

CURRICULUM VITAE (CV)

Position, Title:	Geotechnical Engineer
Name of the Expert:	Richard SHUMBUSHO
Date of Birth:	25 th November 1989
Country of Citizenship/ Residence:	Rwanda/ Rwanda

Education:

I have Bsc. in civil engineering (option of highway and geotechnical engineering) obtained in 2012 from University of Rwanda with first class honours (**highest award achievable**). The research project was a feasibility study on construction of earthdam at Gatimbazi Marshland located in Kamonyi district. I have an Msc. in Geotechnical engineering with Distinction from University of Birmingham (**highest award achievable**) obtained in 2014. The research project was on stabilization of expansive soils using fly ash and lime. After completing Msc. Program, I worked in Rwanda for nearly a year and half before going to do further postgraduate studies on a geotechnical and road engineering-related subject at the University of Birmingham. Currently I work as a geotechnical consultant on a number of construction projects in Rwanda, and I worked on several projects internationally as well. I also work for University of Rwanda, where among other things, I teach/taught the courses of Soil Mechanics, Rock Mechanics, and Engineering Mechanics.

Training course

- Rural roads for development course (2017) – Birmingham, UK
- Workshop on the use of geogrids in civil engineering projects (2019) organized by TENSAR – one of the largest manufacturers of geogrids – Warrington, UK
- Expert training with PrimECS – Master builder academy (2024)

Work experience relevant to the assignment:

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
<u>From:</u> March 2020 - <u>Now</u>	<u>Employer:</u> Odelx Ltd & Mass Design Group <u>Positions held:</u> Geotechnical Engineer <u>For references:</u> <u>Tel</u> - (+250) 78651915 <u>Email</u> – cbailey@mass-group.org Cameron Bailey – Director of structural engineering	Rwanda	a) Designing, supervision and carrying out ground investigation work; doing geotechnical site inspection; assessment of founding material before construction of foundations; analyzing ground investigation data; and recommending appropriate geotechnical solutions b) Retaining wall design and research related to slope stability in Rwanda and in other areas which have residual tropical soils c) Reviewing and doing calculations for foundations d) Ensuring quality of construction materials, conformity to design specifications, etc.
<u>From</u> March 2022 – <u>March 2024</u>	<u>Employer:</u> HYCOGEC Consultant <u>Contract:</u> Supervision of upgrading works of Ngoma-Ramiro road <u>Positions held:</u> Geotechnical Engineer <u>For references:</u> <u>Tel</u> - (+250)788448560 <u>Email</u> – nyandwiemmanuel1@gmail.com Mr Nyandwi Emmanuel, General Manager	Rwanda	The work includes quality assurance and geotechnical related tasks in road construction project

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
From: August 2022 up to March 2025	<u>Employer:</u> NPD Ltd <u>Positions held:</u> Geotechnical engineer <u>For references:</u> <u>Tel :</u> (+250) 788329221 <u>Email:</u> komukoto@npd.co.rw Kennedy Omulindi Mukoto, Project director	Rwanda	In summary, the tasks include providing expert's services on geotechnical investigations, site assessment and design of road side slopes, retaining structures, embankments, bridges and other areas identified by Kigali Infrastructure Project (KIP) Engineering Office and/or as directed by KIP management.
From: March 2018 to February 2020	<u>Employer:</u> University of Birmingham <u>Positions held:</u> Postgraduate Teaching/ Research Assistant <u>For references:</u> <u>Email:</u> g.s.ghataora@bham.ac.uk Dr. Gurmel Ghataora, supervisor	United Kingdom	The tasks included laboratory demonstration of various tests on fresh and hardened concrete for different mix designs ranging from 20 to 80 MPa of compressive strength where a wide range of concrete additives including fly ash, GGBS, and plasticizer were also used; Conducting a study on impact evaluation methodologies of rural roads to inform Rural Mobility and Socio-Economic Baseline Pilot Study in Liberia; assisting in teaching some other engineering courses to undergraduate students
From: May 2015 - To: October 2016	<u>Employer:</u> NPD Ltd <u>Positions held:</u> Cobble stones plant supervisor <u>For references:</u> <u>Tel :</u> (+250) 788304683 <u>Email:</u> jnsinga@npd.co.rw Jeannette Nsinga, HR Manager	Rwanda	The tasks included managing quarry activities, producing crushed aggregates for construction projects, identifying new quarries, production of cobbles stones for 70 km project of the city of Kigali, etc.

