

Wayne P. Barnett

Principal Consultant



Profession

Principal Structural Geologist

Education

Doctor of Philosophy in the School of Geological Sciences, University of KwaZulu-Natal, South Africa, 2007

Master of Science in Structural/Engineering Geology, University of Cape Town, South Africa, 1997

Certificate in Rock Mechanics, Chamber of Mines of South Africa, 2002.

Bachelor of Science with Honours in Geology, University of Cape Town, 1995

**Registrations/
Affiliations**

Professional Geologist (APEGBC #43273), Professional Natural Scientist (SACNASP #400237/04)

Specialisation

Structural Geology; Kimberlite Geology; Engineering Geology; 3D Computer-based Geological Modelling and GIS.

Expertise

Wayne is a Principal Consultant with 24 years of experience in the mining and exploration industry. He has been employed over a period of eight years as a mining operations-based geotechnical engineer and applied structural geologist. Subsequently, Wayne has performed the role of consulting structural geology specialist in mining and exploration in Africa, North America, South America and Asia. Consequently he specialises in defining the structural geology of mining projects in order to properly characterize the rock mass for geotechnical engineering applications - for scoping to pre-feasibility studies, as well as problem-solving in active mining operations.

Wayne is a geological modelling expert and undertakes and provides training in structural and geotechnical drill core logging, open pit and underground mapping, geological data management, data QA/QC, and statistical analysis of structural data. He has provided formal applied structural geology training to over 1000 geologists and engineers internationally.

These versatile skills have also allowed him to provide practical, goal-focussed structural consulting in diamond, precious and base metal exploration and resource characterization on numerous projects and active operations on all major mining-active continents; for understanding controls on mineralization and targeting purposes. Wayne manages and contributes to the geology resource and geotechnical teams in Vancouver.

Employment

April 2008 – Present	SRK Consulting, Principal Structural Geologist, Practice Lead, Vancouver, BC
January 2006 – March 2008	De Beers, Geoscience Centre, Senior Structural Geologist, Johannesburg, South Africa
January 2005 – December 2005	De Beers, Lithosphere Dynamics Group, Principal Specialist: Geology, Johannesburg, South Africa
March 2004 – December 2004	De Beers, Geoscience Centre, Principal Specialist: Geology, Johannesburg, South Africa
May 2003 – February 2004	De Beers, Cullinan Mine, Geotechnical Engineer Section Head, Cullinan, South Africa
January 1998 – April 2003	De Beers, Venetia Mine, Geotechnical Engineer, Musina, South Africa
January 1996 – December 1997	De Beers, Finsch Mine, Structural Geologist, Lime Acres, South Africa

