



ENGINEERING FOR PEOPLE DESIGN CHALLENGE 2024-25

Makers Valley
Johannesburg, South Africa



The Engineering for People Design Challenge has been delivered in the UK and Ireland since 2011, South Africa and the USA since 2019, and Cameroon in 2022. It is an educational programme based on a concept developed originally by Engineers Without Borders Australia.

The production of this document has been led by Engineers Without Borders UK and Engineers Without Borders South Africa (August 2024) in collaboration with Makers Valley Partnership. Disclaimer: Engineers Without Borders Australia is a third-party organisation and Engineers Without Borders UK is not responsible for ensuring content on this site.

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contributed their time and expertise to enhance the content of this design brief. To learn more or support the ongoing efforts in South Africa by Makers Valley Partnership and Engineers Without Borders South Africa, please visit their site below.

Makers Valley Partnership:
www.makersvalley.org.za

Engineers Without Borders South Africa:
www.ewbsa.org

Engineers Without Borders UK:
www.ewb-uk.org

Disclaimer: Across the world there are slight variations in English orthography (writing conventions), the two most recognised variations being UK and American spelling. For the purpose of providing consistency, UK English has been adopted throughout this document.

Please visit www.engineering-for-people.org and log into the online portal using the password provided by your university for further information.

Front cover image: "Be the river" (2023) is an environmental piece of artwork situated along the Jukskei River culvert within Victoria Yards. Created by Io Makandal in collaboration with Water for the Future.



Learn about the competition

Welcome

The Competition

Get curious about Makers Valley

Context

Click on the text and jump straight to that section

How does the context inform your design?









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Pick your challenge! There are eight areas to choose from

- Challenge Areas**
- Built Environment 
 - Food 
 - Water 
 - Transport 
 - Energy 
 - Digital 
 - Waste 
 - Sanitation 

Hear directly from key people in the Makers Valley community

- Case Studies**
- Chidi Maponya and Innocent Jiyane
 - Christinah Ngoy
 - Desiree Beukes
 - Hector Dibakoane
 - Johanna Monama
 - Matshepiso Makhabane
 - Nqobile Shabalala
 - Romy Stander
 - Siyabonga Ndlangamandla
 - Stefan Neubig and James Mason
 - Thando Bam Francis, Refiloe Sibisi and Sandra Van Oostenbrugge
 - Zweli and Metsi Magwaza

Let your design be shaped by the people who live in Makers Valley.

Ideas on how to get going

Getting started



Welcome

Both on a global and local scale, we are facing challenges that require urgent action. Engineering plays a key role in everyday life and our response to addressing current and future challenges. We have a global responsibility, especially to vulnerable communities, to adapt to changing conditions and to reduce inequality. Participating in the Engineering for People Design Challenge marks the beginning of your journey to invest in your skills and talent for the benefit of all people and our planet.

You have an opportunity to join thousands of university students from across the world taking part in an Engineers Without Borders initiative. This year, students in Ireland, South Africa, the UK, and the USA are participating in the Engineering for People Design Challenge. Over 80,000 students have participated since 2011, tackling a different design brief context each year. This is more than a theoretical exercise. In this document, the challenges described are real issues in Makers Valley, a community in Johannesburg, South Africa. The opportunities for improvement are identified by people living there, who have offered their perspectives to help form this design brief and enhance your educational experience and cultural understanding.

About

Within this design brief you'll find information about Makers Valley, each of the eight challenge areas, as well as case studies of the people living and working in the local area. At the end of this document, there is guidance on the design process to get you started.

This design challenge is not about doing what you are told or finding a 'right' answer to a pre-defined problem. You are designing for the purpose of improving people's livelihoods and environmental systems. You may focus on one challenge area e.g. Food or Digital, or have a solution that addresses multiple areas. You are not trying to tackle everything within all the challenge areas. Just as in real life, there are likely to be many possible solutions and you have the freedom to lead the direction of your project. There is plenty of guidance and resources available (in addition to this document) to help you achieve this, including:

- An online portal (with photographs, discussion forum and lots more information) available at www.engineering-for-people.org
- A [case studies section](#) in this document to hear directly from people living and working in Makers Valley.
- [An immersive interactive map](#) to explore the community, video interviews and the day-to-day lives of people in Makers Valley.

Under no circumstances are you to contact people living in Makers Valley, or those that feature in this brief.

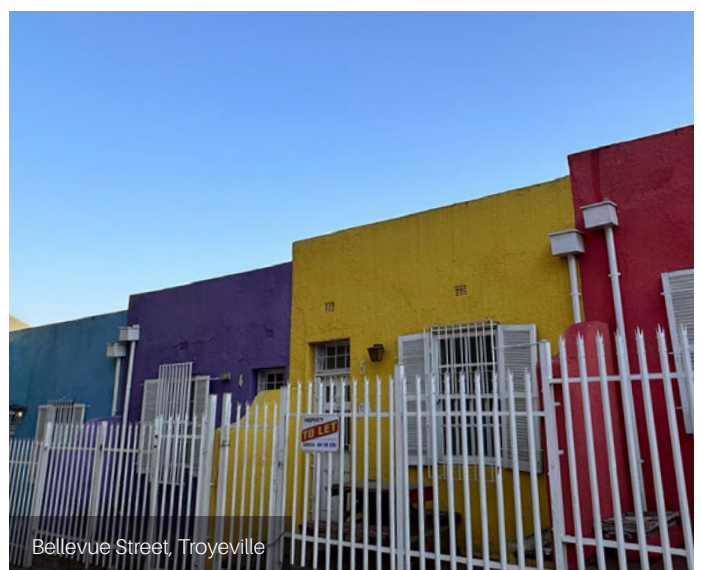
This is an educational exercise for your benefit and all involved have a responsibility to respect people's privacy. Those who have contributed directly to the brief have chosen to do so and have agreed to respond to questions you may have through the online portal only.

The Competition

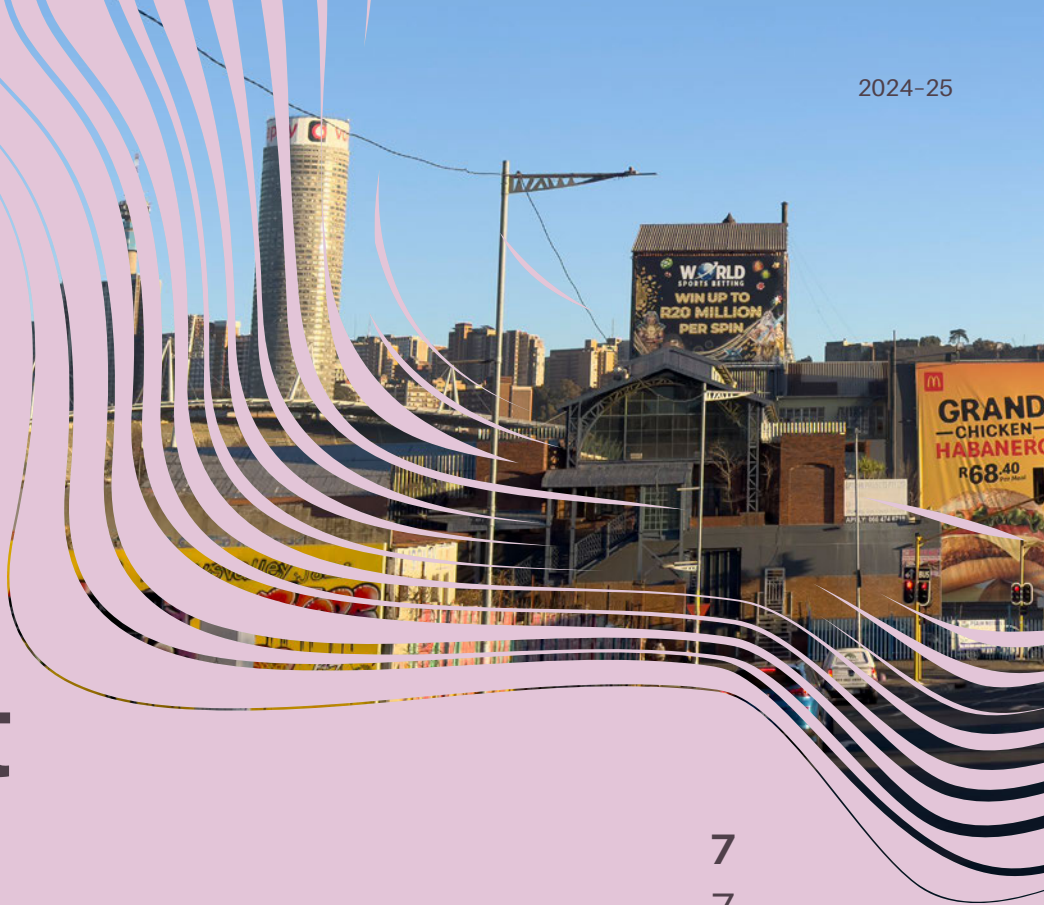
By participating in this programme you'll also be eligible to enter into a national competition. The top five teams from each university will be invited to submit their ideas to a panel of expert reviewers. The top teams from the review stage, including at least one team from each university, are invited to the Grand Finals. The Grand Finals provides you with an opportunity to showcase your work to peers, academics, industry representatives and on the collaborative workspace CrowdSolve. The [marking criteria](#) determines who has best understood the social, environmental and economic factors present in Makers Valley and can clearly demonstrate the application of this in their project. There are three awards to compete for: the First Prize, Second Prize Winner, and People's Prize.



View of Makers Valley (facing north), Johannesburg



Bellevue Street, Troyeville



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Makers Valley

The Area

Makers Valley is an informal term given to a collection of city suburbs on the eastern edge of inner Johannesburg, spanning from New Doornfontein to Bezuidenhout Valley, and including Bertrams, Judith's Paarl, Troyeville, and Lorentzville. Home to some 46,000 people, the historically economically disadvantaged area has rich cultural diversity and an evolving community culture but has also suffered from urban decay and high unemployment rates.

Population: Over 46,000 people*

Approximately 60% of Makers Valley residents were born outside of South Africa

44% of the population is aged between 15 and 34 years old.



Street art in Makers Valley

Makers Valley is now showing signs of regeneration, as activity from social and creative enterprises increases. This has led the neighbourhood to be informally defined by a group of entrepreneurs as Makers Valley, which reflects the presence of artists, craftspeople, urban cultivators, artisans, poets, designers, and youth advocates that live and work in the area. The valley has formed an identity rooted in creativity, and creative place making, representing a hub for social and creative enterprise.

The 'maker' movement challenges consumerism, with a do-it-yourself mentality, using traditional and modern methods, and encompasses not only artists and manufacturers, but anyone who wants to create something, be it dancers, poets, or gardeners. The idea is to empower people to explore their creativity whilst fostering a sense of community and belonging. The value is stemmed from the thought and attention to detail given to the product made, which is not likely to be mass produced, but rather carefully designed.

[Watch this video that introduces Makers Valley, the place and the partnerships.](#)



*As of 2020. Note this number may be higher due to a general population increase since and may also not account for the dynamic and often rapid changes in migration patterns.



Population of Johannesburg:
6,300,000



Population of Gauteng:
15,100,000



Population density of Johannesburg:
2,900 people per square kilometre



View over Makers Valley, Johannesburg

Johannesburg

Johannesburg is the economic heart of Gauteng, one of South Africa's nine provinces. While Gauteng is the smallest province in South Africa by land size, it is home to over a quarter of South Africa's population, with Johannesburg and Pretoria being the two major cities in the province.

Johannesburg was established following the discovery of gold in 1886, and grew rapidly from a gold-mining town to South Africa's most populous city and one of the largest cities in the world. Known colloquially as Jozi, Joburg and the "City of Gold," Johannesburg hosts industries such as banking, IT, media and real estate, serving as an economic and financial hub for the country.

Johannesburg is an evolving, growing city with a booming art and culture scene. The city has many shopping centres, theatres, galleries, cafes and restaurants. The Market Theatre in Johannesburg hosts plays, jazz performances, and various other artistic displays. The Constitutional Court in the centre of town, once a fort and womens prison complex, symbolises the nation's journey towards

justice and equality. Slightly further out of town, Safari tours give tourists an experience of African wildlife and nature.

The Apartheid Museum, between Johannesburg and Soweto (a vibrant township 30 minutes south west of Johannesburg synonymous with resistance against apartheid) offers an exploration of apartheid's impact through immersive exhibits about the country's history of racial segregation and its enduring effects on society. Apartheid is a policy or system of segregation or discrimination on grounds of race - learn more about apartheid in South Africa in the History section.

Despite the legacy of colonialism, apartheid and governmental challenges, Johannesburg is a city full of hope. For example, JoziMyJozi is a people-led, corporate-funded organisation which aims to bring hope and instil pride in Johannesburg and South Africa, and connect people who want to make a difference, and to inspire sustainable solutions for the inner-city. Read more at www.jozimyjozi.com.

South Africa



Capital: Pretoria (executive),
Cape Town (legislative),
Bloemfontein (judicial)



Population: Over 60 million people



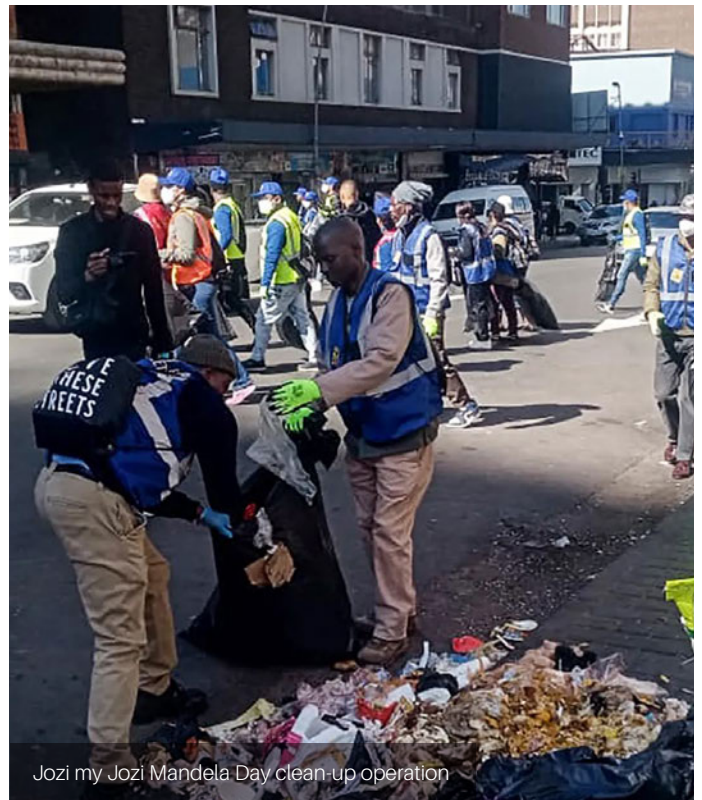
Languages: 12 official
languages, including South
African Sign Language (SASL)



Currency: Rand
1 rand (R) = \$0.055 USD (July 2024)

South Africa has one of the most diverse cultures in the world, representing a variety of traditions, languages, and beliefs. Modern humans have inhabited South Africa for over 100,000 years, and their ancestors for some 3.3 million years. Christianity is the most widely practised religion, with other religions including Islam, Judaism, Hinduism, and traditional African religions also practised. Sports such as rugby, soccer, cricket, and athletics are popular, and the country has hosted major international events like the Rugby and FIFA World Cups.

South Africa is amongst one of many countries colonised by Europeans from the late 15th century onwards, first by the Dutch and then by the British. During colonial times and the apartheid regime that followed, earning opportunities were limited for the majority of the South African population, as land ownership was appropriated, quality education limited and skilled employment severely restricted. April 2024 marked the 30th anniversary of South Africa's first democratic all-race elections, which the African National Congress (ANC) won, signifying the official end of apartheid. However, 30 years later, poverty, unemployment and inequality levels still persist, and corruption, fraud and misappropriation of funds through 'State Capture' (see the Politics and Local Government section) have been extensive. While major post-apartheid interventions



Jozi my Jozi Mandela Day clean-up operation



Salon Faronel, Yeoville

aimed to address racial inequality,^[1] it is still a huge problem in South Africa. Studies suggest that white South Africans still disproportionately hold the majority of the country's wealth today,^[2] while poverty levels are highest amongst black South Africans, followed by coloured* South Africans.^[3]

*It is important to note that in South Africa there are communities that self-identify as "Coloured" (which is not necessarily "mixed-race" ¹). It is an officially used term in South African statistics.