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
<u>From:</u> January 2015 - <u>now</u>	<u>Employer:</u> University of Rwanda <u>Positions held:</u> Assistant lecturer <u>For references:</u> <u>Tel:</u> (+250) 788665258 <u>Email:</u> drwabuhu@gmail.com Dr. Digne Rwabuhungu, Dean of the School of Mining and Geology	Rwanda	Teaching soil mechanics and engineering mechanics courses, supervising final year research projects, etc.
<u>From:</u> November 2012 - <u>To:</u> September 2013	<u>Employer:</u> STRABAG International GmbH <u>Positions held:</u> Trainee first & Technical engineer later <u>For references:</u> <u>Tel:</u> (+250) 788301708 <u>Email:</u> felix.bruehl@strabag.com Mr Felix Bruehl, former site manager	Rwanda	Site supervision; preparation of works method statements; reviewing technical drawings; following up the progress of daily activities in road construction project including earthworks, road foundation, road base construction, etc.

Locations of projects worked on/countries of work experience: Rwanda, United Kingdom, Liberia, Togo, Uganda, Kenya, Angola

Membership in Professional Associations:

- Member of Institute of Engineers Rwanda (IER);
- Member of technical advisory board of EarthEnable in their mission to promote the use of earth materials in construction

Research work and publications

Shumbusho, R., 2014, Utilization of pulverised fuel ash to reduce shrink-swell characteristics of expansive soils, Thesis (Msc.), University of Birmingham

Ineza, W.B., Izere, E.C., Shumbusho, R., Tumwebaze, F., Kukunda, C.B., Sonnenschein, R. and Razak, K.A., Application of Geospatial and ICT Technologies for Landslide Disaster Risk Reduction in Rwanda. Available at SSRN 5087469.

Shumbusho, R., Ghataora, G. and Burrow, M.P., 2018, The mitigation of longitudinal cracks on low-volume road pavements built over expansive soils. 2018 IRF/SARF/PIARC Regional conference for Africa. Durban, 9th - 11th October 2018

Burrow, M., Ghataora, G., Shumbusho, R., Bopoto, C. and Lema, C., 2018, October. Appraising the impact of rural road maintenance in Sub Saharan Africa. In *2018 SARAF/IRF/PIARC: regional conference for Africa* (p. 34).

Shumbusho, R., Ghataora, G., Burrow, M. and Rwabuhungu, D.R., 2021, The use of geogrids in mitigating pavement defects on roads built over expansive soils. *Rwanda Journal of Engineering, Science, Technology and Environment*

Shumbusho, R., Ghataora, G., 2019, Using electrical resistivity tomography to map subsurface cracks. Unpublished manuscript

Shumbusho, R., Ghataora, G., Burrow, M.P., and Rwabuhungu, D., 2020, Experimental study on structural benefits of using geosynthetics in construction of low volume roads built over weak expansive soil subgrades. Unpublished manuscript

Shumbusho, R., Ghataora, G., 2020, Structural benefits of geosynthetics in construction of low volume paved roads built over weak subgrades. Unpublished manuscript.

Shumbusho, R., Ghataora, G., 2021, Structural benefits of geosynthetics in low volume unpaved roads built over weak subgrades. Unpublished manuscript

Shumbusho, R., Ghataora, G., 2021, Advances in cyclic shrink and swell behaviour of expansive soils. Unpublished manuscript

Language Skills:

	Reading	Speaking	Writing
English	Good	Good	Good
French	Good	Good	Good
Kinyarwanda	Mother tongue		

Adequacy for the Assignment:

Detailed Task Assigned	References to Prior Work/ Assignments that Best Illustrates Capability to Handle the Assigned Tasks
<p>a) Designing, supervision and carrying out ground investigation work; doing geotechnical site inspection; analyzing ground investigation data, and recommending appropriate geotechnical solutions</p> <p>b) studies related to stability of slopes</p> <p>c) Reviewing and doing foundation calculations</p> <p>d) Site supervision; preparation of works method statements; reviewing technical drawings; follow-up of daily activities in road construction project including earthworks, road foundation, road base construction, etc.</p> <p>e) Preparation of technical proposals</p> <p>f) Teaching undergraduate students</p> <p>g) Production of cobble stones for road construction, production of crushed aggregates for different construction projects, identification of new quarrying site, supervision of road works, etc.</p> <p>i) Conducting research work on geotechnics applied to roads investigating the use of geosynthetics in construction of low volume roads built over expansive soils</p> <p>j) Research on stabilization of expansive soils using fly ash and lime</p> <p>k) Quality assurance work related with road construction project</p>	<p>Name of the project or assignment: Ngoma-Ramiro road upgrading project Year: 2022 - 2024 Project Location: Eastern province Client: RTDA Project description: The project consists of execution works to construct lot 2 of the Ngoma-Ramiro road project which is 23 km long. Position Held: Geotechnical Engineer Activities Performed:</p> <ul style="list-style-type: none"> • To ensure quality of construction materials • To review/do technical documents • To interpret ground investigation data and provide recommendations thereof • To do calculations for foundation • Follow-up of site activities • To advise the resident engineer in quality assurance and geotechnical matters regarding road construction work, ground stabilization associated with construction of road crossing a peat material in a marshland, etc. • To provide technical assistance in geotechnical matters
	<p>Name of the project or assignment: Kigali Infrastructure Project (KIP) Year: 2022 - 2025 Project Location: Kigali Client: City of Kigali Project description: The project consists of design and execution works to construct several roads with a total length 220 km in city of Kigali. Position Held: Geotechnical Engineer (Expert) Some of the roads worked on within KIP: Design of a geotechnical solution of Mageragere marshland; design of a geotechnical solution of Busanza marshland; design of a geotechnical solution of Karembure marshland; design of a geotechnical solution of Karuruma marshland as well as design of Karuruma bridge; geotechnical work on Kimihurura-Rugando-Gishushu road; geotechnical work on Gahanga-Nunga-Karembure road; geotechnical work on Akabuga ka Nyarutarama intersection, and geotechnical design of Akabuga ka Nyarutarama flyover bridge; geotechnical work on the access road to Groupe Scolaire Cyeru and new brick factory in Mbandanzi; geotechnical work on Nyabugogo-Akanogo road; geotechnical work on Yamaha-Kinamba-Utexirwa road; geotechnical work on Kiyovu road networks; geotechnical work on Kinamba-Gisozi-RDB road; geotechnical work on Rugenge-Muhima hospital-Nyabugogo access roads; geotechnical work on Apaper-SOS, and SOS-TV 1 road; etc.</p> <p>Scope of work:</p> <ul style="list-style-type: none"> • To provide expert's service on geotechnical investigations, site assessment and design of road side slopes, retaining structures, bridges and other areas identified by KIP Engineering Office and/or as directed by KIP management; • Develop blueprints or specifications for use during construction and ensures that all project comply with applicable standards/guidelines; • To assess the potential adverse impacts of the development project on the stability of slopes, soil, Marshland, water and natural environment. • To provide appropriate recommendations and remedial as well as mitigation measures to be adopted • Provide technical advice on safe designs and construction; • Undertake field trips to the identified area and carry out field surveys to confirm desk study interpretation and gather supplementary data; • Review the existing marshland treatment technics/ publications, norms etc. and recommend expertise suggestions for required improvements • Carry out research work of various problematic slope areas, marshland, road subsidence, upheaval, bridge subsidence sites etc. under the jurisdiction of DoRQ2 and recommend the long-term remedial measures • Provide technical advice for "value engineering" during execution and redesign of hydraulic structures;