Publications

21 publications in Geology and Engineering

Languages

English, Afrikaans

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Publications

1. **Barnett, W.P.,** Armstrong, R.A. & De Wit, M.J. (1997). Stratigraphy of the upper Neoproterozoic Kango and lower Palaeozoic Table Mountain Groups of the Cape Fold Belt revisited. *South African Journal of Geology*, 100(3), 237-250
2. **Barnett, W.P.,** Guest, A.R., Terbrugge, P.J. and Walker D. (2001). Probabilistic pit slope design in the Limpopo metamorphic rocks at Venetia Mine. *SAIMM*, 101(8), 381-392
3. **Barnett, W.P.** and Preece, C. (2002). Expanding the Geological Model for Finsch Mine. *South African Journal of Geology*, 105, 381-400
4. **Barnett, W.P.** (2003). Geological Control on Slope Failure Mechanisms in the Open Pit at Venetia Mine. *South African Journal of Geology*, 106(2/3), 149-164
5. **Barnett, W.P.** (2004). Subsidence breccias in kimberlite pipes: An application of fractal analysis. *Lithos*. 76/1-4, 299-316
6. **Barnett, W.P.** (2004). A model for stress controlled pipe growth. 2nd International Maar Conference, Hungary, Abstract Volume
7. **Barnett, W.P.** (2006). The Rock Mechanics of Volcanic Pipe Excavation. Long Abstracts of the 2006 Kimberlite Emplacement Workshop, Saskatoon, Canada, 5p
8. **Barnett, W.P.** and Lorig, L. (2007). A model for stress-controlled pipe growth. *Journal of Volcanology and Geothermal Research*, 159, 108-125
9. **Barnett, W.P.** (2007). Keynote Address: Kimberlite Volcanic Pipe Breccias. Short Abstract of the 2007 Breccia Symposium, James Cook University, Townsville, Australia, June 2007
10. **Barnett, W.P.** (2008). The Rock Mechanics of Kimberlite Volcanic Pipe Excavation. *Journal of Volcanology and Geothermal Research*, 174(1-3), 29-39
11. **Barnett, W.P.,** Kurszlauskis, S., Tait, M. and Dirks, P. (2011). Kimberlite wall-rock fragmentation processes: Venetia K08 pipe development. *Bull Volcanol*, DOI 10.1007/s00445-011-0499-3
12. **Barnett, W.P.,** Jelsma, H., Freeman, L. and Bloem, A. (2013). How structure and Stress Influence Kimberlite Emplacement. D. G. Pearson et al. (eds.), *Proceedings of 10th International Kimberlite Conference, Volume 2, Special Issue of the Journal of the Geological Society of India*, DOI: 10.1007/978-81-322-1173-0_4
13. **Barnett, W.,** Stublely, M., Hetman, C., Uken, R., Hrkac, C. and McCandless, T. (2018). Kelvin and Faraday kimberlite emplacement geometries and implications for subterranean magmatic processes. *Mineralogy and Petrology*, 112(2), 447-462.
14. **Barnett W. P.,** and Carter T. G. (2020). Structural domaining for engineering projects. In: *Proceedings of the 54th US rock mechanics/geomechanics symposium, Golden, Colorado. ARMA Paper 20-2105.*
15. Barton, J.M., **Barnett, W.P.,** Barton, E.S., Barnett, M, Doogapershad, A, Twigg, C, Klemd, R, Martin, J, Mellonig, L and Zenglein, R. (2003). The geology of the area surrounding the Venetia kimberlite pipes, Limpopo Belt, South Africa: A complex interplay of nappe tectonics and granitoid magmatism. *South African Journal of Geology*, 106(2/3), 109-128
16. Campbell, R., **Barnett, W.** and Levy, M. (2015) A structural geology matrix for geotechnical design in hard rock. *The Southern African Institute of Mining and Metallurgy, Slope Stability 2015 Conference.*
17. Doogapershad, A, Barnett, M, Twigg, C, Martin, J, Millonig, L, Zenglein, R, Klemd, R, **Barnett, W.P.** and Barton, J.M. (2003). Procedures used to produce a digitized geological mapping database of the area around the Venetia kimberlite pipes, Limpopo Belt, South Africa. *South African Journal of Geology*, 106(2/3), 103-108
18. Jelsma, H.; Smith, C., Barton, E. and **Barnett, W.** (2005). Geodynamic setting of kimberlites. *GAC-MAC-CSPG-CSSS Joint Meeting, Halifax, Nova Scotia, Abstracts*
19. Kramer Bernhard, J., Barnett, W., Uken, R., and Meyers, R. (2020). Structural Analysis of Drill Core for Mineral Exploration and Mining: Review and Workflow Toward Domain-Based 3-D Interpretation. *Society of Economic Geologists Inc., Reviews in Economic Geology: in press.*
20. Kurszlauskis, S. and **Barnett, W.P.** (2003). Volcanological and Structural Aspects of the Venetia Kimberlite Cluster – a case study of South African kimberlite maar-diatreme volcanoes. *South African Journal of Geology*, 106(2/3), 165-192
21. Jelsma, H., **Barnett, W.P.,** Richards, S. and Lister, G. (2009). Tectonic setting of kimberlites. doi:10.1016/j.lithos.2009.06.030
22. Murphy, B. and **Barnett, W.** (2018). Approach to geotechnical characterization and slope design data acquisition programs in different deposit types. *Proceedings of the XIV Congreso Internacional de Energia y Recursos Minerales, Seville, Spain, 15 pp.*
23. Onsel, E., Chang, O., Mysiorek, J., Donati, D., Stead, D., **Barnett, W.,** and Zorzi, L. (2019). Applications of mixed and virtual reality techniques in site characterization. In *Proceedings of the 26th Vancouver Geotechnical Society Symposium, Vancouver Geotechnical Society, Vancouver.*
24. Onsel, E., D., Stead, **Barnett, W.,** Zorzi, L., and Shaban, A. (2020). Innovative mixed reality approach to rock mass mapping in underground mining. *MASSMIN 2020.*
25. White, J.L., Sparks, R.S.J., Bailey, K., **Barnett, W.P.,** Field, M. and Windsor, L. (2012). Kimberlite sills and dykes associated with the Wesselton kimberlite pipe, Kimberley, South Africa. *South African Journal of Geology*, 115(1), 1-32