Further reading:

[Learn more about race and ethnicity in South Africa.](#)

[Read about the importance of religion in post-apartheid South Africa.](#)

Reference:

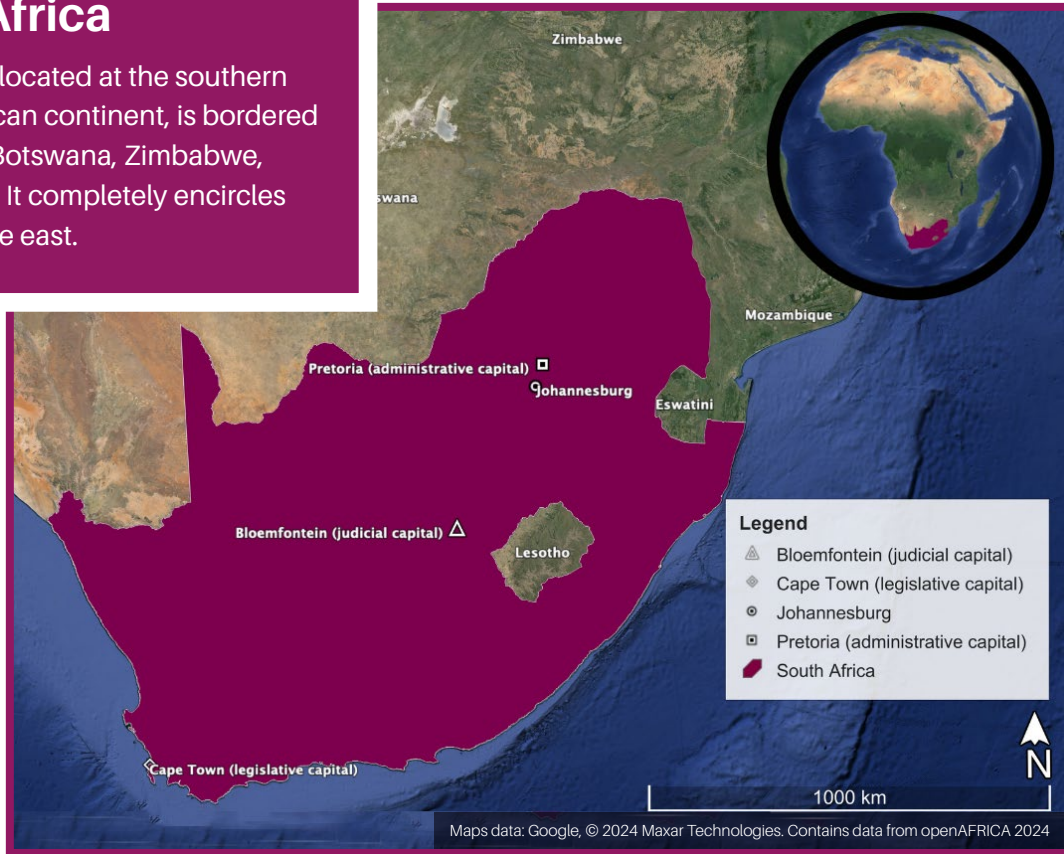
1. Francis, D. and Valodia, I. (2022) 'Black Economic Empowerment (BEE) in South Africa: introduction and a review of the labour market literature,' *Transformation*, 109(1), pp. 1–20. <https://doi.org/10.1353/trn.2022.0010>
2. Chelwa, G., Mabushe, M. and Hamilton, D. (2024) 'The racial wealth gap in South Africa and the United States,' *Review of Political Economy*, 36(2), pp. 423–440. <https://doi.org/10.1080/09538259.2024.2318962>
3. Liebenberg, S. and Slade, B. (2023) 'Applying a human rights lens to poverty and economic inequality: the experience of the South African Human Rights Commission,' *Federal Law Review*, 51(3), pp. 296–314. <https://doi.org/10.1177/0067205x231188637>



Performing a religious cleansing ritual, Muldersdrift, Gauteng

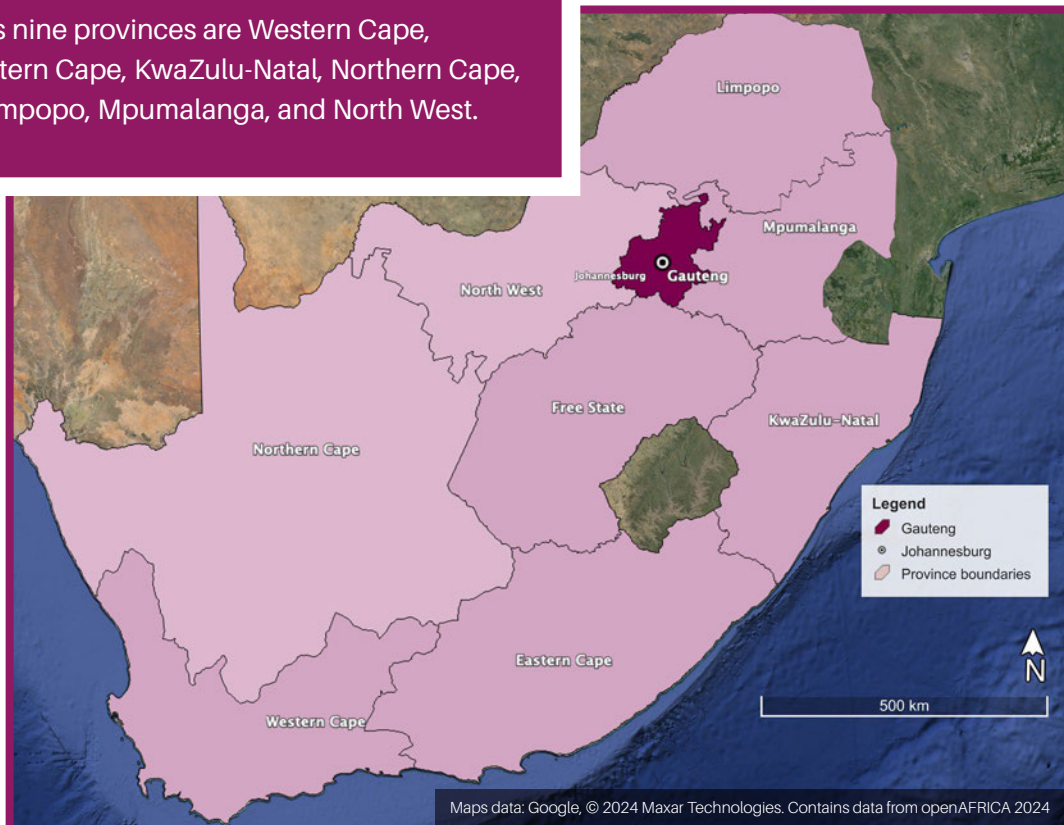
South Africa

South Africa, located at the southern tip of the African continent, is bordered by Namibia, Botswana, Zimbabwe, and Eswatini. It completely encircles Lesotho to the east.



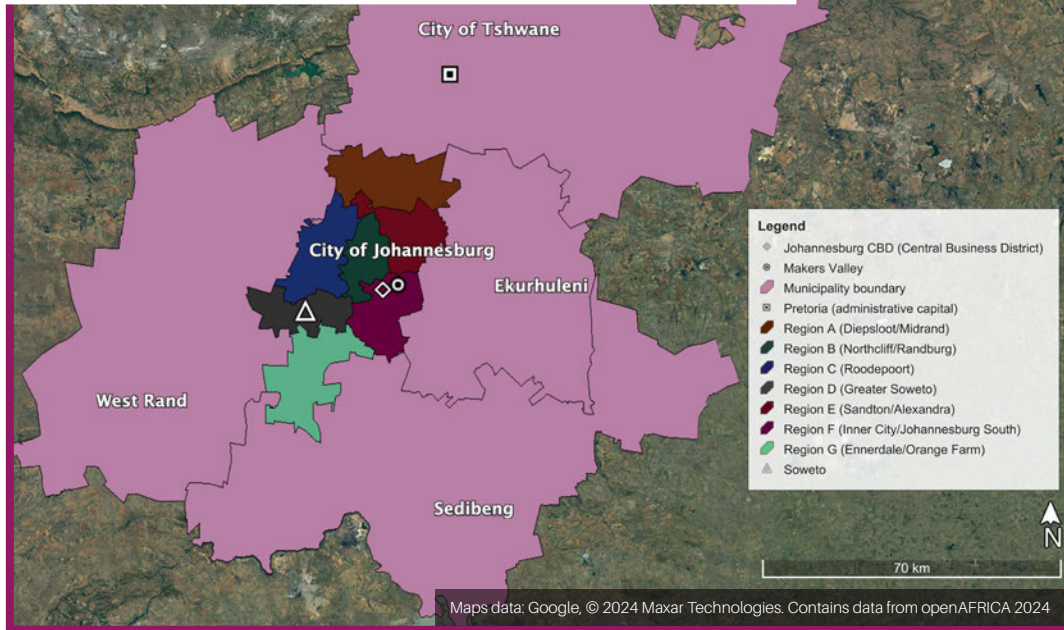
Gauteng

South Africa's nine provinces are Western Cape, Gauteng, Eastern Cape, KwaZulu-Natal, Northern Cape, Free State, Limpopo, Mpumalanga, and North West.



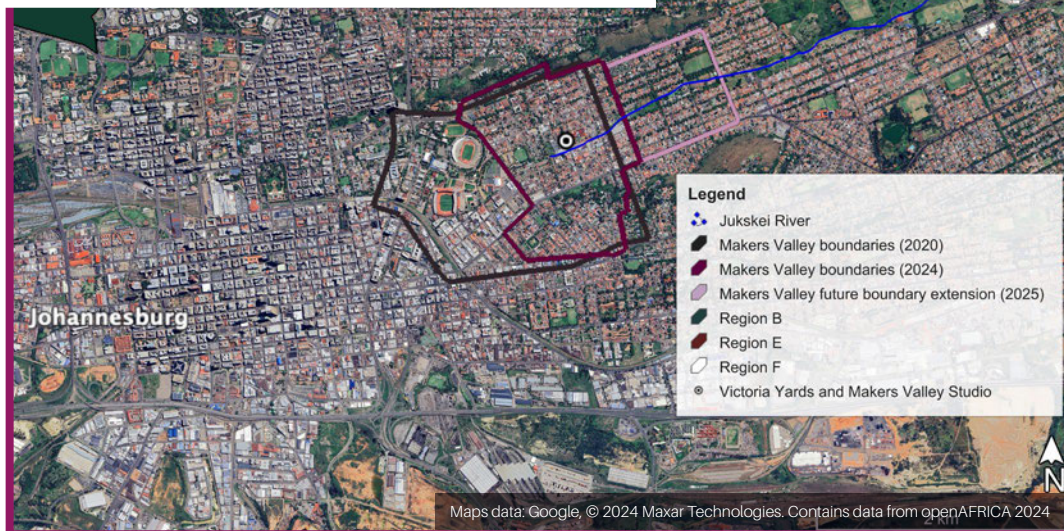
Johannesburg

Gauteng is made up of three metropolitan municipalities (Ekurhuleni, the City of Tshwane and the City of Johannesburg) and two district municipalities (West Rand and Sedibeng). Johannesburg is located in Region F in the east of the City of Johannesburg Metropolitan Municipality.



Makers Valley

Makers Valley is located in the southeast of Johannesburg. The informal boundaries defined by Makers Valley Partnership are updated as new projects and activities are proposed. Use the [immersive interactive map](#) to explore the Makers Valley area and learn about the Makers Valley community through video case study interviews and photos.





Partners

Makers Valley Partnership

Makers Valley Partnership (MVP) is a non-profit organisation established in 2018 and formally registered in 2020. Driven by the question, “What does a better community look like?” MVP aims to enable the Makers Valley community towards a wellbeing economy through social and creative entrepreneurship. MVP envision a vibrant community with flourishing enterprises, and a clean, green, safe environment. Recognising the need for economic system change to address poverty, inequality, and environmental challenges globally, the organisation works to create, support, and showcase pathways to social, ecological, and economic well being. They promote social cohesion, public safety, and environmental regeneration. MVP’s activities include incubating and developing social and creative enterprises through various programmes and a co-working space, promoting ecological wellbeing with projects such as community street gardens, street cleanups, and eradicating dumping hotspots, and addressing social needs with initiatives like women circles and youth leadership programmes. MVP collaborates with various local and external organisations, building meaningful community partnerships and engaging policymakers, corporate stakeholders, and the broader society.

Learn more about the Makers Valley Partnership and changemaking stories at makersvalley.org.za/

Engineers Without Borders – South Africa

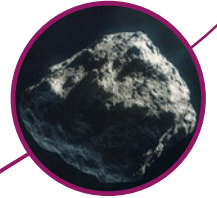
Engineers Without Borders South Africa (EWB-SA) is a non-profit organisation founded in 2013 with a mission to empower engineers to empower communities. Since its establishment, EWB-SA has been dedicated to delivering programs focusing on youth leadership, engineering education, critical infrastructure, along with executing various social impact projects through its national chapter network.

In engineering education, EWB-SA delivers the Engineering for People Design Challenge annually in collaboration with Engineers Without Borders-UK to over 2,000 students a year in South Africa, exposing engineering students to real-world design challenges in a safe and supported environment, through a project-based learning approach. EWB-SA were the first to introduce “Human-Centred Design Thinking” training to South African engineering universities, going on to deliver 20+ Human-Centred Design Courses through their Student Chapters. EWB-SA’s infrastructure projects are delivered under the Just Infrastructure Lab. JIL follows a project-centric and collaborative approach to support community-based nonprofits by harnessing its professional and student members to implement solar, water and architectural solutions.

Learn more about Engineers Without Borders South Africa at ewbsa.org

History

South Africa's history is rich, intricate, and marked by significant challenges. In a nation grappling with profound poverty and inequality, understanding its historical backdrop sheds light on persisting racial disparities. As you embark on your design journey, research South Africa's past to grasp the essence and significance of its evolution. What narratives shape the lives of Makers Valley's residents, and how have these evolved? When designing engineering solutions, keep the people you're designing for at the forefront of your considerations.



2 billion years ago

A large meteorite hit the earth leaving a 300 km wide crater known as the Vredefort Dome, exposing rich gold deposits beneath the Southern African surface.

4,000 to 5,000 years ago

Bantu-speaking population migrated to South Africa from West Africa

1,000 years ago - 1600s

Introduction of iron tools and agricultural practices by Bantu-speaking peoples. Establishment of settled farming communities and the development of intricate social structures.



70,000 to 100,000 years ago

The earliest South Africans included the Khoisan and the Bantu. Fossils found north west of Johannesburg, in the Gauteng province, are the largest collection of human ancestral remains discovered, declared the "Cradle of Humankind World Heritage Site" by UNESCO in 1999. Early humans migrate from Africa to Europe and Asia.



1460

Portuguese navigators, representatives of the Portuguese Royal House and merchants looking for a sea-route to India around the south coast of Africa, reached the coast of Guinea, West Africa.

1652

The Dutch East India Company established the first European settlement in Table Bay, later known as Cape Town. The settlement rapidly grew as Dutch farmers started to settle and grow produce. Colonies were created by using slave labour and skills, bought in from East Africa, East Indies and Madagascar.

1795-1803

British occupation of the Cape Colony during the Napoleonic Wars.

1836

Eastward migration of Dutch Afrikaans (Boer) into modern South Africa, called the Great Trek. Clashes with indigenous African groups like the Zulu and Xhosa as Boer settlers expanded into their territories.

1879 to 1915

A series of wars, including the first Anglo-Boer War, the AngloZulu War, the Basotho Gun War, the 9th Frontier War and others leading up to the Second Anglo-Boer War and the Union of South Africa in 1910

**1883**

Gold was discovered. Johannesburg was founded as a result in 1886. In the January 1890 census, Johannesburg had 26,303 inhabitants.

1914 - 1918

The First World War sparked the industrialisation of South Africa, which required labour and creation of a labour system for non-miners.

1939 - 1945

Second World War. The country actively participated in several campaigns, including the East African Campaign against Italian forces in Abyssinia (now Ethiopia) and Somalia. South African troops also fought in North Africa, notably in the Battle of El Alamein.

1934

South Africa became a self-governing nation state within the British Empire. The Slum Clearance Act of 1934 in Johannesburg empowered authorities to designate areas as slums and forcibly relocate residents, primarily non-white, to segregated townships. It was a tool of racial segregation during apartheid in South Africa. In Johannesburg, non-white people were mostly not allowed to own property.

1948

Apartheid. Under Apartheid law, the Population Registration Act of 1950 formalised racial classification and introduced an identity card for all persons over the age of 18, specifying their racial group even if this hadn't been defined for over 300 years.

1950

The Group Areas Act was one of the most oppressive and discriminatory laws of the apartheid era, segregating residential areas by race, forcibly removing people from designated areas and deeply impacting the lives of millions of South Africans by institutionalising racial segregation.

1961

South Africa leaves the Commonwealth and becomes a sovereign state named Republic of South Africa on 31st May, 1961.



1994

The African National Congress (ANC), achieved victory in the country's first democratic election in which all races could vote.

When apartheid ended, South Africa's national infrastructure had been designed by predominantly white South Africans, 10% of the total population. South Africa rejoins the Commonwealth on 1 June.

**Early 1990's**

Change in social demographic of primarily white neighbourhoods to non-white during the transition from apartheid to democracy. Motivated by fears of instability, loss of privileges, and changes in racial dynamics, many affluent whites emigrated to other countries.

2007

South Africa experiences severe water shortages, particularly in urban areas such as Cape Town and Johannesburg. Load shedding, ongoing periods of widespread national blackouts of electricity supply, begins in October and continues to the present day.

1994 - 1999

Nelson Mandela (1918 - 2013) was a South African anti-apartheid revolutionary, political leader and philanthropist who served as President of South Africa from 1994 - 1999. He spent 27 years in prison and was released on the 11th of February 1990.

2013

Nelson Mandela dies 5 December at the age of 95. South African government announce ten days of mourning.

2010

South Africa hosts the FIFA World Cup, becoming the first African nation to do so.

2018

Cape Town faces a severe water crisis, with the city on the brink of running out of water due to prolonged drought and poor water management. The crisis highlights that water scarcity is becoming an increasing threat in part due to climate change impacts, which in South Africa include changing rainfall patterns and rising temperatures.

2018-2022

The Judicial Commission of Inquiry into Allegations of State Capture investigates State Capture in South Africa. This is a form of corruption in which businesses and politicians conspire to influence a country's decision-making process for their interests. The enquiry, which took place over four years found that state capture took place on an extensive scale in South Africa.

2020

South Africa imposes strict lockdown measures in response to the COVID-19 pandemic, including travel bans, curfews, and business closures.