	<ul style="list-style-type: none"> • Present the findings of site assessments and geotechnical investigations reports to KIP management and/or Client / Engineer office. • Identify and assess the strength of geological materials by conducting necessary field and laboratory test and analysis • Determine the geotechnical causes of existing structural failures, damages, and defects through site investigations and considering them during new structures design; • Determine requirement for engineering structures to enhance stability of roadside slopes through anchoring, rock netting, drains, deep drains, anchored walls, retaining walls, Landscaping, complementary bioengineering application or any other new technology or high-end engineering measures • Undertake geotechnical designs for roads and bridges under KIP • Assess quality risks likely to be encountered in projects and propose early mitigation measures; • Any other support on the project related to the durability of structures. <p>Name of assignment or project: Kagasa housing development project Year: 2024 Location: Kigali Project description: The project is located in Bugesera, and it is about designing and building 40 whole houses that are affordable for rural Rwandans. Position held: Geotechnical consultant Activities performed: Providing ground investigation specifications; designing, supervising, and executing ground investigation works on Kagasa site equivalent to a 1 hectare of land; preparation of ground investigation interpretative report providing general understanding of the ground conditions throughout the site, and soil parameters for foundations and soak-away pits design</p> <p>Name of assignment or project: Upgradation of Nyamata 30/30 KV Switching Substation and Rehabilitation of Distributed Substations in Rubavu, Muhanga and secondary cities, as well as Upgrade of Gikondo, Nzove, and Gahanga Substations Year: 2024-2025 Location: Across Rwanda Project description: The project consists of two parts. Part 1: Construction of new 30 kV switching substations and associated MV lines (overhead & underground) and rehabilitation of old cabins and MV line links (U.G & O.H) located in the different secondary cities of Rwanda where there is a need to connect new or rehabilitated cabins to existing MV and LV network, and Part 2: Upgrade of Gikondo, Nzove, Gahanga Substations. Position held: Geotechnical specialist Scope of work: Providing specifications of ground investigation works (method statement); supervision of ground investigation works, and providing technical guidance on how geotechnical investigation works should be conducted; reviewing geotechnical reports; assessing stability of electrical infrastructure, etc.</p> <p>Name of assignment or project: Gatuna One Stop Boarder Post Project Year: 2024-2025 Location: Gicumbi District Project description: Position held: Geotechnical consultant Activities performed: 1. <u>Review of Historical Geotechnical Data:</u> Conducting a review of previous geotechnical studies and reports related to the Gatuna OSBP project, dating back to 2019. This involved an evaluation of past findings to ensure a clear understanding of site conditions 2. <u>Guidance on Laboratory Testing:</u> Providing technical guidance on laboratory testing for soil samples collected from the site, as part of the recent ground investigation exercise conducted in 2023. 3. <u>Design and Oversight of Supplementary Ground Investigations:</u> Designing and supervising additional ground investigation activities. 4. <u>Preparation of Geotechnical Report:</u> Compiling a geotechnical report summarizing the findings from the previous geotechnical studies and the recent supplementary ground investigations. This report provided necessary geotechnical information to inform the structural audit and other design decisions for the project. 5. <u>Proposing and designing long-term solution for the project:</u> Proposing and designing long-term solutions for the project. Working as part of the team including structure design expert to design the long-term solution for the project</p>
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	<p>Name of assignment or project: Kigali Financial Square project Year: 2023 Location: Kigali Project description: The project is located in Kigali, and it is a business complex set to serve as a regional hub for financial services. Position held: Geotechnical consultant Activities performed: Reviewing geotechnical reports, and conducting supplementary ground investigation work in order to provide expert second opinion on geotechnical data and their interpretation as well as to confirm the findings of the initial ground investigation for the purpose of informing the design of tower foundation.</p> <p>Name of assignment or project: Kepler project Year: 2023-2024 Location: Kigali Project description: The project is located in Kigali, and it is about the works of developing Detailed Designs (Schematic Design, Design Development, Construction Documents) for the Kepler Campus, especially academic building and water treatment area Position held: Geotechnical consultant Geotechnical scope: Investigation design and specification; production of tender documents, Advice on contractor selection and contract, designing and supervising ground investigation works, reviewing geotechnical reports, and providing appropriate feedbacks to the contractor, production of an Interpretative technical note summarizing the results of the investigation and providing recommendations for design, provide recommendations for the most appropriate foundation type, provide ad-hoc advice / inputs to allow structural engineering team to size foundations (e.g. allowable bearing capacities, guidance on settlements, etc., provide input to schematic design report (ground conditions, suitable foundation types, and recommended parameters for design), reviewing detailed design deliverables (drawings and specifications) relating to substructure and groundworks to ensure design assumptions are captured, provide ad-hoc advice/inputs to allow structural engineering team to develop the foundation design, reviewing construction documentation deliverables (drawings and specifications) relating to substructure and groundworks to ensure design assumptions are captured, and provide advice / guidance to the civil engineering team on ground-related aspects of site design, for example slope stability, earthworks, retaining walls, infiltration rates, etc.