatened Species Assessments;
- GIS mapping;
- Small mammal assessments;
- Desktop assessments;

- Sample design set-up;
- Data collection and analyses;
- Report writing.

Rautenbach Biodiversity Consulting – Durban (*Independent Specialist Consultant*)

2012 March – March 2015 (part-time)

- Fauna surveys;
- Sample design, data collection, data analyses;
- Basic GIS mapping;
- Report writing;
- Desk-based assessments;
- Training;
- ISO 14001 compliance monitoring and auditing (construction).

GVK Siya Zama Building and Renovations – Durban (*Regional Safety Manager*)

March 2013 – March 2015

- Development of HSE Plans;
- Hazard identification and risk assessments;
- Data analyses;
- Report writing;
- Training;
- Quarterly safety meetings;
- Monthly OHSAS 18001 and ISO 14001 compliance audits.

GVK Siya Zama Building and Renovations - Durban (*Roaming Safety Officer*)

March 2012 – February 2013

- Ensure on-site subcontractor compliance,
- Conduct risk assessments;
- Monthly safety meetings;
- Induction training;
- Incident investigation and report writing;
- Training

Durban Natural Science Museum (Mammal technician)

April 2007 – August 2011

- Acceptance, accessioning, care and loan of mammal specimens;
- Preparation of specimens for addition to museum collections;
- Data entry;
- Biological sampling;
- Co-ordination, organizing and conducting field surveys;
- Assistance with research;
- Mammal identification.
- Training

Dr D Storm (*Receptionist*)

1997 - 2007

- Setting up appointments;
- Ordering;

- Accounts;
- Filing, typing of medical reports.

Drs Smith, Snyman and Partners Diagnostic Radiologists – Pretoria (*Medical typist*)

1992 - 1997

- Making of appointments;
- Typing

Drs Brits and Griessel Pathologists – Pretoria (*Medical typist*)

1990 - 1991

- Typing of pathology reports.

Professional Affiliations

South African Council for Natural Scientific Professions (400725/15).

Publications

- Solano, E., Taylor, P.J., Rautenbach, A., Ropiquet, A., Castiglia, R. 2014. Cryptic speciation and chromosomal repatterning in the African climbing mice *Dendromus* (Rodentia, Nesomyidae). *PloS One* (DOI:10.1371/journal.pone.0088799).
- Rautenbach, A., Dickerson, T., Schoeman, M.C. 2013. Diversity of rodents and shrew assemblages in different vegetation types of the savannah biome in South Africa: no support for nested subset or competition hypotheses. *African Journal of Ecology* 5(1) pp. 30-40.
- Taylor, P.J., Rautenbach, A., Schoeman, M.C., Combrink, X. 2007. A winter survey of the smaller mammals of the uMkhuze section of the iSimangaliso Wetland Park, KwaZulu-Natal Province, South Africa. (<https://www.researchgate.net/228787004>).

REFERENCES:

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