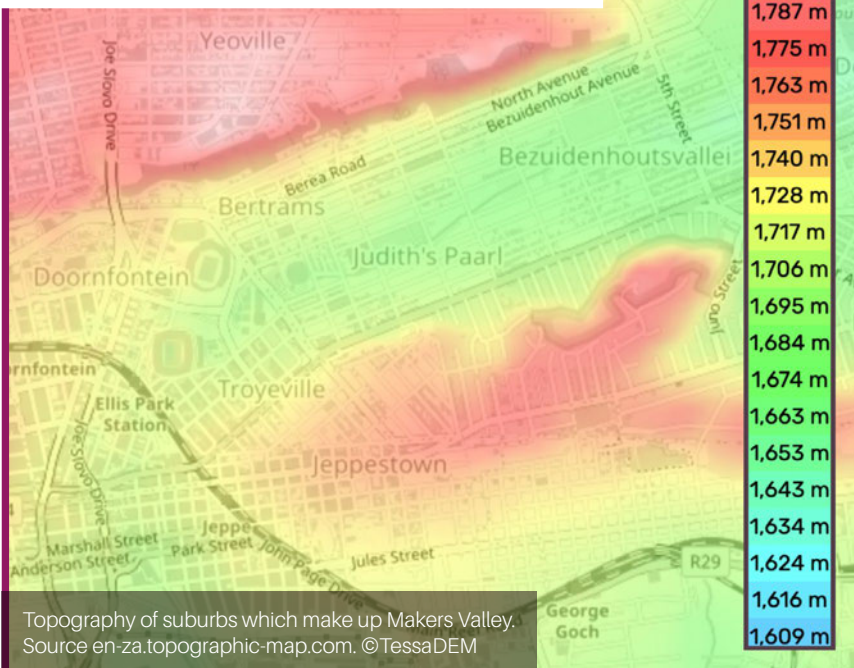
2024

South Africa holds its seventh general election. A new coalition government is formed following the ruling African National Congress (ANC) party losing its parliamentary majority.



Geography & Climate

South Africa's climate varies widely, featuring warm subtropical coastal regions, hot desert areas, humid highlands, snow-capped mountains, and a pocket of Mediterranean weather in the southwest.



Johannesburg is distinctive among major cities worldwide for its location away from major rivers, lakes, or seas. The Jukskei River, mostly shallow and not suitable for transportation purposes, is one of the largest in Johannesburg and originates under Ellis Park Stadium, Makers Valley.

Johannesburg is approximately 1,600m above sea level with significant slopes and sits on a plateau in the north-eastern part of the country. The topography of Johannesburg impacts the way the city is organised. A crest line which divides the city in half in an east-west direction, effectively separates the north and south of the city. Further zones are created in the city by geological features such as crest lines, slopes, hills, valleys and watercourses. The city centre is located where some of the gold deposits were first discovered, and is elevated, overlooking the urban area with an altitude of 1,700m. Makers Valley is at a lower elevation than surrounding areas, which can result in air stagnation that exacerbates pollution levels.

In Johannesburg, the climate is subtropical, featuring mild, sunny winters and pleasantly warm, mostly sunny summers occasionally interrupted by afternoon thunderstorms. During summer, spanning from October to March, Johannesburg experiences warm temperatures with cool nights. Winter, lasting from May to August, brings mild days and chilly nights, with temperatures dropping. December is typically the wettest month. The average temperature goes from 10 °C (50 °F) in June and July to 21 °C (70 °F) in January. Makers Valley enjoys warm summers, but is affected by heavy rainfalls which run down the valley and cause localised flooding. Winters are harsh as the cold air settles into the valley keeping it cooler than surrounds, especially at night and early mornings.



Johannesburg, once a rolling grassland with few trees, today has over 10 million trees, and is amongst the biggest urban forests in the world. The city has 2,000 parks as well as many open spaces and gardens.



Strelitzias at sunrise in The Wilds – a local Nature Reserve

Johannesburg's flora has been significantly altered, with many habitats transformed, leaving only small remnants of their original extent. The city hosts a disproportionately high number of rare and threatened species and ecosystems compared to the rest of Gauteng Province and South Africa overall. This is due to its diverse topography and geology, which create various habitats supporting diverse species, despite extensive habitat transformation. Johannesburg encompasses two of South Africa's nine biomes—Grassland and Savanna—and has recorded a total of 1,374 plant species.^[1]

Further reading:

[Monthly average maximum temperature \(°C\), relative humidity \(%\), total rainfall \(mm\), daily sunshine \(hrs\) and wind speed \(mph\).](#)

[Learn about how geography impacted Johannesburg's Spatial Form.](#)

[Read the Biodiversity Strategy and Action Plan for Johannesburg.](#)

[Learn about Johannesburg's Climate Action Plan.](#)

Reference:

1. Department of Environmental Affairs et al. (2012) 2nd South Africa Environment Outlook. Edited by A. Mampye and Endangered Wildlife Trust. https://www.dfe.gov.za/sites/default/files/reports/environmentoutlook_executivesummary.pdf

Industry & Economy

Makers Valley is synonymous with the Maker movement, which has a long history. In today's world, four external factors are fueling this movement:

1. A shift from traditional to digital methods of design and production
2. Greater economic efficiency due to reduced time and costs in development and prototyping
3. A trend towards collaborative creation of items
4. Increased participation of end-users in both innovation and production processes

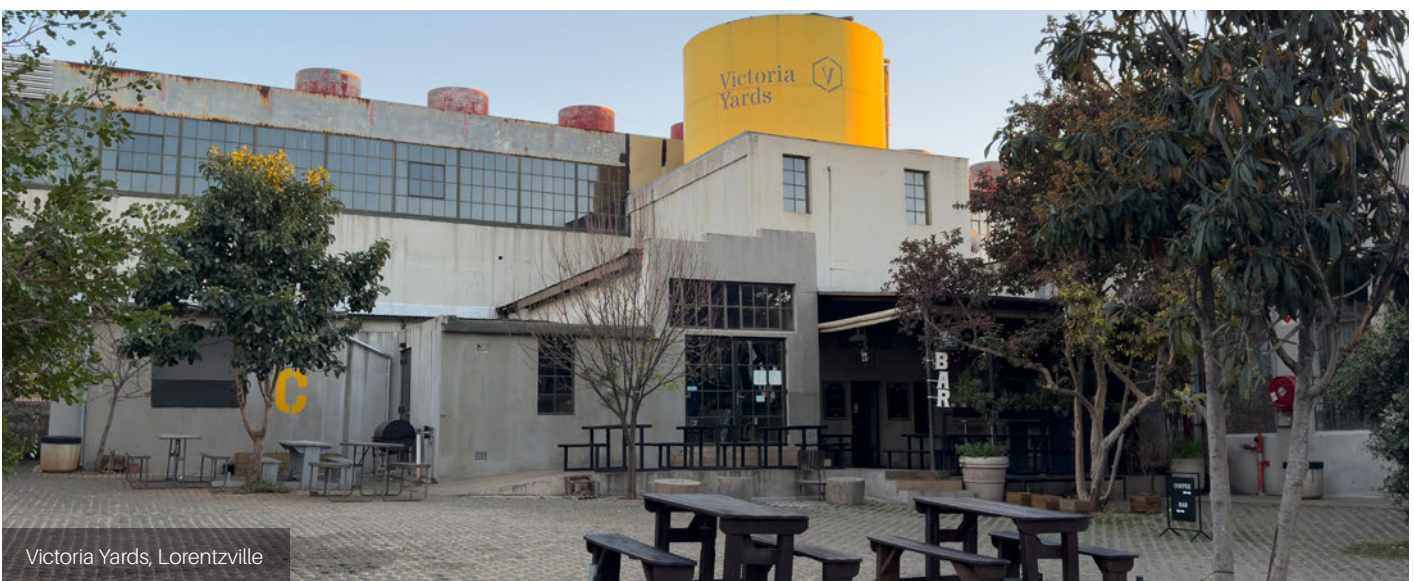
In Makers Valley not all of these factors are at play, largely due to a lack of resources and funds. These external factors influence economic activities, the resources accessible for new ventures, and the conditions under which these resources are available.^[1] Two major organisations that contribute to Makers Valley's economic activity are Victoria Yards and Nando's Global Headquarters, the fast-food chain founded in Johannesburg in 1987.

Neighbourhood Organisations

Victoria Yards

Victoria Yards, or Vic Yards, is an award winning urban complex formed in 2016 that serves as a community hub for Makers Valley with a focus on social development alongside economic growth. Hosting an urban farm, artist studios, retail spaces, sewing factories, and office space for Makers Valley Partnership amongst other enterprises, Vic Yards is a space that encourages collaboration and creativity.

The development of Victoria Yards was not easy. The site, a collection of early 1900s masonry buildings, was badly neglected, had illegal occupants and housed a panel beating shop, which came with large amounts of car parts and rubbish. The original redevelopment proposal was to turn the space into 500 low cost housing units, but through discussions and negotiations, the potential of Vic Yards was realised. The rejuvenation project, which started in



Victoria Yards, Lorentzville

2016 by giving existing occupants sufficient notice to relocate, had a three pronged approach;

1. Considering the external areas. The soil needed to be remediated to enable the development of edible gardens and car parking space were also to be added.
2. Creating internal working and studio spaces to sell to artisans and facilitate vocational training for the community.
3. Community engagement and buy in.

The development grew organically, with materials from the river such as mulch, wood and scraps utilised on site. Today Vic Yards houses multiple tenants, hosts Sunday Markets, music events, poetry readings and functions as a third space for Makers Valley. Third spaces are places outside home or work, where people can get together, relax and spend time.

Nando's

Nando's is a global restaurant food chain, specialising in Mozambican grilled chicken. The Global Headquarter for Nando's, known locally as Central Kitchen has had a presence in Makers Valley for over three decades. Nando's has been contributing towards the arts in South Africa by

buying and displaying art from predominantly emerging artists in their restaurants, as well as investing in artist development platforms and initiatives.

Creative block, a programme developed by Spier Art Trust and supported by Nando's works by sending artists blank blocks, of varying materials and sizes, every month as a canvas for artwork. The art pieces created from these are then reviewed, and sold to the public or bought by Nando's and typically go on to be displayed in Nando's restaurants, providing income, exposure and development opportunities for artists.

Further reading:

[Learn more about the creative artists and entrepreneurs working from Victoria Yard and Makers Valley](#)

[New York Times article highlighting Victoria Yards as one of the places to visit in Johannesburg](#)

[Read about how Nando's works with and supports artists in South Africa](#)

Reference:

1. Browder, Russell E., Aldrich, H.E. and Bradley, S.W. (2019) 'The emergence of the maker movement: Implications for entrepreneurship research,' *Journal of Business Venturing*, 34(3), pp. 459-476. <https://doi.org/10.1016/j.jbusvent.2019.01.005>

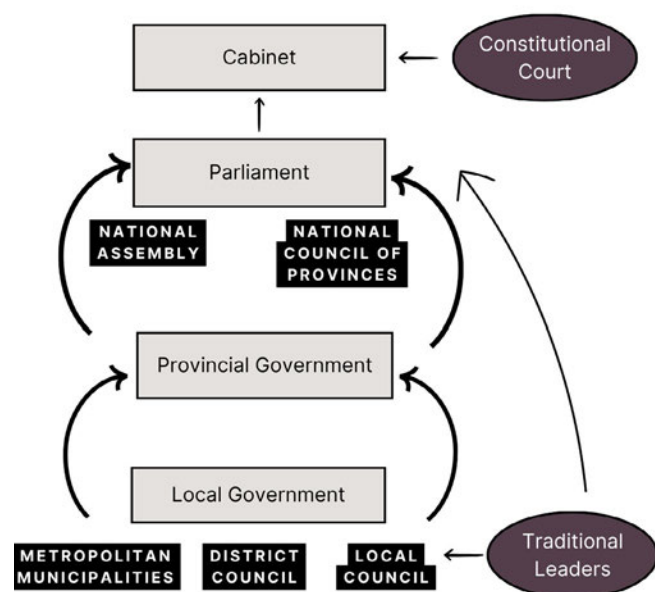


Nando's Central Kitchen (Head Office), Lorentzville

Politics & Local Government

South Africa functions as a constitutional democracy, with the Constitution outlining separate yet interconnected roles for the national, provincial, and local governments. The national level comprises the Executive, Legislative, and Judicial branches led by the President and Parliament.

South Africa consists of nine provinces, each differing significantly in size. The smallest, Gauteng, is densely populated and highly urbanised, while the largest, the Northern Cape, is expansive, arid, and sparsely populated, occupying nearly a third of the country's total land area. Each province operates with its own Legislature, Premier, and Executive Council. Local matters are handled by municipalities, each governed by a Municipal Council.



At the national level, Members of Parliament (MPs) represent Johannesburg residents in Parliament, engaging in legislative processes and advocating for the city's interests. Johannesburg falls under the jurisdiction of the Gauteng provincial government in terms of broader regional matters like education and healthcare. As part of Johannesburg, Makers Valley

falls under the jurisdiction of the Johannesburg Metropolitan Municipality, which is responsible for local governance, service delivery, and infrastructure development within its boundaries. The municipality is overseen by a Municipal Council, led by a Mayor or Executive Mayor, who is elected by the residents of Johannesburg, including those in Makers Valley.

Johannesburg faces challenges with political stability. Over a period from August 2021 to April 2023, the city experienced turnover in its mayoral position, with six different individuals assuming the role. Kabelo Gwanda took office as Mayor in May 2023, succeeding his predecessor Thapelo Amad, who resigned after just three months in the position. Political instability, characterised by frequent changes in leadership, inconsistent policies, and corruption, significantly undermines principles of good governance such as accountability, efficiency, and transparency. Research demonstrates that in South Africa, political unrest hinders local development and the delivery of services.^[1] Protests over service delivery across the country often stem from residents' dissatisfaction with basic municipal services such as water, electricity, and sanitation. These protests also highlight concerns about housing shortages, unemployment, and high poverty levels, particularly in informal settlements.



Human Rights Watch found that there is a restriction on civil and political rights that are further exacerbated by social and economic disparities.

Investment in Makers Valley:

The Johannesburg Inner City Partnership (JICP), a public benefit organisation, highlights in their Inner City Transformation Road Map that areas within Makers Valley, such as Ellis Park Stadium and the Bertrams suburb have the potential to attract public investment, but have not benefited from this. However the economy is growing, with businesses such as property developers investing in the area. New collaborations among developers, creative enterprises, residents, universities, and local governments aim to enhance community welfare and support sustainable urban development and socio-economic progress.



Stewart Drive, Yeoville, Johannesburg

On 29th May 2024, South Africa held its general election. Despite concerns, election day was relatively peaceful, with only minor disruptions and no violence reported, although long queues caused voting to extend beyond the scheduled time frame. Election campaigns in South Africa are typically calm, but there are fears of potential political violence. Political tensions often escalate in the lead-up to elections, which can lead to clashes between security forces, rival activists or striking union members. While such violence is typically targeted at opposing supporters, it can impact bystanders and businesses. The election was a landmark for South Africa as voters frustrated with the unemployment crisis, crippling poverty and inequality delivered the worst result ever for the African National Congress (ANC), which lost the majority it had held for 30 year since the end of the apartheid system.

Recently, the Human Rights Watch highlighted concerns that foreign nationals were being unfairly scapegoated and demonised in the May 2024 election campaign, raising the risk of further xenophobic violence. Xenophobia is an expression of intolerance and hatred

towards foreign nationals. Human Rights Watch criticised the government for not addressing anti-immigrant actions and hate speech, including those involving public officials. Denying foreign nationals access to healthcare and conducting raids on their businesses are violations of South Africa's constitutional and international human rights commitments.^[2] South Africa's politics is also impacted by corruption, a crime that steals resources meant to improve the lives of the poorest and most vulnerable in our society. In recent years 500 government officials have been convicted of corruption.^[3]

State capture is also an issue in South Africa, occurring when private interests use corruption and manipulation to gain control over government institutions and decisions. During Jacob Zuma's presidency, this involved private interests influencing government decisions. Investigations by the Zondo Commission aimed to uncover these practices and suggest reforms to improve transparency and accountability in governance.^[4] The enquiry, which took place over four years found that state capture took place on an extensive scale in South Africa.