</p> <p>Name of assignment or project: Grafanil Project Year: 2023 Location: Luanda, Angola Project description: The project is located in Luanda, and it is about the works of design of Grafanil hospital, phase I Position held: Geotechnical consultant Activities performed: Previously completed geotechnical investigations have indicated the potential risk of collapsible soils. In order to fully understand the soil structure and behaviour, further geotechnical investigations were proposed. Therefore, the geotechnical consultant has designed the technical terms of references (ToR) to guide the additional ground investigation with the aim of verifying whether the Grafanil site is underlain by collapsible soils.</p> <p>Name of assignment or project: GP Tech project - Liberia Year: 2023-2024 Location: Nimba county, Bomi county, and Marshall area located in Liberia Project description: The project is to design new ranger facilities and conservation centres in Liberia Position held: Geotechnical consultant Activities performed / expected activities to be conducted: Desk study to identify likely ground conditions and provide guidance on potential risks, recommended design approaches, recommended investigation techniques, etc.; guiding the production of the terms of reference for geotechnical investigations; reviewing geotechnical report and providing technical comments; providing recommendations for most appropriate foundation type for each of the three sites; providing advice / inputs to allow Structural Engineering team to size foundations (e.g. allowable bearing capacities, guidance on settlements, etc); providing input to Schematic Design report (ground conditions, suitable foundation types, recommended parameters for design; reviewing Detailed Design as well as Construction Documentation deliverables (drawings and specifications) relating to substructure and groundworks to ensure design assumptions are captured; providing advice / guidance to Civil Engineering team on</p>
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	<p>ground-related aspects of site design, for example slope stability, earthworks, retaining walls, infiltration rates.</p> <p>Name of assignment or project: Jacaranda project – Kenya Year: 2023-2024 Location: Kakamega county - Kenya Project description: The project is about the design of the three maternity units on three separate sites in Kakamega County, Kenya Position held: Geotechnical consultant Activities performed / expected activities to be conducted: Guiding the production of the terms of reference for geotechnical investigations; reviewing geotechnical report and providing technical comments; providing recommendations for most appropriate foundation type for each of the three sites; providing advice / inputs to allow Structural Engineering team to size foundations (e.g. allowable bearing capacities, guidance on settlements, etc); reviewing Detailed Design deliverables (drawings and specifications) relating to substructure and groundworks to ensure design assumptions are captured; providing advice / guidance to Civil Engineering team on ground-related aspects of site design, for example slope stability, earthworks, retaining walls, infiltration rates.</p> <p>Name of assignment or project: Mengo hospital - Uganda Year: 2023-2024 Location: Kampala, Uganda Project description: To design a renovation of an existing outpatient department building with the intention of a redefined building use Position held: Geotechnical consultant Activities performed / expected activities to be conducted: Reviewing geotechnical report and providing technical comments as well as interpretation; providing technical inputs on new and existing foundations; providing advice / inputs to allow Structural Engineering team to size foundations (e.g. allowable bearing capacities, guidance on settlements, etc); providing advice / guidance to Civil Engineering team on ground-related aspects of site design, for example slope stability, earthworks, retaining walls, infiltration rates.</p> <p>Name of assignment or project: Wasimi project Year: 2022 Location: Muhazi Project description: The project is located at lake Muhazi, Indatemwa, Gasabo district and it involves building resorts on a steep slope in the vicinity of the lake Position held: Geotechnical consultant Activities performed: Conducting ground investigation work and walkover survey to determine the soil parameters and data essential for planning and designing foundations. In order to evaluate the suitability of the soil for foundations, visual inspection, trial pits, dynamic cone penetration testing, and dynamic penetration tests using steel rebars were performed.</p> <p>Name of assignment or project: Ground investigation at Centre of excellence for ophthalmology in Kigali Year: 2021 - 2022 Location: Kigali Position held: Geotechnical consultant Activities performed: Supervision of ground investigation work, providing technical guidance on geotechnical testing, and reviewing geotechnical reports</p> <p>Name of assignment or project: Construction of the headquarters of Integrate Health in Kara,Togo Year: 2022 Location: Kara, Togo Description: The project was about the design of Integrate Health headquarters based in Kara, Togo Position held: Geotechnical consultant Activities performed: Supervision of ground investigation work, translation of specifications for ground investigations works from English to French, reviewing contractors' tender returns and providing the recommendations to the client; reviewing ground investigation report, and producing a technical note on the ground investigation and geotechnical design.</p> <p>Name of assignment or project: National Museum of Heroism Year: 2022 Location: Kigali, Rwanda Description: To design a new National Museum of Heroism</p>