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Key Experience:

Project experience includes:

(A) Structural-Geotechnical Project Review and 3D Structural Modelling

Gold: Sabodala (Senegal), Tongon (Cote d'Ivoire), Kişladağ / Taç / Çorak (Turkey), Cortez Hills (USA), Jinlonggou (China), Skouries (Greece), Grasberg (Indonesia), Cortez / Round Mountain (USA), New Afton (Canada)

Copper: Antamina (Peru), Kamo Project (DRC), Silangan Project (Philippines), Chuquicamata and Radomiro Tomic (Chile), Ernest Henry / Mnt Isa (Australia), Pebble Project / Arctic (Alaska), Cozamin (Mexico), Mnt Milligan (Canada), Josemaria (Argentina), Oyu Tolgoi (Mongolia)

Diamond: Venetia / Finsch / Kimberley Pit / Voorspoed / Jagersfontein (South Africa), Koidu (Sierra Leone), Jwaneng / Orapa (Botswana), Snap Lake / Victor / Diavik / Kennady North (Canada)

Other: Selwyn Pb-Zn, Willow Creek Coal (Canada), Del Toro Ag (Mexico), Mogalakwena Pt (South Africa), IOC Fe / Willow Creek coal (Canada)

(B) Structural Geology Control on Ore Deposits Resources and Exploration Targets

Gold: Tanlouka / Karma / Youga Mine (Burkina Faso), Kokoya (Liberia), Lac La Hache Project / Thorn Project / White Gold (Canada), Sabodala (Senegal), Vetas (Colombia), Çorak (Turkey), Medden (Yemen), Taricori (Peru), Arabia

Copper: Minto Mine / Spout Lake (Canada), Bisha (Eritrea)

Diamond: Snap Lake / Kennady North (Canada)

Other: El Mochito Mine Zn/Ag (Honduras), Del Toro Ag (Mexico)

Currently managing the resource estimation and structural geology team in Vancouver.

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Currently:

SRK Consulting (Canada) Inc., Practice Leader and Principal Structural Geologist Vancouver, Canada (2008 – present)

- Specialized structural geology and geological modeling service to Mining Operations and Exploration programs globally
- Managing the Geology team in Vancouver

Previously:

De Beers, Senior Structural Geologist, Mineral Resource Management Johannesburg, South Africa (2006 – 2008)

- Structural geology service to the operations providing the input parameters for geotechnical engineering and/or hydrology projects
- Large degree of overlap with the Geotechnical Engineering discipline, including work on engineering geology data analysis
- Structural geology service to Exploration primarily for targeting purposes
- Providing quality control/auditing service with regards to structural geology and geotechnical data collection at the operations, setting Group standards and procedures
- Undertaking three-dimensional solids modeling of the country rock geology

De Beers, Principal Geologist, Lithosphere Dynamics Group, Johannesburg, South Africa (2005-2006)

- Member of research team with objective of challenging current models on diamond and kimberlite formation and kimberlite emplacement, towards improving the *exploration targeting* tools available for De Beers Exploration

De Beers, Principal Specialist: Geology, GeoScience Centre, De Beers, Johannesburg, South Africa (2004-2005)

- Section Head manager of Geoprojects, involving kimberlite geology related projects and technical services to De Beers *Exploration* world-wide

De Beers, Geotechnical Engineer Section Head, Cullinan Mine, Cullinan, South Africa (2003-2004)

De Beers, Geotechnical Engineer, Venetia Mine, Limpopo, South Africa (1998-2003)

De Beers, Structural Geologist, Finsch Mine, Northern Cape Province, South Africa (1996-1998)