Further reading:

[Learn about equality in South Africa, thirty years after the end of apartheid.](#)

[Learn more about structure and functions of the South African Government.](#)

[Read about the South African government's fight on corruption.](#)

[Explore trends in South Africa's Freedom Index, Political Subindex, Legal Subindex and Prosperity Index from 1995 to 2023.](#)

[South Africa's profile as part of the Human Rights Watch World Report.](#)

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View from Troyeville looking north

Demographics

Johannesburg Demographic Information



Age Structure

Population under 15: **21.9%**

Population 15 to 64: **73.1%**

Population over 65: **5.0%**



Dependency Ratio

Per 100 (15-64 years): **36.8**



Sex Ratio

Males: **50.37%**

Females: **49.63%**



Education (aged 20+)

No schooling: **3.5%**

Higher education: **15.0%**



Household Dynamics

Households: **1,841,917**

Formal dwellings: **89.8%**



Household Services

Flush toilet connected to sewerage: **93.0%**

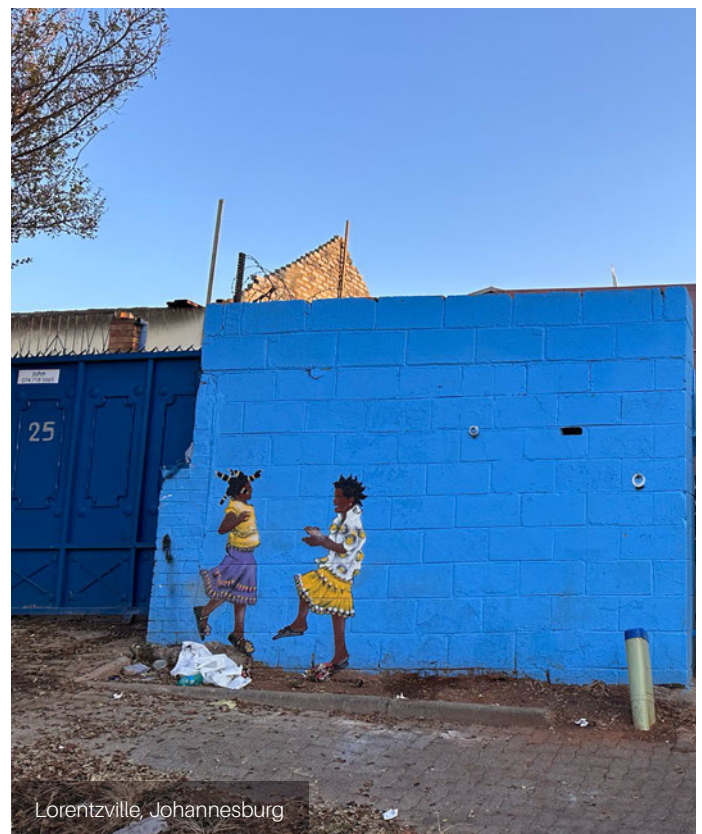
Weekly refuse removal: **90.5%**

Piped water inside dwelling: **77.1%**

Electricity for lighting: **94.1%**

Race and Ethnicity

While race is typically ascribed to individuals on the basis of physical traits, ethnicity encompasses everything from language to nationality and religion, enabling people to take on several identities. Historically, ethnicity in South Africa was considered to be based around concepts such as kinship, ancestry, face to face signal of dialect and cultural practices. During colonial times, racial segregation was formally introduced. Then in the apartheid period, legislations based on racial classification were introduced. The legislative basis for racial classification, the Population Registration Act No. 30 of 1950, divided the South African population into the following racial groups: Whites, Natives (Blacks), Indians and Coloured (anyone not white or not a member of one of the indigenous groups of Africa on a cultural basis) people. Today, racial groups are described similarly; in Johannesburg the racial demographics are Black African (76.4%), *Coloured (5.6%), White (12.3%), and Indian/Asian (4.9%).



Lorentzville, Johannesburg

The largest ethnic group is the Zulu, and the majority live in KwaZulu-Natal Province and Gauteng Province. The second largest is the Xhosa group. South African ethnic groups are also found across South Africa's boundaries in neighbouring countries. Today, the South African constitution provides equal human, political and social rights to all individuals regardless of race, ethnicity or language. A characteristic of ethnicities is languages and the majority of the South African population are multilingual.

Approximately 2.4 million people, which constitutes around 3% of South Africa's population, are migrants. Despite economic challenges, South Africa is an attractive destination for people from the region and the continent as a whole. The constitution of South Africa safeguards the rights of both citizens and noncitizens, guaranteeing everyone the right to freedom and security, which includes protection "from all forms of violence, whether from public or private sources".

A study examining the psychological effects of xenophobia in Gauteng, South Africa found that migrants experienced discrimination, fear, uncertainty, identity crises, and vulnerability, often due to insufficient protection from law enforcement. The findings highlight the importance of a coordinated, multi-level approach by the government to tackle xenophobia and its consequences effectively.^[1]

*It is important to note that in South Africa there are communities that self-identify as "Coloured" (which is not necessarily "mixed-race"). It is an officially used term in South African statistics.

Language

South Africa's biggest language is isiZulu, spoken by almost a quarter (23%) of the population. Other official languages are isiXhosa (spoken by 16%), Afrikaans (13.5%), English (10%), Sesotho sa Leboa (9%), Setswana and Sesotho (both 8%), Xitsonga (4.5%), siSwati and Tshivenda (both 2.5%), and isiNdebele (2%). In Johannesburg, five languages are regarded as official; isiZulu, Sesotho, Setswana, English and Afrikaans. The right to use any of these languages has been built into South Africa's Bill of Rights

and Constitution, which acknowledges that the languages are a resource that should be harnessed.

Religion

Approximately 80% of the population in South Africa identifies as Christian, while around 15% do not affiliate with any religion. The remaining 5% follow Islam, Hinduism, Judaism, or other faiths. The constitution ensures freedom of religion for all citizens. The country embraces religious diversity and tolerance. Johannesburg features numerous places of worship and spiritual sites, including traditional buildings and public spaces repurposed as places of worship on weekends. Public parks in the city are also used by members of the Zion Christian Church (ZCC), one of Southern Africa's largest African initiated churches. Another prominent group is the Shembe Church, whose members wear white robes.



Church of Christ, Bertrams

Employment

The unemployment rate in South Africa was 28.4% in 2023, down from 28.77% in 2022.

According to a National Income Dynamics survey, the Covid-19 pandemic saw 3 million people lose their jobs, with approximately 2 million of them being women.^[2] In Makers Valley, youth (Age 18-34) make up 40% of the population. In this age sector, almost 50% of people are formally unemployed.^[3]

Research on how families in Johannesburg build resilience during unemployment found that they achieve this through effective communication,

which helps them solve problems and share emotions. This highlighted the importance of ubuntu (meaning ‘humanity to others’ in Bantu), where strong connections and support networks help mitigate the impact of unemployment, contrasting with families demonstrating less resilience due to having weaker support systems. Additionally, spirituality provided a significant source of strength, with practices like attending church and prayer providing comfort and hope.^[4]

Educational Attainment

In South Africa, only a small percentage of young people stay in education after school, which ends at age 18 (Grade 12). In 2021, 46.3% of 19 year olds were not in formal education, which increased to 77% by age 20, contrasted by only 9% of 18 year olds being out of school. Reasons for non-attendance included illness or disability, poor academic performance and inability to afford fees. There are also gender differences, with females often leaving school due to family obligations. Not pursuing formal education poses significant concerns, as it limits access to higher education and job opportunities, resulting in lower wages compared to peers who completed their schooling and attended university.

The number of out-of-school children in South Africa rose sharply in 2020 due to COVID-19-related school closures. Distance learning proved ineffective due to limited digital access. In 2021, many schools adopted hybrid models combining in-person and distance learning due to ongoing restrictions.

Disability

The 2030 Agenda for Sustainable Development pledges to “leave no one behind,” with SDG 10 highlighting persistent inequality within and among countries. In Gauteng, 20% of adults have some functional difficulties, which include seeing, hearing, mobility, cognition, self-care and communication. When considering poverty levels in South Africa, it was found that people with functional difficulties more frequently experience multidimensional poverty, i.e. low educational attainment, having

inadequate living conditions, than people without functional difficulties. In Gauteng for instance, the poverty levels for people with no functional difficulties is 14%, this increased to 18% for people with some functional difficulty, and saw a further increase to 25.5% for people with a lot of functional difficulties.^[5] In South Africa, disability can come with a stigma and lack of awareness, which makes it difficult to identify how many people are affected. People living with disabilities are less likely to be able to access support, and employment, and can get stuck in a cycle of poverty. Historically people with disabilities have faced discrimination and social exclusion. In Johannesburg, the Department of Social Development have developed interventions including skills development, and provision of assistive devices to improve the rights of people with disabilities.

Further reading:

[Migration Profile Report for South Africa, 2023, published by Statistics South Africa.](#)

[Read about the diversity of languages in Gauteng and their complexities.](#)

[Key population statistics for South Africa by the United Nations Populations Fund.](#)

[Further demographic information on South Africa in eight charts, including crime, load shedding, and GDP per capita.](#)

[More demographic information on the City of Johannesburg Metropolitan Municipality \(JHB\).](#)

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Challenge areas

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Challenge Areas

Before we get into the challenges, let's remember the United Nations Sustainable Development Goals (SDGs). The SDGs provide a valuable framework for addressing this design challenge. Launched in 2015, these 17 goals delineate critical areas for eradicating poverty, safeguarding the planet, and ensuring universal peace and prosperity.

As we find ourselves in the Decade of Action (2020-2030), there's an urgent need to accelerate efforts to achieve the SDGs. The latest SDG Index indicates that progress is lagging, particularly in impoverished and highly vulnerable countries. We need to speed up our efforts if we're to meet these global targets.^[1]

To provide a broader context, several UN SDGs are highlighted here for further exploration. By familiarising ourselves with these goals, we can gain insights into both local and global perspectives. It's

crucial to consider whether our designs for Makers Valley, South Africa, align with and contribute to the attainment of these global goals.

A UN publication authored largely by UN staff based in South Africa, discussed the key issues and challenges faced by South Africa in the country's efforts towards achieving the UN SDG targets.^[2] The edition focused on topics such as financing the UN SDGs, facilitating a just transition, and how to bridge gender gaps. The following questions were explored:

- How best can we support small business development and entrepreneurship?
- Do we have policy space for an industrial strategy?
- What strategy will be most effective in the South African context?
- How will developments in South Africa affect its neighbouring countries and the African region at large?

UN Sustainable Development Goals



These topics are at the centre of South Africa's National Development Plan (NDP) 2030 and can provide insight into the main developmental challenges that are critical to South Africa.

Decolonising Engineering

In South Africa and other nations, a movement to "decolonise" engineering education has emerged, seeking a socially just, inclusive, and contextually relevant approach. During Apartheid, the Bantu Education Act of 1953 legalised racial separation of education in South Africa. A separate education system was developed for Black South African students, designed to prepare students for lives as a labouring class. In 1959 separate universities were created for Black, Coloured and Indian people, while existing universities could not admit new Black students. Decolonisation is the process of reversing the political, economic, and cultural impacts of colonisation.

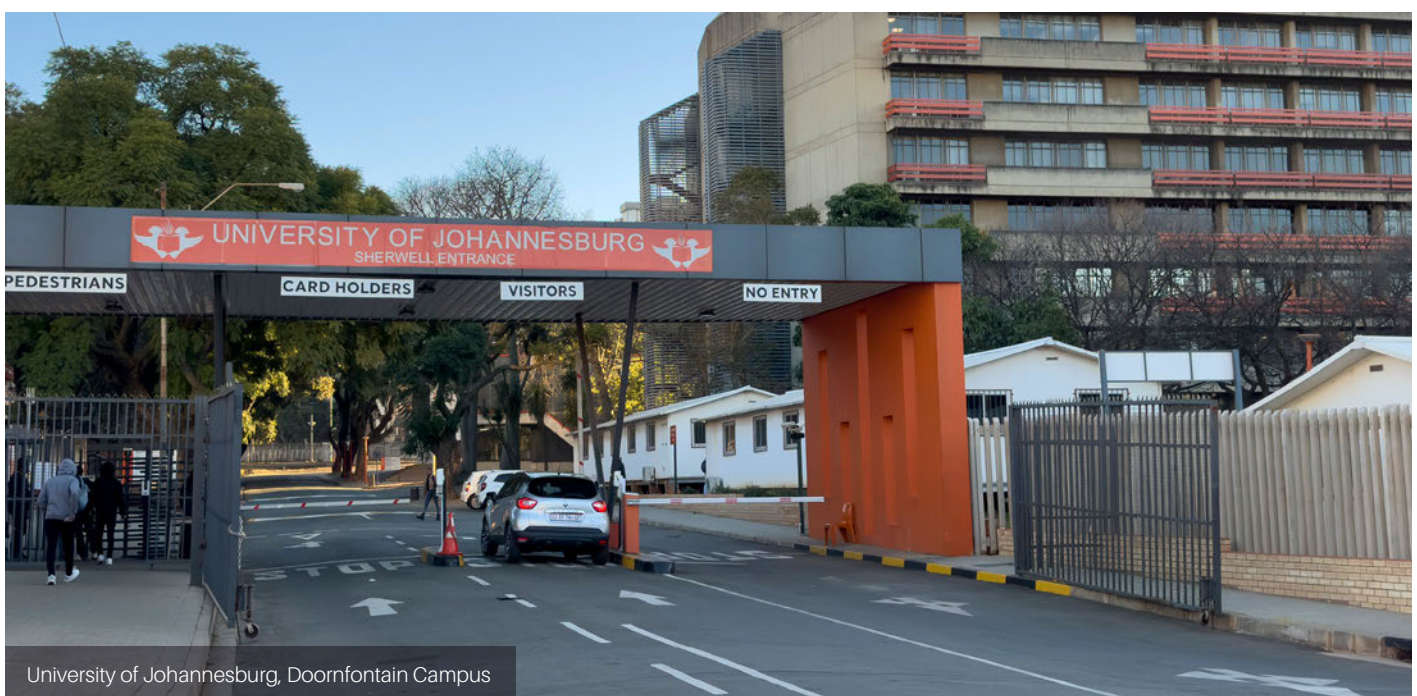
Overall, decolonising engineering education necessitates the adoption of contextually respectful and responsive practices, drawing from diverse knowledge resources.^[3]

Four themes underpin decolonising engineering education.

1. Addressing concerns about science's historical alignment with colonialism and its perceived suppression of indigenous knowledge within STEM disciplines.
2. Rectifying misconceptions about STEM's history and recognising its diverse origins.
3. Promoting ethical engineering education grounded in social justice and the concept of engineering as a public good.
4. Addressing ongoing colonial dependencies through innovation in engineering education for localised problem-solving.

Reference:

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University of Johannesburg, Doornfontain Campus



Built Environment



Makers Valley has many abandoned buildings that can be repurposed to meet the critical housing shortages. Can you think of ways to utilise these buildings to be safe, energy efficient and meet the needs of the community?

Overview

The built environment is a phrase used to describe the public spaces, healthcare facilities, schools, markets and shops that people need to have access to for a healthy and thriving society. As more and more of the world's population live in cities, the built environment should create spaces where people feel safe and secure. Public infrastructure can provide schools, as well as opportunities for people to convene and engage with income generating activities. Mixed-use spaces like Victoria Yards, which integrate cultural and commercial activities, are vital to community well-being.

Makers Valley was developed in the early industrial era which began in Johannesburg in the late 19th century, sparked by the discovery of gold in Witwatersrand. Many of the area's warehouses and factories date back to this period, with features of Victorian and Edwardian architecture. The 20th century saw the expansion of industry as well as development of formal neighbourhoods. Makers Valley is a residential area and industrial area, interspersed with parks, schools and amenities. The area is characterised by the presence of street art in the form of murals, which often have local historic, cultural and social themes. It has mosques, churches and temples as well as local primary and secondary schools and a day care creche nursery.

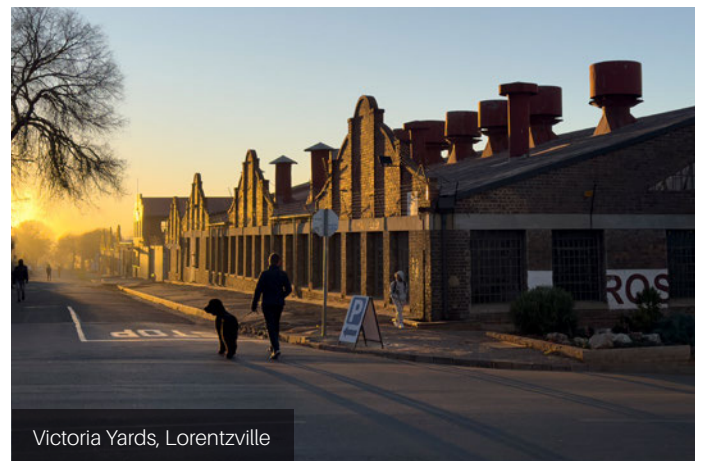
Homes built around this period were typically single-family dwellings, modestly sized apartment buildings and duplexes. Today, multiple families can live in single-family households with approximately 10 people in a two bedroom home and 25 people in a house designed for five. The houses are typically single to double story, of reinforced concrete and masonry construction with pitched roofs. Apartment blocks are generally of reinforced concrete frame structure with masonry panel infills. Homes in Makers Valley are generally built for summer weather and not well insulated, which can make the winter months difficult.

There are communal spaces between the sections of the building and many residential buildings feature a small garden or composting area. Often gardens are filled with informal housing structures, as a means for additional income and housing. There is a public park, Bezuidenhout Park, north east of Victoria Yards. The park has a football pitch which is used at the weekend for local matches and there is also a day centre for children. The Jukskei River runs through the park and the park is generally avoided at night.

Current Situation

Mixed-use spaces, such as Victoria Yards, where cultural and commercial activities are integrated are very important to the well being of a community. Some historic buildings have been repurposed and refurbished to be workshops, galleries and studios. Skills Village, a local training facility, makes use of disused shipping containers alongside masonry and concrete buildings and Gearhouse South Africa is made up of more modern construction materials such as reinforced concrete, steel and glass.

A by-product of redevelopment can be gentrification, where an area that has previously suffered from neglect becomes 'trendy'.^[1] This can encourage wealthier people to move into the area, contributing to a rise in cost of living, which can result in the eventual displacement of the existing community. In Makers Valley, there is an aim to mitigate the impacts of gentrification through creating employment opportunities, and one of these ways is by repurposing existing buildings into creative, design and work spaces.



Victoria Yards, Lorentzville

Security

Security systems, such as alarms and CCTV are in place on many buildings, however, some are not in use or are only maintained when the building is being advertised to new owners. Houses also tend to have high walls, fences and/or metal spikes. Violence, including murders, stabbings and muggings have occurred in various parts of Makers Valley, and people tend to avoid walking around the area late at night.

Hijacked buildings

Makers Valley attracts residents from different parts of the world, but there is a critical shortage of housing, which can push people into living in hijacked buildings. 'Hijacked' buildings are old buildings, abandoned by their owners or the city authorities and are home to families often paying rent to criminal gangs who run them. These buildings lack running water, legal electricity connections, proper waste disposal and adequate toilet facilities.