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	<p>Position held: Geotechnical consultant Activities performed: Supervision of ground investigation work; reviewing ground investigation report, and providing technical comments thereof; producing an interpretation report on soil permeability characteristics.</p> <p>Name of assignment or project: Ground investigation work at a development site located in Gikondo Year: 2022 Location: Gikondo, Kigali Position held: Geotechnical consultant Activities performed: Conducting ground investigation work, determining soil parameters essential for planning and designing foundations, providing recommendations on foundations</p> <p>Name of the project or assignment: Design and construction works for Rwanda Institute of Conservation Agriculture (RICA) campus (funded by Howard G. Buffet Foundation) Year: 2020 – 2021 Project Location: Gashora, Eastern province Client: RICA Project description: The project consisted of the design and supervision of execution works to construct the Rwanda Institute of Conservation Agriculture campus. Project size is 3400 acres. Position Held: Geotechnical Engineer Activities Performed:</p> <ul style="list-style-type: none"> • To ensure quality of construction materials • To review/provide technical drawings for foundations • To provide technical specifications • To interpret ground investigation data and provide recommendations on foundations • To conduct geotechnical site inspection at construction sites before foundation work is initiated to verify whether design assumptions are valid and provide appropriate recommendations on founding depth, foundation width, structural improvement, drainage, etc. • To do calculations for foundation • To do/review geotechnical reports <p>To provide technical assistance in geotechnical matters</p> <p>Project Name: Construction of the Ellen DeGeneres Campus of the Dian Fossey Gorilla Fund Year: 2020 - 2021 Project Location: Kinigi, Western Province Client: Dian Fossey Gorilla Fund Project description: The project consisted of the design and supervision of execution works to construct the Ellen DeGeneres Campus of the Dian Fossey Gorilla Fund campus. The campus will include a Conservation Gallery that builds upon Dian Fossey's legacy and serves as a key attraction for tourists from around the globe; an Education Outreach Center to increase opportunities for capacity building for students, staff, and the community; a Research Center that will enhance their cutting-edge research on gorillas and their habitats; and Housing to enable students, staff, and researchers to live on site and build professional and personal relationships. Throughout the campus, there will be interpretive paths for visitors to explore and expand their education of gorilla habitats and reforestation efforts. Project size is 4500 m² Position Held: Geotechnical engineer Activities Performed:</p> <ul style="list-style-type: none"> • To provide technical specifications • To review technical drawings • Assessment of stability of slopes • To conduct geotechnical site inspection at construction sites before foundation work is initiated to verify whether design assumptions are valid and provide appropriate recommendations on founding depth, foundation width, structural improvement, drainage, etc. • To review/do calculations of foundations • To do/review geotechnical reports • To provide technical assistance in geotechnical matters <p>Name of the project: Design of Norrsken Kigali House Period: 2020 - 2021 Location: Kigali, Rwanda Client: Norrsken foundation Position: Geotechnical engineer Project Description: The project consisted of designing the new Kigali entrepreneurship hub which</p>
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	<p>will be housed on the historic École Belge site in central Kigali. The design of the Norrsken Kigali House incorporated spaces for different scales and types of work, from large collaborative spaces to quiet individual workspaces, in addition to landscaped and semi-public outdoor spaces. The aim of Norrsken Kigali House is to fuel growth in East Africa, accelerating their rapid development of entrepreneurship by increasing access to international capital, ultimately shifting the paradigm from aid to investment (project size is 4400 m²)</p> <p>Activities performed: Review of the geotechnical documents of project</p> <ul style="list-style-type: none"> • Supervision of ground investigation work • Reviewing ground investigation report and provide geotechnical data to be used as inputs in structural design • To conduct geotechnical site inspection during foundation work to verify whether the design assumptions are valid • To provide technical assistance on geotechnical matters
	<p>Name of assignment or project: UNOPS Manicaland project Year: 2020 - 2021 Location: Zimbabwe Project description: The project involved design of various education and healthcare facilities in Zimbabwe Position held: Geotechnical engineer Activities performed:</p> <ul style="list-style-type: none"> • Review and interpretation of ground investigation report • Provide geotechnical inputs for design of foundations • Characterization of sites based on their ground conditions • Working on retaining wall design • Provide technical assistance on geotechnical matters
	<p>Name of assignment or project: Project on standardization of adobe blocks for use in local construction Year: 2020 - 2021 Location: Kigali, Rwanda Project description: The project was about developing standards that govern the production and use of adobe blocks in Rwanda. These would enable legalisation of adobe blocks in local construction. Position held: Geotechnical Engineer Activities performed:</p> <ul style="list-style-type: none"> • Review/write project documents • Characterization and confirmation of soil materials from borrow pits before being used for making adobe blocks • Reviewing, interpreting, comparing, and contrasting geotechnical data of the soils from different labs and providing conclusions thereof • Conducting bottle shaking tests in geotechnical laboratory to investigate whether these can effectively help in particle size distribution analysis of soils • Developing a low tech methodology that would help masons and other people to recognize the soils suitable for producing adobe blocks without having to perform time-consuming lab tests • Providing technical assistance on geotechnical matters
	<p>Name of assignment or project: Kweza Craft Brewery project Year: 2021 Location: Kinyinya, Kigali Client: Kweza craft brewery Position held: Geotechnical consultant Activities performed: Conducting site inspection survey to evaluate the suitability of the soil for foundation as well as carrying out infiltration rate tests to evaluate the suitability of the site to accommodate infiltration basins and soakaway pits. In order to evaluate the suitability of the soil for foundations, visual inspection, trial pits, and dynamic penetration tests using steel rebars were conducted.</p>
	<p>Name of assignment or project: Cooling Fund Project Year: 2021 Location: Kinyinya, Kigali Project description: Demonstrating the best practices of using adobe blocks in construction; best practices to be followed in producing adobe blocks, methodology used in conducting geotechnical site inspection for foundation work, and renovating/building a model house to demonstrate the above</p>

