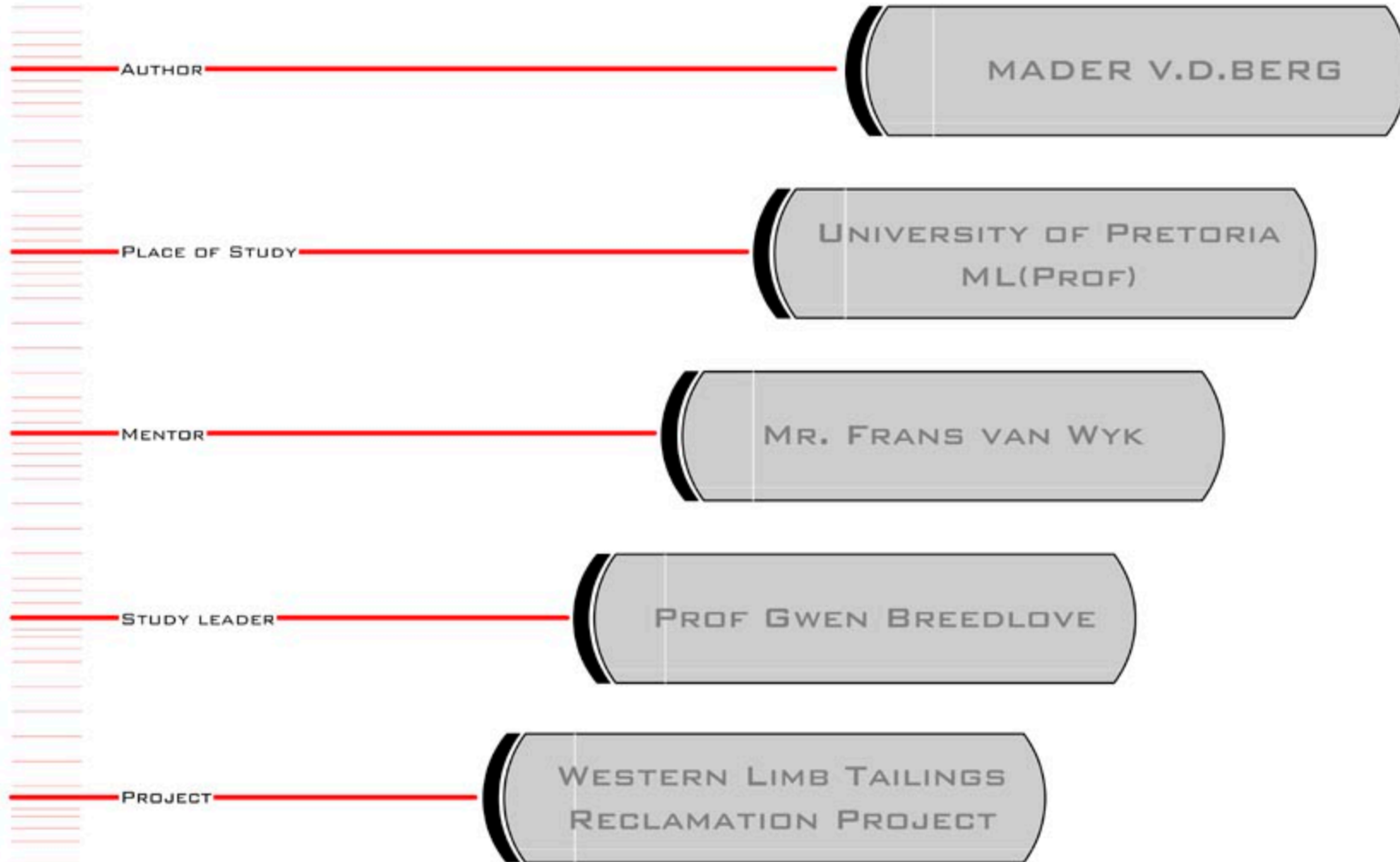


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Abstract

A new approach towards waste management in a mining environment is developed and applied. This dissertation specifically studies the storage and management of tailings in the platinum industry as well as the associated environmental impacts. The product is an alteration of conventional tailings storage methodologies, to a sustainable design strategy in order to minimise environmental impact and optimise social and natural conditions. Factors influencing Tailings Disposal Facility design is: geo-technical stability, public safety, economic considerations, visual impact, water, soil and air pollution, local social context and end land use goals. Each are discussed from an environmental and social impact point of view in order to arrive at a sustainable landform (Tailings Disposal Facility) design.

Keywords

Tailings Disposal Facility

Tailings

Platinum

Waste management

Dust outfall

Visual impact

Impoundment

Landform design

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Decommissioning: "...the transitional period between cessation of operations and final." (Mudder & Harvey 1998)

Deposit: "A dump, heap, pile or filling which usually projects above the natural ground surface, but may occupy the space of a pre-existing excavation." (Chamber of Mines of South Africa 1996:1)

Impoundment: "...a system of one or more barriers which intercepts all potential routes for the transfer of material and which results in an acceptably low rate of transfer of contained materials to the environment." (Chamber Mines of South Africa 1996:2))

Reclamation: "...the site should be habitable to organisms originally present in approximately the same composition and density after the reclamation process." (Box 1978:4)

Rehabilitation: "...the disturbed site should be returned to a form of productivity in conformity with a prior use plan." (Box 1978:4)

Residue: "...any waste rock, slimes or tailings derived from any mining operation or processing to extract those constituents or parts which is profitable to extract at the time." (Mudder & Harvey 1998)

Restoration: "...the exact conditions and density after the reclamation process." (Box 1978:3)

Tailings: "...crushed rock particles that are either produced or deposited in slurry form. This encompasses the vast majority of finely ground mill or mineral processing wastes remaining after extraction of mineral values." (Vick 1983:1)

Wetland: Rogers (1995) defines a wetland as a "open-ended system, which occur adjacent to river and stream channels where plant species distribution and growth is determined by at least intermittent soil, (root zone) saturated or inundation as a consequence of fluctuations in flow."