In September 2023, an apartment fire happened in Johannesburg's central business district, killing over 70 people. The apartment building was raided in 2019, when city officials arrested 140 foreign nationals who were illegally charging rent. Imtiaz Sooliman, founder of the Gift of the Givers Foundation noted that many people live in dangerous, cramped conditions and come from countries such as Somalia, Zimbabwe and Nigeria.^[2]

Makers Valley is also home to several such dwellings. These buildings are a fire risk, as extra rooms and partitions are built to house more occupants than the design allows for. People separate rooms by hanging sheets and curtains to get some privacy. Some people lock their belongings into a metal chest or cupboard which are at risk of theft. Sometimes complete strangers are forced to share a room, which impacts privacy and safety. Despite efforts by city authorities to address the issue, criminal syndicates exploit the situation. This further marginalises vulnerable residents as there is a general lack of safe,

regulated housing. Victoria Yards is an example of a previously illegally occupied building that has now been transformed into an innovative, impactful space.

Further Reading:

[Learn more about the housing crisis in inner-city Johannesburg, as well as what the city's hijacked buildings are like.](#)

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Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how the built environment interconnects with other challenges identified by the community.

- **Christinah Ngoy**, who works at Timbuktu in the Valley, an organisation that provides local youth a safe learning environment where they can develop skills and access academic support, discusses how infrastructure impacts life in Makers Valley.

Christinah Ngoy



- **Johanna Monama**, Makers Valley Partnership Uplift Manager, discusses the issues with abandoned buildings in Makers Valley.

Johanna Monama



- **Nqobile Shabalala**, an intern at Engineers Without Borders South Africa, highlights that developments such as Victoria Yards are a source of hope for Makers Valley.

Nqobile Shabalala



Suggested Starting Points

To help you get started, we've outlined some initial starting points. These are only suggestions, and you can come up with your own if you have identified another issue from the design brief or your own research.

Makers Valley has many buildings that have been abandoned. Can you think of ways to adapt existing buildings to create homes for an increasing population? The temperature in Makers Valley averages 24 degrees in the summer and 13 degrees in the winter, but can get below freezing at night. How can buildings be adapted for climate resilience?

Green spaces play an important part in making urban areas positive living and working



House in Bertrams

environments. Can you propose ideas that are inclusive of what's happening in Makers Valley to ensure green space is an integral part of its growth and future? How can we make green spaces feel safe and welcoming to everyone?

Due to the housing shortage many people live in high density homes, hostels suffer from over crowding and some live in non-regulated backyard rentals. Can you propose ideas for how these existing houses could be improved to increase the privacy, space and dignity of the people living in them?

Security can be a concern in Makers Valley. What measures can you think of that can improve safety within the built environment?

Remember

Consider the overall context of the social, environmental and economic factors in Makers Valley. This is part of our marking criteria and is key to the success of any engineering intervention you come up with. We recommend you read all the other Challenge Area pages and our guidance pages on getting started. You will need to conduct your own research beyond the information available here to show your depth of understanding. Additional information can be found in the pages about Makers Valley and online at:

www.engineering-for-people.org.



Frere Road, Lorentzville



Food



In South Africa, changes in land use, urbanisation, and the unpredictable impacts of climate change are straining local food production. As petrol prices increase, transport costs do too, which contribute to food price inflation. Urban farms are being embraced in Makers Valley as a means to improve food security. How can we ensure urban farming is more accessible to the community? What other measures can we take to enhance food security?

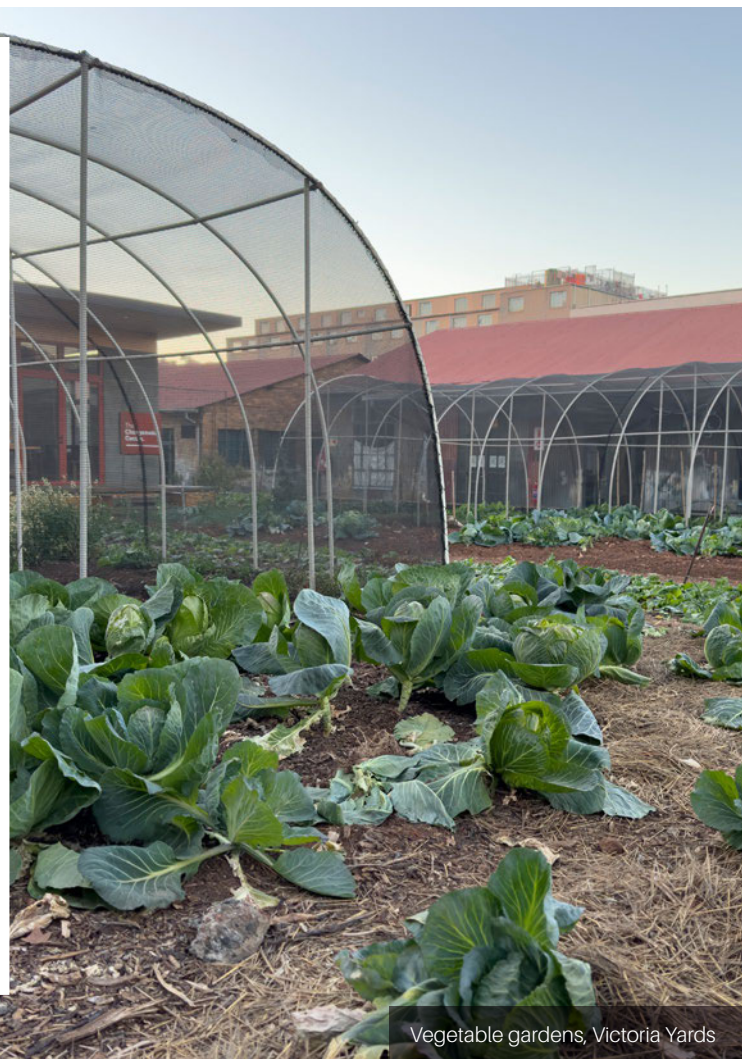
Overview

In Makers Valley maize (also known as 'pap') and spinach are food staples. When meat is eaten, parts such as intestines, chicken feet and gizzards are also often used. Meat takes centre stage in celebratory South African meals, with braaing (the local term for barbecue) being a common cooking method. Braai is not just a cooking technique but a cultural tradition that brings people together across all cultural backgrounds for social gatherings and celebrations. South African cuisine is also influenced by Cape Dutch and Cape Malay cooking styles, blending European dishes with spices, reflecting the country's history and cultural mix. Johannesburg is a multicultural city and is regarded as one of the world's top food destinations, offering local delicacies such as Sowetan kota sandwich, bunny chow and mala mogodu. However food security is a pressing, persistent issue.

Many residents encounter difficulties in obtaining nutritious, varied and affordable food. Families purchase food from supermarkets, street markets and informal sellers such as Spaza shops. Spaza shops are informal convenience stores, that are common in Makers Valley and across South Africa in general. The term 'spaza' is derived from the Zulu and Xhosa word "ispaza," meaning 'hidden' or 'secret'. These small-scale retail outlets are often operated from people's homes (particularly garages), shacks or small buildings and offer a range of basic goods and household items, including groceries, beverages, toiletries, and cooked food. Spaza shops are typically used for day to day items that may have been missed in the monthly shop. Some residents of Makers Valley have said that they avoid Spaza shops, citing that these shops are generally expensive, offer food with little nutritional value, and do not dispose of waste responsibly.

There are numerous challenges in Johannesburg's food systems, including distribution, access, and scarcity, particularly in lower income households. According to a National survey taken during the Covid-19 pandemic,^[1] when some 3 million people of the 60 million South African population experienced job losses;

- **10.2 million** people experienced hunger at least once or more a week
- **2.4 million** of the **10.2 million** experienced hunger daily
- **2.8 million** children of the **10.2 million** faced hunger at least once or more times a week
- while **600 000** children faced hunger daily



Vegetable gardens, Victoria Yards

Current Situation

Food security in Makers Valley is a challenge as the cost of living has increased substantially while wages have stagnated. In South Africa there has been a 74% increase in the average cost of the household food basket since 2018. Coping mechanisms to manage food needs include only purchasing essential items, eating less preferred foods, adhering strictly to a budget, and seeking assistance from friends or family, either in the form of food or financial support. This means households often compromise on the quality and variety of their diets. Starchy and sugary foods and beverages, alongside meat are more commonly consumed, while healthier options like fruits, vegetables (especially dark green leafy vegetables and those rich in vitamin A), and pulses are less frequently included in diets.

In Makers Valley, addressing food security is a collaborative effort that combines community-driven projects and support from non-governmental organisations. The Covid-19 pandemic saw increased proactiveness, solidarity and buy-in from the Makers Valley Partnership community as people lost their jobs during lockdown and food insecurity increased. Over 30 residents and stakeholders came together to formulate a plan, which had



Makers Valley's urban farms play a vital role in enhancing food security, promoting self-sufficiency, and strengthening community bonds

three aspects; food parcel distribution, soup and community kitchens, and a community swap shop. Makers Valley food initiative was started, and hot meals were served almost daily from the community yard. Community members contributed to cooking and delivering food to the sick and elderly.

The emergence of urban farms in Makers Valley is particularly noteworthy, as these initiatives repurpose urban spaces for agricultural activities. Spinach, carrots and spring onions are typically planted as they mature quickly. These farms serve as more than just a source of fresh produce; they are educational hubs that showcase sustainable farming methods and engage the local community in food production. Makers Valley's urban farms play a vital role in enhancing food security, promoting self-sufficiency, and strengthening community bonds.



Vegetables for sale on the sidewalk, Judith's Paarl

Urban farms face several challenges, with water shortage being a major obstacle. This is exacerbated by a lack of access to boreholes, and working around load shedding, which is a deliberate and controlled shut down of electricity supply. Farmers also contend with fierce competition from larger agricultural operations and the ongoing struggle to recruit and retain skilled people for farming duties.

Further reading:

[Read about Johannesburg's food system challenges, vision for the future and strategies to improve food security.](#)

[Learn more about the urban farmers of Johannesburg.](#)

[Compare the cost of staple food prices in South Africa from 2017 to 2024.](#)

Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how food interconnects with other challenges identified by the community.

- **Siyabonga Ndlangamandla** aids farmers, gardeners, and those keen on cultivating their own food in the Makers Valley community, fostering food security and utilising overlooked pavements and open spaces in the neighbourhood.

Siyabonga Ndlangamandla



- **Thando Bam Francis, Refloe Sibisi, and Sandra van Oostenbrugge** from the People's Pantry improve community food security by supporting local community kitchens to provide healthy food to community members in need.

Thando Bam Francis, Refloe Sibisi and Sandra van Oostenbrugge



- **Desiree Beukes**, a prominent community leader, discusses her work in helping tackle food insecurity in Makers Valley.

Desiree Beukes



Suggested Starting Points

In Makers Valley, urban farms aim to boost food security. However, due to limited water access, these farms mainly grow drought-resistant plants such as amaranth, lentils, kale, spinach, and spring onions. How can we expand the variety of crops grown in these urban farms?

Spaza shops provide convenience but often come with higher prices compared to larger commercial stores. This is mainly because transportation costs out of the area are steep and unpredictable. As a result, many residents resort to doing their major monthly shopping elsewhere but reluctantly rely on spaza shops for daily essentials. Additionally, spaza shops frequently offer prepared foods. Can you come up with ideas on how Spaza shops can diversify their offerings beyond prepared foods to include a wider range of groceries and fresh produce in a way that is also economically viable?

Remember

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Reference

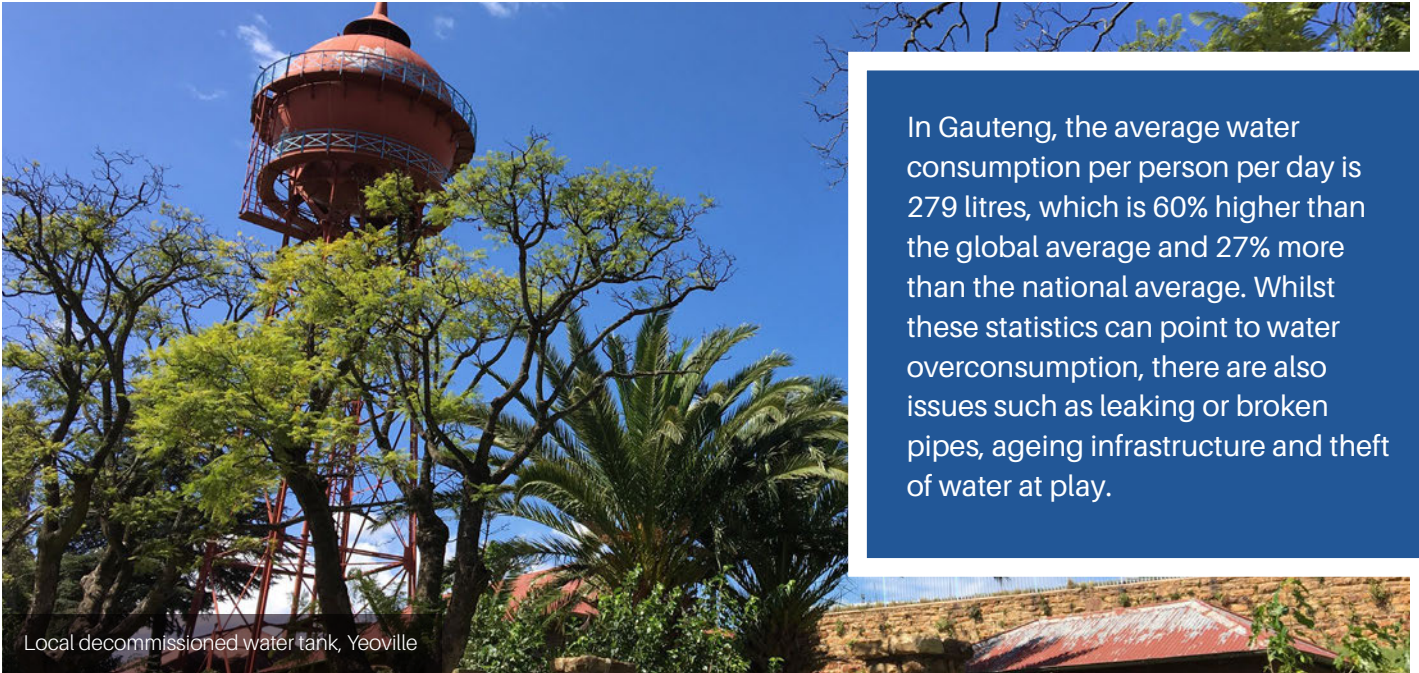
1. Cram Survey. (2019). Cram Survey Homepage. Available at: <https://cramsurvey.org/> (Accessed: 24 July 2024).



Water



Johannesburg is the largest city in the world that is not built near a natural body of water large enough to support its growth. It is also one of many cities facing deteriorating infrastructure, lack of maintenance, corruption and insufficient planning for population growth. Frequent water cuts are becoming the norm. What ideas can you suggest to improve the situation?



In Gauteng, the average water consumption per person per day is 279 litres, which is 60% higher than the global average and 27% more than the national average. Whilst these statistics can point to water overconsumption, there are also issues such as leaking or broken pipes, ageing infrastructure and theft of water at play.

Local decommissioned water tank, Yeoville

Overview

In Johannesburg, water distribution is based on a system that considers both population size and dam water levels. Rand Water, the primary supplier, purchases water from the Department of Water and Sanitation, mainly drawn from Vaal Dam. After it is piped from Vaal Dam, water is stored in reservoirs at the top of the hill in Yeoville. There are three reservoirs in Yeoville, with a storage capacity of 102 mega litres. These reservoirs supply many areas in Johannesburg, including Makers Valley. Variable speed pumps then distribute the water into the network supplying the residents and businesses of Makers Valley. The water quality is typically considered safe to drink, although microplastics have been detected.

The majority of the water for Johannesburg is transferred from neighbouring country Lesotho, but the climate crisis is now threatening the future of Lesotho's water supply impacting people in both regions. Johannesburg also faces significant water shortages, partly due to old infrastructure originally not built for the current population, leading to leaks and theft. About 45% of water is lost due to these issues, and the maintenance budget falls short of what's needed. These challenges have been mounting for an extended period, underscoring systemic deficiencies in infrastructure maintenance by the government.

Current Situation

Water scarcity and management of water resources is a persistent challenge in South Africa. Cape Town suffered from a water crisis which peaked in 2017-2018 and was driven by three consecutive years of below-average rainfall, leading to critically low dam levels. The City of Johannesburg has identified risks like flooding, rising temperatures, and changing rainfall patterns as exacerbating climate change issues. Fluctuating rainfall patterns can adversely impact agricultural production. The Cape Town crisis underscored the importance of sustainable water management and highlighted the vulnerability of cities to climate change impacts. Despite assertions of adequacy by authorities, the reality of water shortages in Johannesburg persists.

In Johannesburg water is distributed through a centralised pipe network to provide water to all taps in the area and is wholly reliant on pumps. Due to the reliance of the system on pumps, the water system is closely linked to the electricity distribution system which suffers from both scheduled (i.e. load shedding) and unscheduled power outages. The shutdown of water also exacerbates the deterioration of pipes due to the absence of water pressure to support them. The failure of systems and water cutoffs have left homes and businesses without water for up to three weeks.

Water is also expensive. Most households have a water meter or a prepaid water meter that measures the amount of water used and the cost associated. The first 25 litres per person per day is free, and then it's banded into segments for cost, with the price per litre increasing in higher water usage bands. People pay at the utility department or at local supermarkets such as Pick n Pay, or online. This is preferred as using the postal service to send bills is considered unreliable.

Water access can be affected by lack of payment. In such cases the municipal water company will shut off the connection to the house. Where a connection is shut off but physically exposed, people will occasionally tap the connection illegally to gain water access. Others might arrange to use a neighbour's water connection and fill up storage containers which they then store for use. Sometimes water is sold by vendors who fill up small containers that are transported using a wheelbarrow.