	<p>Position held: Geotechnical engineer Activities performed: Inspection of existing building in a geotechnical and structural perspective which was intended to be renovated, conducting site inspection survey to evaluate the suitability of the soil for foundation as well as the stability of the slope which was behind the house, designing a masonry wall to support the slope, providing technical drawings, providing a technical report, etc.</p> <hr/> <p>Name of assignment or project: Slope stability research Year: 2021 Location: Kigali Client: MASS DESIGN GROUP Project description: The project was intended to provide technical insights on slope failures that are witnessed in Rwanda. Position held: Geotechnical engineer Activities performed: Conducting literature review on the extent of the work done on slope stability in Rwanda; identifying the gaps in knowledge as far as slope stability and slope failures in Rwanda are concerned; conducting the literature review on slope stability in other areas which have similar soil as Rwanda (residual tropical soils); identifying the mechanism of slope failures in areas with tropical residual soils, drafting a concept note on the need of the study to investigate slope stability issues in Rwanda, etc.</p> <hr/> <p>Name of assignment or project: GIRINZU housing development project in Gahanga Year: 2020 Location: Kicukiro, Rwanda Client: GIRINZU Project description: Girinzu project has as a mid-term objective to create in Kigali 200 housing units per year. Adapted to tropical climate, in altitude and steep hills, the houses are conceived to be very long lasting and tailor-made for the Rwandan way of life. Position held: Geotechnical consultant Activities performed: <ul style="list-style-type: none"> • Given that a portion of foundation was to be placed on a fill, a calculation was done to verify the possibility of foundation differential settlement • Reviewing ground investigation report and provide recommendations on further ground investigation and design of foundations • Conducting a walkover survey to evaluate the stability of a slope located at the downstream side of the area intended for housing development • Providing insights on parameters that would be used in conducting seismic analysis in design of buildings in Rwanda </p> <hr/> <p>Name of assignment or project: Aquaponics project in Kayonza Year: 2020 Location: Kayonza, Eastern province Client: NjordFrey Ltd Project description: Building aquaponics system in Kayonza district located in Eastern province of Rwanda Position held: Geotechnical consultant Activities performed: Conducting site inspection survey to evaluate the suitability of the soil for foundation. The site inspection involved trial pits, dynamic penetration using steel rebars, and visual inspection.</p> <hr/> <p>Name of assignment or project: Writing a technical proposal on identification of new rock quarries for Nyarubaka stonecraft plant Year: 2020 Location: Kamonyi, Southern province Client: CVL Position held: Geotechnical consultant Activities performed: preparing a technical proposal detailing the methodology that would be used to identify good quality quarries for Nyarubaka stonecraft plant</p> <hr/> <p>Name of assignment or project: Preparing a concept note on the study to address the landslides problem (especially along transport corridors) in Rwanda. The concept note was submitted to RTDA Year: 2020 Location: Kigali Project description: Investigation of landslides problems, their causes, triggering mechanisms, mitigation measures and cost effective solutions for handling slope instability cases in Rwanda. Position held: Geotechnical consultant</p>
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	<p>Activities performed: preparing a technical concept note to address the landslides problems in Rwanda</p>
	<p>Assignment Name: A walkover survey at Rwaza and Rubagabaga sites following landslide events Year: 2020 Client : East African Power Ltd Location : Rwaza and Rubagabaga Position: Geotechnical consultant Activities performed:</p> <ul style="list-style-type: none"> • Geotechnical site inspection • Identifying the causes of the landslides • Proposing mitigation measures
	<p>Assignment or project name: Rural Mobility and Socio-Economic Baseline Pilot Study in Liberia (Report - on impact evaluation methodologies of rural roads - funded by the UK Aid through the Research for Community Access Partnership (RECAP)). Year: 2018 Location : Liberia Position: Research assistant Activities performed: Systematic literature review on impact evaluation methodologies of rural roads projects to inform the Rural Mobility and Socio-economic Baseline Pilot study in Liberia.</p>
	<p>Assignment or project name: Construction of low volume roads over weak expansive soils using geosynthetics (further postgraduate studies) Year: Since November 2016 Location : Birmingham, UK Activities performed: Extensive literature review and synthesis; identifying the gaps in knowledge through literature review; investigating the best geogrid position in road pavement structure to maximize reinforcement benefit; investigating the best practice to combine non-woven geotextiles and geogrids within road pavement structure; investigating whether there is any structural role associated with the use of non-woven geotextiles in road construction; investigating the best use of combining two geogrids within road pavement structure; investigating whether geogrids can alleviate differential shrink/swell movements of road pavements built over expansive soil subgrades; building road pavement models in laboratory on weak expansive soil subgrades; applying cyclic plate load tests on pavement models and measure rutting behaviour over time; evaluation of geosynthetic reinforcement benefit based on the level of surface rutting recorded by LVDT mounted on cyclic plate load equipment; studying the effect of base CBR on observed performance; simulating wet and dry season in laboratory and investigating their effects on road pavement models where subgrade water content was monitored by moisture sensors and pavement deformation was monitored by LVDTs placed on surface of pavements; calibration of LVDTs and moisture sensors; monitoring the swelling behaviour of compacted expansive soils in CBR moulds allowed to stand in water for a period of up to 11 months; designing bespoke dynamic compaction methodology to allow compaction of subgrade, base, and cold lay macadam into the test tank; conducting a wide range of geotechnical tests including atterberg limit tests, compaction tests, hand vane shear tests, dynamic penetration tests, sieve analysis tests, oedometer tests, free swell index tests, and density tests; etc.</p>
	<p>Assignment or project name: Teaching soil mechanics course to undergraduate students at University of Rwanda and miscellaneous tasks Year: 2015-2016 Location : Rwanda Position: Assistant lecturer Activities performed: Teaching soil mechanics course to the 2nd year university students, preparing course curriculum for the school of mining and geology, etc.</p>
	<p>Name of assignment or project: Nyarubaka cobble stones project for 70 km roads projects of the city of Kigali Year: 2015 - 2016 Location: Rwanda Position held: cobble stones plant supervisor Activities performed: Production of cobble stones for 70 km roads project of the city of Kigali; production of crushed aggregates for different construction projects; search of the new quarrying sites; creation of an access road to the then newly identified quarrying site; maintenance of a 5 km road from</p>