Boreholes also play a role in the city's water strategy, alongside initiatives like surface water and rainwater harvesting. Some residents choose to install boreholes on their properties, however, these cost around R120 000 (approximately £5,245 GBP or \$6,647 USD), with no guarantees of getting to the ground water table, which can limit their use to more affluent areas, contributing to inequalities.

Another possible solution to Johannesburg's water shortage is the Jukskei River, one of the largest rivers in the city. At present the Jukskei River suffers severe sewage pollution with high levels of raw sewage and E. coli. This is primarily due to ageing infrastructure, a backlog of maintenance, and local dumping. The city's Environment and Infrastructure Office suggests that cleaning up the river and its catchments could potentially supply water to approximately one-quarter of the households in Gauteng Province, which includes Johannesburg and Pretoria.

Further reading:

[Learn more about Johannesburg's Jukskei River, and how the river could help ease the city's water shortages](#)

[Water Can, environmental organisation working to preserve and protect South Africa's water resources share their thoughts on the the impact, cause and possible solutions for the Johannesburg water crisis](#)

[Read about household water-use behaviour in the city of Johannesburg, South Africa](#)

[Learn about how water shortages in Johannesburg impact residents](#)

Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how water interconnects with other challenges identified by the community.

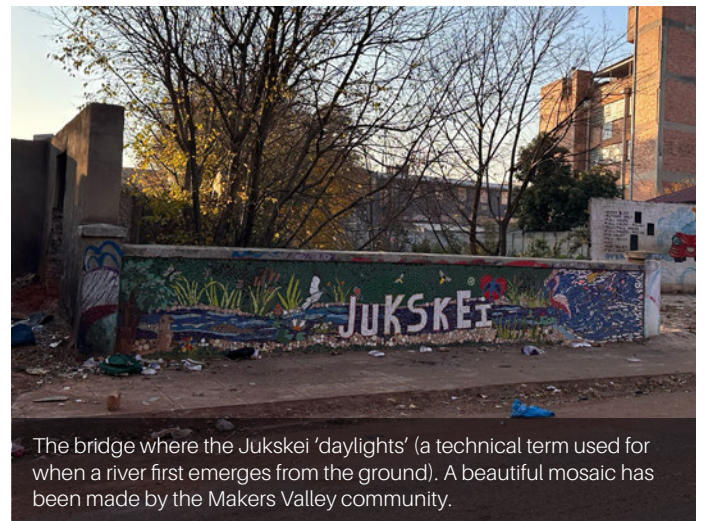
- **Romy Stander**, from Water for the Future, a non-profit organisation working to clean the Jukskei River at its source. This includes ongoing efforts to clear invasive plant species, bolster the river's green corridor and gather scientific data on the river, including its flow rate.

Romy Stander



- **Stefan Neubig and James Mason** from Sonnenglas, an innovative company known for their solar powered lanterns, utilise the borehole located at Victoria Yards during times of water shortages.

Stefan Neubig and James Mason



The bridge where the Jukskei 'daylights' (a technical term used for when a river first emerges from the ground). A beautiful mosaic has been made by the Makers Valley community.

Suggested Starting Points

Climate change and growing demand due to an increase in population contribute to the scarcity of water resources. Do you have any ideas to help water be used more effectively to reduce consumption?

The water distribution system is dependent on pumps, making it vulnerable to disruptions during load shedding and power outages. Additionally, the prevalence of leaking or damaged pipes, coupled with ageing infrastructure, leads to water wastage. Can you suggest solutions to improve the water distribution infrastructure and guarantee a reliable water supply for communities?

When a water connection is physically exposed, people tap it illegally to gain water access. Can you propose a solution to prevent water connections from being tapped illegally?

Can you think of ways that the Jukskei River may help mitigate water shortages in Johannesburg?

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Lack of maintenance, corruption and insufficient planning for population growth, and water shortages are ongoing issues in Johannesburg

Water drainage during heavy rainfall, Judith's Paarl



Transport



Transportation plays a crucial role in alleviating poverty, promoting economic growth and providing access to essential services like healthcare and education. Commuters, often limited by affordability and availability, have few transport options. Can you think of ways to improve Makers Valley's transport system, which makes commuting safe and affordable for the community, including women and children?

Overview

Johannesburg is a big, sprawling city with a transport system that is not always reliable and does not yet effectively connect to all the key areas of the city.

To connect with other parts of the city for work, study, or accessing other amenities, people make use of minibuses and public buses. Public bus networks commonly used by commuters in Johannesburg include the Metro Bus and Rea Vaya (meaning 'we are going'), both of which have been in operation for over 18 years. Car ownership is uncommon due to the high costs associated with purchasing and maintaining vehicles. Local car dealerships offer both new and used cars for sale. The affordability of minibus taxis has also decreased in recent years due to a significant rise in price. E-hailing services have become more affordable in recent years. They also offer provision for transport at night when minibus taxis are not operational.

Johannesburg has two rail networks: the MetroRail and the Gautrain. MetroRail operates in major urban areas in South Africa and has a larger network across the city, but many of the lines are no longer in use. It also faces challenges of ageing infrastructure compared to the Gautrain, which is newer and fully opened in 2012. The Gautrain connects with Johannesburg's international airport but is considered an unaffordable option for many South Africans. The nearest station to Makers Valley is Johannesburg Park Station, where the MetroRail and Gautrain routes also meet.



Within Makers Valley, people generally travel by foot, cycle, using motorcycles and mopeds, hiring taxis, e-hailing services (such as Uber Go and Bolt) or by car.



Current Situation

In Makers Valley, the streets are generally wide. They often feature a pedestrian walkway and trees on either side of the tarmac road. Traffic lights (or 'robots' as they are known) are common at major junctions. Mini-buses are used to pick up children to and from school. Makers Valley residents often run these businesses alongside one or two others, such as owning a shop or working another job. There is a strong support network between these independent business owners. They are also among the few public transport options that offer flexible payment plans, including negotiated late payments for customers, particularly for the parents of schoolchildren.

Safety

Safety is a concern for pedestrians in Makers Valley. While risks persist both day and night — with instances of daytime muggings occurring in quieter areas — women face a heightened sense of vulnerability, especially after dark. Some women express discomfort walking alone, preferring the presence of a male companion for added security. The occurrence of load shedding can exacerbate safety concerns as street lights are not operational.

While cycling is popular in Makers Valley, the cycling infrastructure is inadequate. Few cycle lanes exist, and their usage is often disregarded, with vehicles frequently parked in them. Additionally, cyclists face risks from reckless driving by some minibus taxis and motorists. Competition among various taxi associations further contributes to safety concerns, with incidents of fear, intimidation, aggression, and violence. The privately owned taxi system also lacks government regulation, operates on a cash basis, and lacks a reliable reporting mechanism, leaving customers vulnerable to risk.

Accessibility

Pavements have ramps and drop kerbs but often the pavement surface is uneven, making pedestrian walkways hazardous for those with limited mobility, blindness or deafness and a challenge for parents pushing prams. Accessibility issues are not commonly discussed within Makers Valley, due to the stigma associated with disability and often this means that those with accessibility issues can become stuck in their own homes.

Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how transport interconnects with other challenges identified by the community.

- **Stefan Neubig and James Mason**, from Sonnenglas, discuss how transport impacts their business.

Stefan Neubig and James Mason



- **Christinah Ngoy**, from Timbuktu in the Valley, highlights safety concerns with regards to taxi services.

Christinah Ngoy



- **Desiree Beukes**, a prominent community leader, talks about the issues with roads in Makers Valley.

Desiree Beukes



Minibus Taxi, Bertrams

Suggested Starting Points

Makers Valley residents often walk or cycle, not just as a form of transportation, but also for the associated health benefits. Can you think of a way to make this safer for the residents?

Having fewer cars and taxis on the road is good for air quality, but public transport such as trains and buses can be unreliable. How can the reliability of these modes of transport be improved?

Can you think of a way to regulate an unregulated taxi system? Is there a way to develop safer pickup and drop off points for taxis? Consider if an app to track taxi routes is feasible? How can taxi fares be calculated efficiently?

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Energy



In Makers Valley, the provision of electricity is not always reliable, and residents often find it challenging to afford expensive energy bills, leading them to resort to less safe alternatives. Are there any solutions that can address the need for affordable yet safe energy options? The community is also significantly affected by the frequency of load shedding. Can you suggest ideas to mitigate the impact of load shedding on residents?



Fires are used as a source of heating in Bertrams

Overview

In Makers Valley, energy is essential for everyday tasks like cooking, lighting, heating, and using appliances such as washing machines, fridges, and TVs. It's also crucial for driving the area's industries and economy. Prior to 1990, less than a third of the South African population had access to electricity. It has risen from 58% in 1996, to over 90% access today. Currently, Johannesburg relies heavily on coal-based energy from Eskom, supplying 94% of its needs. However, Eskom's limited capacity has led to scheduled power cuts, called load shedding, which impacts the city's social and economic life.

Renewable Energy Target: South Africa aims for 41% renewable energy by 2030, but current projections suggest it will only reach 20%.

Coal Dependence: Coal currently dominates with over 80% of electricity generation. Most fossil fuel power stations are in their mid- to end-of-life phases, with a designed lifespan of 50 years.

Emissions Goals: South Africa targets a 10-25% reduction in greenhouse gas emissions by 2030, hindered by coal reliance.

Load Shedding

Makers Valley has seen an increase in load shedding; a controlled and deliberate shutdown of electricity supply to prevent a total collapse of the power system. Load shedding disrupts access to essential services such as healthcare and education as well as daily life, and particularly for those who cannot afford backup power supplies. For example, when the power goes out, fridges stop working, causing food to spoil. Load shedding occurs in various stages. During Stage 1, one may experience up to 2 hours without electricity per day, while Stage 6 can result in as much as 10-12 hours without power daily. The practice also disrupts businesses, particularly small and medium-sized enterprises (SMEs), which often lack backup power sources, leading to financial losses and job insecurity.

Current Situation

An Integrated Resource Plan, introduced in 2019, aims to diversify the energy sources by 2030 while ensuring a fair transition from an economic and social standpoint. One of the main challenges in diversifying the energy mix is maintaining affordability. A survey by the Department of Energy found that three-quarters of South Africans prioritise keeping electricity prices low in government energy policies, with economic factors taking precedence. When asked about the future energy mix, nearly a third of respondents indicated that the cheapest source is preferred, while a quarter expressed support for renewable energy.^[1]

The majority of households have an electricity connection to the national grid and have enough electricity to meet their needs on a daily basis. Households typically pre-pay for electricity using

a prepaid metering service. Free Basic Electricity (FBE) was introduced across South Africa in 2003 so that the first 50kWh consumed each month in low-income households is free. However studies indicate that this is insufficient, and at least the first 200kWh per household per month should be provided for free to meet basic household needs. The electricity distribution system also suffers from load shedding, lack of maintenance and illegal connections which all impact on the reliability of electricity supplied to consumers.

Some businesses like Victoria Yards have installed solar photovoltaic (PV) systems, though residential properties with off-grid electricity generation systems are uncommon.

Residents could tap into the gas network run by Egoli Gas, with Johannesburg sourcing its natural gas from Mozambique. However, as of January 2024 Egoli Gas has stopped supplying gas to Johannesburg's eastern suburbs. For cooking, Makers Valley residents now rely on Liquid Petroleum Gas (LPG) from portable canisters. Small companies have set up businesses collecting and delivering bottles and cylinders. These are also available at local petrol stations and hardware stores.

Certain homes have electric hot water heaters (geysers) to supply hot water, but many shacks or informal dwellings lack this amenity. Landlords

often include water and electricity in the rent at a fixed rate, sometimes omitting geysers to cut costs, leading to shorter cold showers. To cope, some individuals buy electric water heating elements and warm water in storage containers.

Elsewhere in Johannesburg, some households have received subsidised solar water heaters through a government initiative facilitated by City Power. As energy costs are high, some forgo certain appliances or resort to less safe alternatives, like using paraffin heaters or open fires. Paraffin, occasionally used for heating, is sold in bottles.

Many people in Makers Valley live in informal dwellings such as shacks or in 'hijacked' buildings (see Built Environment for more information). These dwellings can lack basic amenities such as running water, toilets and/or legal electricity connections. Without a reliable electricity supply, residents use fire for warmth and lighting within the congested building. Residents often partition rooms into smaller spaces using flammable materials like cardboard and sheets as makeshift dividers, while loose electric cables hang from the ceiling. Paraffin stoves are typically used for cooking, and during the colder winter months between May to August, residents frequently light fires in large metal drums, fueled by wood and scavenged items. Candles, which are commonly used for lighting, together with illegal electricity connections pose significant fire hazards in the overcrowded dwellings.



Damaged traffic light due to cable theft which can cause widespread disruption, Bertrams

Further reading:

[Explore the root causes of load shedding and associated impacts](#)

[Read about the impact of load shedding on crime in Gauteng](#)

[Learn about the impact of load shedding on education systems in South Africa](#)

[South Africa's renewable energy capacity, targets and expected results](#)

Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how energy interconnects with other challenges identified by the community.

- **Thando Bam Francis, Refiloe Sibisi and Sandra van Oostenbrugge** from The People's Pantry discuss the impact of energy security on food storage.

Thando Bam Francis, Refiloe Sibisi and Sandra van Oostenbrugge



- **Stefan Neubig and James Mason** from Sonnenglas discuss the renewable energy initiatives in their business.

Stefan Neubig and James Mason



Suggested Starting Points

Electricity is a major household expense for people living in Makers Valley. Furthermore, load shedding is increasingly prevalent in Johannesburg. Can you think of ways to reduce electricity cost, such as energy efficient appliances?

While places like Victoria Yards have solar panels, others think installing solar panels comes with a risk of theft. In what ways can these issues be addressed?

In 'hijacked' buildings, improper electricity connections can present fire hazards. Can you propose safer, energy efficient solutions?

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Reference

1. International Energy Agency, 2024. South Africa. International Energy Agency. Available at: <https://www.iea.org/countries/south-africa> [Accessed 24 July 2024].



Digital



Mobile phones are widely used in Makers Valley, but there is a lack of access to computers and laptops, as well as digital skills. We are at a point in time where digital technology influences nearly every part of our world, and it has become increasingly important that people have an understanding of its significance and advantages, alongside its limitations. Can you come up with any ideas to improve digital access and skills in Makers Valley?

Overview

Digital technologies enhance communication and information sharing for educational, social, economic, and political purposes. They come in various forms, such as radios, televisions, computers, internet networks, mobile devices, data loggers, sensors, and both small and big data.

Global trends indicate that these technologies will significantly impact daily life in Makers Valley. Self-directed learning through digital platforms is likely to grow, possibly challenging traditional education. However, concerns about increased social isolation due to less face-to-face interaction persist. Despite this, digital technologies continue to offer global solutions across various sectors.



Co working space at Makers Valley Partnership



In early 2024, South Africa had **45.34 million internet users**, with **internet use reaching 74.7%**



As of January 2024, South Africa had **26.00 million social media users**, representing **42.8 % of the country's total population**.



South Africa had a total of **118.6 million active cellular mobile connections** in early 2024, equivalent to **195.4% of the total population**.



In January 2024, **57.3%** of South Africa's overall internet users were **active on at least one social media platform**.



Podcast Studio at Makers Valley Partnership

Current Situation

In Makers Valley, mobile phone ownership is high and the network coverage is good, with 4G available on most of the networks. Use of mobile phones typically starts at the age of twelve to thirteen. Some residents own two phones, an inexpensive phone to use outside the home, and a smart phone kept at home, in case of theft. Android smartphones are commonly used in Makers Valley.

Laptop ownership is much less common as laptops are unaffordable for most residents. However there are spaces within Makers Valley where laptops and computers can be accessed. Local internet cafes charge R5 - R15 (R15 is approximately £0.66 GBP or \$0.83 USD) an hour for internet access. Computers are available at the Makers Valley Studio, where residents can also be shown how to connect to the internet. The devices used at the co-working space have largely been donated. Computer classes are also run on Mondays at Makers Valley Studios.

The closest public library to Makers Valley is in Yeoville. While this library does not have computers at present, they do have a computerised literacy programme, Media Works, for people who need to learn how to read and write. Library Aid Africa, a not-for-profit organisation, has called for libraries to be digitalised post Covid-19 Pandemic, to offer ICT facilities, internet access as well as online library services.

Digital Divide

There is a digital divide in Makers Valley, and South Africa at large. The digital divide refers to the gap between people who have access to and know-how in technology and those who don't. The COVID-19 pandemic highlighted the severe digital gap in South Africa, where children had to stay home from school and adults from work. While wealthier schools could switch to online teaching, many communities struggled. In Makers Valley, digital technology is not sufficiently incorporated into school curriculums, a primary reason being a lack of digital resources, such as computers and laptops.

Jobs and educational programmes are becoming increasingly digital, a trend accelerated by COVID-19. It's key to ensure everyone not only has access to technology but also gets training in digital skills to participate in the changing economy. Mobile phones play a crucial role in bridging the digital gap, with many people accessing the internet through smartphones. Government initiatives aim to improve broadband infrastructure and affordability, but digital literacy remains a challenge, particularly among older adults and those with limited education.

Further Reading:

[Data, insights, and trends for how people in South Africa use digital devices and services in 2024](#)

Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how digital knowledge and access interconnects with other challenges identified by the community.

- **Chidi Maponya and Innocent Jiyane**, from Makers Valley Partnership, run a free of charge digital literacy programme class tailored to the members of the community. Read their case study to understand some of the digital challenges they face in their roles.

Chidi Maponya and Innocent Jiyane



- **Christinah Ngoy**, from Timbuktu in the Valley, discusses the technological barriers at play in Makers Valley.

Christinah Ngoy



Suggested Starting Points

The taxi systems in Makers Valley generally only accept cash payments, and there is no system for user feedback. Can a digital system help to do this in an effective and cost-efficient manner?

Makers Valley is increasingly host to events and new businesses bringing in people from all over Johannesburg. Can digital technologies help to improve the relationship between the local community and the changes happening in Makers Valley so that the local community are integrated into the change?

Personal safety and security are issues in Makers Valley. Is there a way digital solutions can reduce this risk for residents and visitors alike?

The next generation are key to Makers Valley's aim of ensuring that the existing community is part of the economic regeneration that is happening. Can you propose ways in which digital technology could engage local youth and children in the change and the maker's movement in Makers Valley?

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Waste



In Makers Valley, residents and industries generate a range of waste, from food, plastics, chemicals, and metals to green waste, which is often improperly disposed of. All of these waste streams have the potential to damage the local environment, contribute to unsightliness and cause health issues if not properly managed. Are there any suggestions for managing this waste in a safe and sustainable manner?



Street sweepers periodically clean streets, but bagged rubbish may sit for days, posing hazards when torn open by rats or stray dogs

Illegal waste dumping, Lorentzville

Overview

There is limited landfill space available in Johannesburg, and it is rapidly reaching capacity, reflecting the population increase in the city. It is estimated that it will take less than eight years for the landfills to reach capacity.

The city's largest waste management service, Pikitup, collects some 6,000 tonnes of waste from residential and commercial areas. Almost 70% of Johannesburg's informal settlements receive waste management services but illegal waste dumping is a persistent problem.

Pikitup aims to reduce landfill waste by at least 33% through schemes such as Separation at Source, where residents are encouraged to separate their waste and recycle.

Current Situation

In Makers Valley, each household receives one black bin collected weekly by Pikitup. Residents typically place their waste in plastic bin bags in the morning. Informal recyclers sift through waste in the streets and bins before Pikitup collection, seeking valuable items like plastic, paper, cans, and glass to sell to buy-back centres. This job is hazardous due to sharp or dangerous items such as broken glass, metal scraps

and wire scraps in bins. Metal waste stores attract thieves due to perceived value. Pikitup, with over 4,500 employees, is Johannesburg's official waste management provider. In May 2024, temporary Pikitup workers staged a two-week strike for fair wages and permanent employment, resulting in uncollected refuse citywide, including in Makers Valley.

According to the City of Johannesburg, the percentage of households without waste removal services increases annually by 4.47%. Reasons for households not having access to Pikitup's waste removal services include settlements not easily accessible for Pikitup trucks, illegally occupied homes not given bins and some households producing more than one black bin of waste, typically due to overcrowding. This leads to illegal dumping or burning of waste. Illegal waste dumping remains a significant issue in Makers Valley, resulting in an unpleasant environment marked by the smell and sight of rotting waste. 'Hotspots' for illegal dumping include street corners, public spaces, and areas near informal settlements. Waste from households and construction sites contributes to these sites, creating large mounds of waste.

Poor waste management can lead to public health and environmental issues. Waste blocks stormwater drainage systems, leading to flooding, and can impact water quality, such as through surface water contamination. Waste dumping also provides

ideal conditions for pest infestation, as it offers abundant food sources, breeding grounds, and shelter for pests such as rats, cockroaches, and flies.

Waste management problems have not gone unnoticed in the Makers Valley community, and several initiatives are now in place. Love Our City Klean (LOCK), is a creative start-up aimed at educating the community about recycling and the concept of 'separation at source'. People can get points for recyclables, which can then be used in the community Swap Shop for essentials such as food, clothes, and toiletries. LOCK then sells these to a buy-back centre, where the products are sold to paper mills and glass manufacturers, for closed-loop recycling. LOCK eventually aims to develop products made from recycled materials themselves. There are currently no e-waste recycling facilities in Makers Valley. There are some informal waste pickers who collect and may recondition e-waste depending on the value.

Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how waste with other challenges identified by the community.

- **Zweli and Metsi Magwaza** from Love Our City Klean discuss their work on diverting waste away from landfills through effective recycling and repurposing efforts.

Zweli and Metsi Magwaza



- **Thando Bam Francis, Refiloe Sibisi, and Sandra van Oostenbrugge** from The People's Pantry talk about how they use their soup kitchen to minimise food waste in Makers Valley.

Thando Bam Francis, Refiloe Sibisi and Sandra van Oostenbrugge



- **Hector Dibakoane**, from Makers Valley Partnership, which are based in Victoria Yards, highlights waste management challenges in Makers Valley.

Hector Dibakoane



- **Matshepiso Makhabane**, CEO of The Green Business College, discusses how food preservation can reduce waste and tackle food insecurity.

Matshepiso Makhabane



Suggested Starting Points

The health and environmental impacts of improper waste management are not always apparent. In what ways can waste be managed in Makers Valley with community buy in?

Makers Valley is a creative hub and the community has recycling initiatives in place. Can you think of ways that the recyclables can be transformed into new products by the community, which can close the loop and generate income?

Even if items of potential value are sorted from the waste, there is still residual waste which ends up in landfill. Can you propose any ideas for treating this residual waste so that the impacts are reduced?

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Sorting recyclables, Love Our City Klean



Sanitation



As the population grows and living conditions become more crowded, the ageing infrastructure in Makers Valley is struggling to cope with sanitation demands. Localised flooding and contamination of the Jukskei River are also challenges. With the climate emergency impacting the frequency of intense storms, the situation is poised to deteriorate further. Do you have any suggestions for addressing these issues and improving the current situation?

Overview

In Makers Valley, both households and businesses are typically connected to a combined sewer, which also handles street water run-off. However, sanitation issues arise during wastewater conveyance to treatment facilities due to ageing infrastructure and inadequate maintenance. This leads to pipe breakages and contamination of the Jukskei River and its surroundings. Storms exacerbate these problems by overwhelming the system with stormwater, further polluting the river. These factors contribute to the Jukskei's contamination and odour, posing health risks to residents.

Current Situation

Dealing with the sewer system discharge into the Jukskei River is a key part of minimising health risks; cholera-causing bacteria are occasionally detected in the river and have caused local outbreaks.

In 2023, there were two cholera outbreaks in the Gauteng province, resulting in 29 fatalities. Cholera, a bacterial illness transmitted primarily through contaminated water, manifests in severe diarrhoea and dehydration.

Cholera incidents are linked not only to regional sanitation issues but also to climatic variables such as floods that have recently impacted parts of southern Africa.

The Driefontein Wastewater Treatment Works (WWTW), is among the six wastewater treatment facilities tasked with purifying water for potable use for residents of the City of Johannesburg. While Driefontein achieves a 97% compliance rate according to internal standards, others managed by Johannesburg Water fall short. Ennerdale and Olifantsfontein meet standards in two out of three categories, Bushkoppies and Northern Works in one, and Goudkoppies, serving the city centre, has 59% compliance with standards. Reasons

cited for these issues include vandalism, theft of infrastructure, lack of investment, and manipulation of procurement systems.

Most households in Makers Valley have a seated toilet with a flush. Often, multiple households living in the same dwelling will utilise a single toilet to serve 15 to 20 people. Some households that have had their water connection cut off have experienced sewage blockages due to lack of water for flushing. Residents living in illegally occupied buildings that have no running water or toilets use buckets, which are emptied onto the streets, leading to sewage ending up in the Jukskei River. Menstrual hygiene is usually managed by flushing items down the toilet or putting waste in bags to throw out with the general waste.

While there are public toilets within Makers Valley, they are generally locked for use, due to reasons such as maintenance cost, vandalism, and to prevent homeless people sleeping in them. A lack of public toilets restricts people, particularly women from travelling into town for long periods of time. Limited pee-pods (free standing public urinals) for men are available in Makers Valley, but public urination, despite it being a crime still exists. Urination on trees, grassed areas, electricity boxes and walls leads to unpleasant odours and sights around Makers Valley. Many businesses in Makers Valley also do not have toilet provisions, which poses further barriers.

Stormwater in Makers Valley is managed through an existing stormwater network with water travelling into the drainage system by passing through openings under the road kerbs (curbs). However, the system breaches its capacity during intense storms which have increased in intensity and frequency in recent years. When the system breaches it causes flooding in homes and businesses, particularly in low-lying parts of Makers Valley. Businesses in Victoria Yards use sandbags to protect themselves from the floodwater.

The Jukskei River starts under the Ellis Park Stadium, at the western end of Makers Valley. Illegal dumping of waste into the river is an issue. Tonnes of waste such as plastic, metal, rubber and raw sewage flow down the river annually. This waste contributes to the contamination and unsightliness, whilst also increasing the likelihood of flooding during a storm taking contaminated water into people's homes and businesses in the surrounding area.

Further reading:

[Learn about how Johannesburg's wastewater treatment works and the process of keeping the city's drinking water safe](#)

[Read about the Jukskei River course, history, and the rivers connection with Johannesburg's sewerage and storm water drainage](#)

Relevant Case Studies

Take a look at the following case studies for more information and ideas. As you explore this area and the perspectives from the case studies, consider how sanitation interconnects with other challenges identified by the community.

- **Romy Stander**, from Water for the Future, a citizen-led non profit organisation that focuses on rehabilitation of the upper Jukskei River through community participation, nature based solutions and green economy focused enterprise.

Romy Stander



- **Zweli and Metsi Magwaza** from Love Our City Klean, discuss the challenges with public services in Makers Valley and their work in keeping the area clean.

Zweli and Metsi Magwaza



Suggested Starting Points

In Makers Valley some do not have connection to piped running water or toilets, which means people resort to using buckets. Can you think of alternative sanitation facilities which are safe, and easy to access?

The disposal and treatment of human waste across the area is a health risk to the residents of Makers Valley and is damaging the local environment. Can you propose a solution that would improve the management of human waste?

Flooding in Makers Valley is exacerbated by both intense storms and the area's geographical features. The ageing infrastructure further compounds the issue by causing the displacement of waste and sewage during flood events. What solutions can you propose to mitigate the risk of flooding or reduce the impact of surface water during these occurrences?

Remember

Consider the overall context of the social, environmental and economic factors in Makers Valley. This is part of our marking criteria and is key to the success of any engineering intervention you come up with. We recommend you read all the other Challenge Area pages and our guidance pages on getting started. You will need to conduct your own research beyond the information available here to show your depth of understanding. Additional information can be found in the pages about Makers Valley and online at:

www.engineering-for-people.org.



Overflowing sewerage, Lorentzville

Case studies



**Chidi Maponya
and Innocent Jiyane**
Makers Valley Social
Employment Fund



Nqobile Shabalala
Engineers Without
Borders South Africa



Christinah Ngoy
Timbuktu in
the Valley



Romy Stander
Water for the Future



Desiree Beukes
Community member



**Siyabonga
Ndlangamandla**
Community member



Hector Dibakoane
Makers Valley
Partnership



**Stefan Neubig and
James Mason**
Sonnenglas



Johanna Monama
Makers Valley
Partnership



**Thando Bam Francis,
Refloe Sibisi, and Sandra
van Oostenbrugge**
The People's Pantry



Matshepiso Makhabane
Green Business College



**Zweli and Metsi
Magwaza**
Love our City Klean



Case studies

These case studies feature a diverse range of people, businesses and experts on life in Makers Valley, interviewed in May 2024. The case studies set out a perspective from people living and/or working in Makers Valley and highlight the unique challenges and opportunities for improvement. People have given their time and perspectives to help form this design brief, enhance your educational experience and share challenges faced in day-to-day life.

Do not contact community members or project stakeholders in Makers Valley. Those who have contributed directly to the brief have chosen to do so and have agreed to respond to questions you may have through the forum on the online portal only.

Each case study gives you an idea of other issues you could address as well as additional information on the main challenge areas. As part of understanding the context, it is important to review

the case studies and integrate these perspectives into the decisions you make and how you develop your ideas or build on existing initiatives.

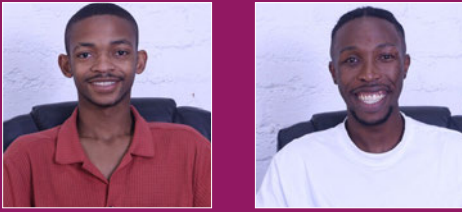
In your business plans, detail how you would collaborate with various people, or other stakeholders within the Makers Valley area if you were doing this in practice. This is an educational exercise, and it is not appropriate to enable a participatory or inclusive design process for each student project as this would mismanage expectations and be a very timely exercise for those living in Makers Valley. Please do explicitly detail how you might approach this process if you were working for an engineering company (NGO or commercial) that was working directly with people in Makers Valley.

Case studies are listed alphabetically. Each case study has an accompanying video linked. The case study videos can also be found linked in the Interactive Map of Makers Valley.

Additional information is available at www.engineering-for-people.org.



Victoria Yards, Lorentzville



Chidi Maponya and Innocent Jiyane
Makers Valley Social Employment Fund

About

Innocent Jiyane, a program administrator for Makers Valley Partnership, oversees the SEF (Social Employment Fund), a government project aimed at employing members of the community, designed to tackle unemployment through the unique concept of social employment. The SEF participants work to maintain the community's health, cleanliness, and environmental sustainability. Chidi Maponya, as an operations coordinator, focuses on ensuring the smooth functioning of day-to-day activities.

In their roles, both Chidi and Innocent experience a range of challenges and deal with various people and situations, requiring strong managerial skills to address complaints and resolve issues. They find fulfilment in their work, particularly when they're able to employ individuals within the community, providing opportunities for them to contribute to keeping their surroundings clean and improving their living conditions.

In their engagement with Makers Valley Partnership (MVP), they implement programs aimed at empowering community members. Chidi oversees a free digital literacy program tailored for community members, where individuals sign up to learn basic computer skills.

SEF aims to empower civil society organisations by enabling them to address issues in health, education, nutrition, gender-based violence and food security. MVP is one of the organisations benefiting from SEF, providing temporary work opportunities that contribute to the well-being and sustainability of the community.

Issues and Ideas

Challenges within the Makers Valley community include a lack of utilities. For example, access to the internet is limited and not available to everyone. Free internet access is only available from 9am to 4pm, leaving individuals disconnected from the online world outside of those hours. Chidi expresses a desire for greater access to internet and communication services for all community members.

Despite efforts by Maker's Valley to address crime through community involvement, safety concerns persist. This fear sometimes leads people to hesitate carrying necessary devices, like phones, which they rely on but fear could make them targets for theft. As a relatively small organisation, they face challenges in providing access to items like computers and cell phones to the community for free. What measures can be taken to ensure better access to the internet and computers in Makers Valley?

Watch Chidi and Innocent talk about their day to day experience in Makers Valley.



Sharpen your problem solving skills because that's what we need right now. Problem solving skills for a better economy, lifestyle and wellbeing.



Christinah Ngoy

Timbuktu in
the Valley

About

Christinah Ngoy is a 26-year-old resident of Makers Valley, and works at Timbuktu in the Valley, an organisation dedicated to providing a safe space for children to engage in skill-building activities. While there are occasional community activities, much of her time is dedicated to working with younger individuals, prioritising their safety and well-being.

Issues & Ideas

Christinah reflects that there's limited freedom for children to go out and play as she used to when she was in high school. With limited internet access at home, staying indoors used to seem less appealing. They'd spend their time seeking out social interactions, playing games, and enjoying each other's company. However, she notes times have now changed. The sense of freedom is overshadowed by the safety concerns. Christinah vividly recalls a recent traumatic event when three individuals shot at an Uber delivery driver just across the street from the church she attends.

Christinah finds herself discussing a recurring issue: pollution and illegal dumping. Increasing dump sites have become one of the community's biggest

challenges. She desires for children to fully be able to enjoy the parks in Makers Valley.

In response to inquiries about her community's primary infrastructure challenge, Christinah highlights two key areas: technology access and inadequate infrastructure maintenance. She identifies cost barriers and a lack of guidance as hindrances to adopting new technologies. Additionally, she points out issues with incomplete construction projects, such as uneven roads and unfinished utility repairs, which not only disrupt daily life but also increase security risks. What ideas do you have to enhance the safety for young people in Makers Valley?

Watch Christinah's video case study to listen to her describe how this can be achieved through technology.



Timbuktu in the Valley, Lorentzville

I feel like there is a lot of hope. It's just a matter of sitting down with people who really care about the community and doing something. The minute you put one hand, you get more people and then others also join because then that gives them a glimpse of hope.



Desiree Beukes
Community member

About

Desiree Beukes, known as Mama Desiree in Makers Valley, is a prominent community leader. She's a mother of five and a grandmother to 13 children. Her contributions to the community are extensive. She runs a soup kitchen, collaborates with city patrollers to ensure safety and cleanliness, and facilitates connections between families in need and social workers. She also assists children in accessing educational opportunities. Mama Desiree's enthusiasm stems from her active involvement in community affairs. Her particular joy lies in providing nourishment to those in need.

Issues & Ideas

Mama Desiree dedicates her Tuesdays and Thursdays to cooking for the community. Often entire families queue up at the soup kitchen seeking meals. Food becomes unaffordable due to high rates of unemployment. This can force children to drop out of school, either due to hunger or the inability to afford uniforms.

In Mama Desiree's experience, the lack of job opportunities in Makers Valley presents a significant challenge. There are insufficient spaces for young people to develop skills outside of school, leaving them vulnerable to negative influences like drugs and crime. Infrastructure issues, such as potholes damaging cars and posing safety risks to children who play on the road, also demand attention. How can your ideas help improve the infrastructure in Makers Valley?

Mama Desiree's vision for Makers Valley revolves around investing in its youth. This entails enhancing education quality and accessibility, fostering skill development, and creating more job opportunities. She believes that empowering the youth of today is crucial for nurturing tomorrow's leaders.