	<p>Musambira to Nyarubaka; management of quarry and crusher activities; there has also been supply of water from borehole dug in marshland area to the uphill site area in order to supply stones cutting machines (this activity of supplying water was conducted by subcontractors); etc.</p> <p>Name of assignment or project: Nyamirambo Zone Belge asphalt road Year: 2015 Location: Kigali, Rwanda Main project features: It is asphalt road that extends from Mumena stone paved road to Banque Populaire. The exercise was given by NPD Ltd to appraise the road status in order to evaluate the engineer technical capability before hiring him. Position held: Engineer Activities performed: Conducting a walkover survey to appraise the state of the road two years after its completion; providing information on various types of road defects that were found on the road (the road defects identified include raveling, pothole-like defect, oil spots, progressive removal of connection between pavement and side drain, fatigue failure concrete along longitudinal drain; and clogged drain requiring maintenance); preparing the report and submitting it to NPD Ltd</p> <p>Name of assignment or project: Research project on stabilization of expansive soils using fly ash and lime (Msc. project) Year: May 2014 Location: Birmingham Project description: The study was conducted to investigate the use of fly ash and lime to reduce shrink/swell characteristics of expansive soils. The effects of fly ash on initial lime consumption, atterberg limits, and free swell ratio of expansive soils were examined. Position held: Msc. student Activities performed: Literature review on expansive soils and stabilization methods thereof, conducting various tests including pH tests to predict free lime content of fly ash and to determine the optimum amount of lime to be used in soil treatment for better improvement, preparing various soil, fly ash and lime mix and subject them to different curing periods, atterberg limit tests, oedometer test, free swell index tests, specific gravity tests, hydrometer tests, evaluation of the experimental findings, etc.</p> <p>Name of assignment or project: Kigali-Gatuna road rehabilitation project Year: 2012 - 2013 Location: Rwanda Project description: Road rehabilitation and widening between Rwandan capital Kigali and border town Gatuna (towards Uganda) Position held: Trainee first and technical engineer later Activities performed: Supervision, preparation of works method statements, reviewing technical drawings, following up the progress of daily activities including earthworks, road foundation, road base, etc., and other tasks delegated by the site manager</p> <p>Name of assignment or project: Feasibility study of the construction of earth dam at Gatimbazi marshland Year: 2012 Location: Rwanda Project description: This was a dissertation project as a part of bachelor's degree studies in civil engineering. The earth dam was intended for the creation of a large water reservoir for irrigation purpose at Gatimbazi marshland. Position held: Undergraduate student Activities performed: Site visits to Gatimbazi marshland, identifying the ideal location of an earth dam at Gatimbazi marshland, collection of soil samples from the marshland area, and testing them in geotechnical laboratory, preparation of a report, etc.</p> <p>Name of assignment or project: Execution Works for Development of Primary Irrigation network of Perimeter 8 (1500ha) for Muvumba Valley Year: 2011 Location: Rwanda Position held: Trainee Activities performed: <ul style="list-style-type: none"> • Site supervision when delegated by site engineer • I also got exposure on the following: construction of earthdams, concrete dams, canals, etc.; implication of soil mechanics in construction of rural roads and earthdams; construction of rural bridges; etc. </p>
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5th May 2025

Richard SHUMBUSHO