Pap and Mince meat soup being served



People lined up outside Fuller Park waiting for food to be served

Watch Mama Desiree's case study to hear more about her work and what community means to her.



Community is family. When you're in the community, you look at people as your family. You treat them as your family. You listen to them as you listen to your family, as you listen to your daughter, your son, your own child. You listen to them because there's a big need, there's a big cry out.



Hector Dibakoane

Makers Valley
Partnership

About

Hector Dibakoane is joint CEO of Makers Valley Partnership together with Noluthando Mdayi. Based in Victoria Yards, Makers Valley Partnership (MVP) can be described as the creative heart of Makers Valley. Read more about the work MVP does in the design brief's partnership section. Hector is an active member of the Makers Valley community, wearing many hats including that of culture curator and changemaker.

Hector expresses that his endeavours are fueled by his passion, sense of purpose, and love. Together, these are directed towards reshaping the narrative for African youth and altering perceptions of Johannesburg globally. He is committed to establishing platforms and nurturing safe environments where young individuals can pursue their interests, thereby fostering a vibrant community of artists. He finds his day-to-day life in Makers Valley to be a mix of fulfilment, and occasional frustration. However, his driving force is the opportunity to lead change within the community.



I see a lot of potential, a lot of collaboration, a lot of young people starting businesses and thriving. I see a lot of changemaking and see a pan-african, unified community, because there are people here from all over the continent. There are cross-cultural conversations, cross-cultural learnings, and untapped potential for solutions to tackle the social issues we all suffer from, because this is not unique to South Africa.

Issues & Ideas

Makers Valley, Hector explains, is an inner city setting with high levels of poverty. Hector sees Makers Valley as very rich in opportunities, and finds that despite the problems - which are not necessarily unique to South Africa - people in this community are privileged in many ways. He notes that in Makers Valley, people from different locations, backgrounds and cultures come together, which provides the opportunity to develop unique solutions and ways of thinking.

Hector would like to see a sustainable infrastructure that facilitates cleanliness in Makers Valley. He notes that the municipal dumping centres are far apart from each other and there are insufficient public waste bins available. The waste dumping also compromises the drainage system, with waste getting pulled into drains during heavy rainfall and creating blockages. Sometimes, people will dump waste in the drains intentionally, not realising the impact this will have. How might your ideas improve the way waste is managed in Makers Valley?

Watch Hector's case study video for his thoughts on approaching this design challenge with the Makers Valley community in mind.





Johanna Monama

Makers Valley
Partnership Uplift
Manager

About

Johanna, also known as Jojo, plays multiple integral roles within the Makers Valley community. She is a dedicated community builder, specialising in addressing social issues and mental health concerns. Jojo leads a women's support circle, focusing on empowerment and skill development, in addition to managing youth programs.

Issues & Ideas

Through Johanna's work, she has observed that residents of Makers Valley face numerous challenges and lack safe avenues to discuss their issues and express themselves. She highlights the vulnerability of those residing in abandoned buildings due to the absence of basic amenities and inadequate care from authorities. Further details on abandoned/hijacked buildings can be found in the Built Environment Challenge Area section.

Johanna advocates for improved access to nutritious food in Makers Valley, as healthier options are currently less affordable. She aims to empower the community through skills development and

entrepreneurship, ensuring residents are informed about their rights and where to seek assistance. She encourages participants in the design challenge to maintain a focus on addressing the specific needs of the Makers Valley community with their engineering solutions. What ideas can you come up with to make nutritious food more accessible and affordable in an urban setting such as Makers Valley?

Watch Johanna's case study video for insights into her work and everyday life in Makers Valley.



Walk home from school, Makers Valley



Community for me is growing together, supporting each other, sharing information so that we can build each other up.



Matshepiso Makhabane
Green Business College

About

Matshepiso Makhabane is the CEO of The Green Business College, an institution dedicated to training environmentally conscious entrepreneurs. The college provides short courses that cover practical and business skills, complemented by ongoing mentorship and coaching. The ultimate objective is for students to launch their own businesses by the course's conclusion. These ventures not only foster financial independence, but also contribute to sustainable solutions for South Africa's environmental, economic, and social challenges.

Issues & Ideas

In a city with limited space for urban farms and expensive food prices, Mama Tshepiso raises awareness of organic farming and promotes a balanced diet. She teaches community members to preserve food like beetroots and tomatoes to minimise waste, repurposing any leftovers as compost. Her vision centres on the local community, blending the science and artistry of cooking and

planting to encourage purposeful consumption choices. She emphasises understanding food sources and taking control of production, advocating for traditional preservation methods. How can your ideas support community members like Matshepiso Makhabane in their work?

Matshepiso sees agriculture as a path to financial success, especially vital during crises like the COVID-19 pandemic. She empowers individuals to engage in agriculture, stressing hands-on involvement.

Watch Matshepiso's case study video for her insights on health and nutrition.



Products made The Green Business College students, Victoria Yards



Have a good, positive and powerful mindset because the space that you are occupying is very powerful. Because you are going to engineer and design and build and make it happen.



Nqobile Shabalala
Engineers Without
Borders South Africa

About

Nqobile Shabalala, a 24-year-old resident of Makers Valley, works as an intern with Engineers Without Borders South Africa, where he focuses on implementing solutions to alleviate poverty and promote inclusive sustainable development. His role emphasises empowering communities by providing them with knowledge and a platform to address engineering challenges. Through his work, he aims to redefine engineering as a community-centred profession that fosters leadership for a more sustainable world. His day-to-day experience revolves around prioritising personal well-being, safety, and social fulfilment.

Issues & Ideas

Regarding challenges faced by the Makers Valley community, Nqobile highlighted issues such as crime, which directly affects his safety as a photographer. He also noted broader challenges like poverty, lack of education, limited creative hubs, and inadequate governmental initiatives to

empower youth through education and skills development, resulting in high unemployment rates. Nqobile also emphasised the high cost of living in Makers Valley, particularly in terms of affordable housing and access to technology essential for his photography work.

Looking ahead, Nqobile sees potential in Makers Valley, citing initiatives like Victoria Yards and Nando's headquarters as sources of hope. He believes that improving infrastructure and technology accessibility could significantly uplift the community, especially in empowering youth interested in photography and creative fields. In envisioning the future for his community and personal endeavours, Nqobile aims to empower youth through education and creative initiatives, emphasising the importance of accessible infrastructure and technology to support these goals. Can you brainstorm creative methods to engage the Makers Valley community in engineering solutions?

Watch Nqobile's case study video to hear him talk about his life in Makers Valley as a photographer, intern and environmental activist.



I have people that I consider my uncles or aunties but we are not related, these people actually raised me, so this is what community means to me – Having a place where you are accepted for who you are.



Romy Stander
Water for the Future

About

Romy Stander is the founding director of Water for the Future, a non-profit initiative which works in the Upper Jukskei catchment area.

Recognising the importance of water conservation, Water for the Future concentrates its efforts on the Upper Jukskei catchment area by facilitating the clean up of the Jukskei River, one of the largest in Johannesburg. Fresh water from underground springs is contaminated by untreated sewerage from broken infrastructure, industrial waste, and rubbish. What should be an asset for the community is a hazard and a health risk because of these issues. Romy has a comprehensive approach toward river conservation, from field work to administrative tasks like securing funding and planning future projects. There is increasing public interest in the Jukskei River, and Romy aims to maintain this momentum and community involvement.

Issues & Ideas

The Jukskei River “daylights” (a technical term used for when a river first emerges from the ground) at the start of the Makers Valley, near the Nando’s head office. This is a citizen-led organisation which engages the community through river restoration and flood solutions, envisioning a transformed green corridor. Their efforts began with understanding the river’s dynamics, partnering with experts from around the country as well as dedicated city

officials specialising in engineering, hydraulics, aquatic ecology, soil, invasive plant etc to install flow meters and test water quality. Data monitoring of rainfall, humidity, and river currents informs interventions to enhance water quality. Additionally, they identify and remove invasive plants to preserve natural biodiversity, though ongoing monitoring poses challenges.

One example of a successful pilot that supports sustainable urban drainage practices is the “Eco Seat” which helps mitigate risks of surface water flooding along stormwater routes. These seats, functioning as bioswales, divert stormwater from roadsides into designated areas, replenishing groundwater or irrigating nearby gardens. When not inundated, the seats serve as public shaded seating, fostering community engagement.

Through the work of Water for the Future, Romy aims to help create safe, nature-based spaces in Johannesburg where people can enjoy quiet moments, whilst nourishing their mental and physical well being. What ideas do you have that could support Water for the Future in their work facilitating the clean up of the Jukskei River?

Learn more about the work that Water for the Future undertake at waterforthefuture.co.za/

Watch Romy’s case study for her advice on how to approach the design challenge.



Community for me is growing together, supporting each other, sharing information so that we can build each other up.



**Siyabonga
Ndlangamandla**
Community member

About

Siyabonga Ndlangamandla, an urban farmer residing in Makers Valley, grows organic vegetables which both sustain him financially and provide healthy produce to others. In addition to his commercial endeavours, Siyabonga manages a community garden in Bez Valley, Johannesburg, with the goal of supplying residents with fresh vegetables and equipping them with gardening skills.

Raised on his grandfather's farm, Siyabonga's passion for farming and food security originates from his childhood experiences. Engaging in various community-based activities, such as placemaking through painting people's houses, reflects his commitment to his community.

Issues & Ideas

Siyabonga is trained as a hydroponic farmer, which is a method of growing plants without soil, using nutrient-rich water solutions. Hydroponic systems allow less water to be used as water is reused compared to traditional irrigation methods.

Challenges such as the lack of solar panels, compounded by load shedding, have hindered the farm's ability to optimise production. Nonetheless, Siyabonga is dedicated to addressing food insecurity and ensuring access to food within his community.

Residing and operating within Makers Valley, Siyabonga notes that there are prevalent challenges including crime, illegal waste dumping, and a shortage of recreational spaces for both children and adults. Additionally, he has observed a troubling prevalence of substance abuse among community members. Can you think of ways to create safer, inviting, recreational spaces within Makers Valley?

Watch Siyabonga speak about what community means to him, and his advice for the design challenge participants.



Urban Farm, Bezuidenhout Valley



We need to utilise more urban spaces, such as rooftops that are currently inaccessible so that we have enough growing space to feed ourselves within this community.



Stefan Neubig and James Mason
Sonnenglas

About

Sonnenglas is a South African company, operating from Victoria Yards, known for its innovative solar-powered lanterns. These lanterns are designed to provide sustainable, cutting edge lighting solutions, particularly in off-grid areas or for outdoor use.

The Sonnenglas lanterns feature a solar panel module that can be removed from the lantern and used as a stand alone torch, charging during the day and powering LED lights at night. The company prioritises the use of recycled materials and fair trade principles in its production process.

Issues and Ideas

Solar-powered lighting is particularly valuable in Johannesburg, where load shedding is a frequent occurrence. Stefan, the founder of Sonnenglas, and James, the Managing Director of Sonnenglas South Africa operations, have mitigated the effects of load shedding by using solar panels and addressing water shortages with the borehole located at Victoria Yards. However, damaged roads impact the transportation of supplies into the production facility, and internet outages require having back-up options in place.



If you've come up with a crazy idea that you think will save the world, try it. It doesn't matter if it doesn't work. Just try it. I think as engineers and engineering students, that's what you're innately about.

Community engagement is a core aspect of Sonnenglas's founding mission. For Stefan, community revolves around shared interests and local involvement. He finds fulfilment in contributing to neighbourhood improvement projects such as litter clean-ups. Stefan emphasises the inclusivity and diversity of his local community, where individuals from various backgrounds unite.

Meanwhile, James highlights the integration of community values into their company's mission. Rather than outsourcing manufacturing to other regions, they opted to produce their product locally in response to community needs. This decision not only addresses residents' power outage concerns but also generates employment opportunities and stimulates economic growth within the community. How might your ideas support supply chains and production locally?

Watch Stefan and James discuss their manufacturing process and share advice on approaching design challenges.



Sonnenglas, Victoria Yards, Lorentzville



**Thando Bam Francis,
Refloe Sibisi and Sandra
Van Oostenbrugge**
The People's Pantry



Packed Baking Powder ready to be collected by the community residents', at The Peoples Pantry Kitchen in Victoria Yards

About

The People's Pantry started in Victoria Yards in 2020, as a response to food insecurity during the Covid-19 pandemic lockdown. It is a community-driven initiative in Makers Valley aimed at addressing food insecurity and supporting vulnerable members of the community. They run seven community kitchens and a swap shop. The soup kitchens feed around 500 people a week collectively.

The People's Pantry is also involved in food education, delivering workshops on pickling, fermentation, canning, and drying produce to bolster food security and support income generation. The People's Pantry relies on donors, both individuals and businesses, to keep its shelves stocked. Community members are encouraged to donate surplus food items or funds to support the pantry's operations. Additionally, volunteers play a crucial role in managing and organising the pantry, ensuring that it remains accessible to those in need.

Issues and Ideas

In Makers Valley, many people lack employment and face income insecurity, leading to high levels of hunger. In urban areas, people are particularly vulnerable, as growing your own food is challenging. The ultimate goal for the People's Pantry is to foster a community where the People's Pantry is no longer needed. The organisation aims to get young people interested in nutrition, food security and advocacy.

They are doing this through the use of art, education and cooking classes. The People's Pantry is also working to develop self-confidence skills within the Makers Valley community so that people can begin to advocate for themselves.

The People's Pantry faces many challenges, such as shortage of essential equipment; for instance their soup kitchens do not currently have any fridges. They also need more digital support to improve their communication and reach. The organisation delivers food to the elderly, for which they do not have sufficient packaging. The lack of electricity due to the load shedding that are prevalent in Johannesburg also hinders the organisation from working efficiently. However, volunteers work hard to ensure that despite these mitigating circumstances, the soup kitchens and swap shops keep running. What ideas can you come up with to support the work that organisations such as the People's Pantry are doing in Makers Valley?

Watch Refloe and Sandra from the People's Pantry discuss what community means to them, their day to day life in Makers Valley and the biggest infrastructure challenges they are currently facing.



The right to food is a human right, and that needs to be clear, get it really into our heads, so that we can act accordingly, and start making noise to our policy makers.



Zweli and Metsi Magwaza
Love our City Klean

About

Love Our City Klean (LOCK), founded by a married couple Zweli Magwaza and Metsi Magwaza, is an innovative waste management firm dedicated to diverting waste away from landfills through effective recycling and repurposing efforts. LOCK engages in environmental education and awareness initiatives across the eastern region of Johannesburg. These projects aim to eliminate illegal dumping hotspots and transform them into vibrant spaces adorned with murals promoting cleanliness, safety, and environmental sustainability.

LOCK has a community swap shop, where residents can swap their recyclables for points, which can then be used for household items. Currently the recyclables are sold to buy-back centres; the goal is to be able to transform them into products.

Read more about Love Our City Klean on their website: welock.co.za/

Issues and Ideas

Metsi finds her work challenging and eye opening. Metsi and Zweli identify unemployment, poverty, resource scarcity, educational barriers, and housing shortages as key challenges facing Makers Valley.

Zweli points out that the increasing population is leading to significant waste generation, but that waste collection services are not accessible to everyone. Consequently, illegal dumping is prevalent throughout various corners of the area, posing challenges in maintaining cleanliness. What ideas can you come up with to repurpose the recyclable items that Love our City Klean collect in Makers Valley?

Watch LOCK's video Case Study for their thoughts on what community means, issues the organisation is facing and advice for the design challenge.



Love Our City Klean wall graffiti, Lorentzville



A lot of the solutions that we see here are not effective because they don't speak to our reality... Community is a place to grow, to find your identity and to fulfil your purpose.

Getting started



Getting Started

This design brief provides you with information on Makers Valley to enable you to design solutions for this community. We can't wait to hear about your ideas, passion and approaches to this design challenge. Before you get started, we suggest you gain an awareness of the [Sustainable Development Goals](#). These are 17 shared goals promoted by the United Nations that world leaders have agreed to. These goals provide a framework for all of us to work together to build a better future for everyone, fighting inequality, ending poverty and stopping the climate crisis.

A safe and just space for humanity is not just about the planet as a whole, it is also about the communities we live in. How might we learn from the people who have a lived experience in Makers Valley on how to thrive in balance with natural systems rather than at the expense of them? We now invite you to explore these exciting places and consider engineering design in this urban setting. A context shaped by challenges familiar to many all over the world, including the climate crisis, resource shortages, ageing infrastructure and a growing population. How do we make our cities livable and habitable for communities and not just about the physical engineering and infrastructure?

On the following pages we've outlined some steps to help you begin the process and guide you through the different stages of the design cycle. Note that although the steps are numbered one to four, it is an iterative process as the more you learn through the process the more you will find yourself back at the beginning redefining your problem statement and design criteria.

1. ANALYSE THE CONTEXT

Immerse yourself in the context first by understanding and empathising with people's perspectives, strengths and needs before considering how their problems might be addressed.

- Familiarise yourself with as wide a range of information about Makers Valley as possible. Start with the information we've provided in the design brief, explore the additional resources online at www.engineering-for-people.org and start planning out what additional research you think would be useful.
- Analyse the issues through various perspectives and seek out alternative viewpoints. Seek to understand the various ways that Makers Valley experiences the existing opportunities and challenges.
- Regeneration provides guidance on the creation of a [Story of Place](#) as an overarching context for the design and development process. As you read through the history, context and challenge areas in the brief, consider what is the story of people and place in Makers Valley?
- Doughnut Economics illustrates delivering a decent standard of living for everyone, while living within our ecological limits. The model visualises a space between planetary boundaries and a social foundation where it is ecologically safe and socially just for humanity to exist. Explore the [Doughnut Unrolled](#) tool which highlights the interplay between local aspirations and global responsibilities in a place.

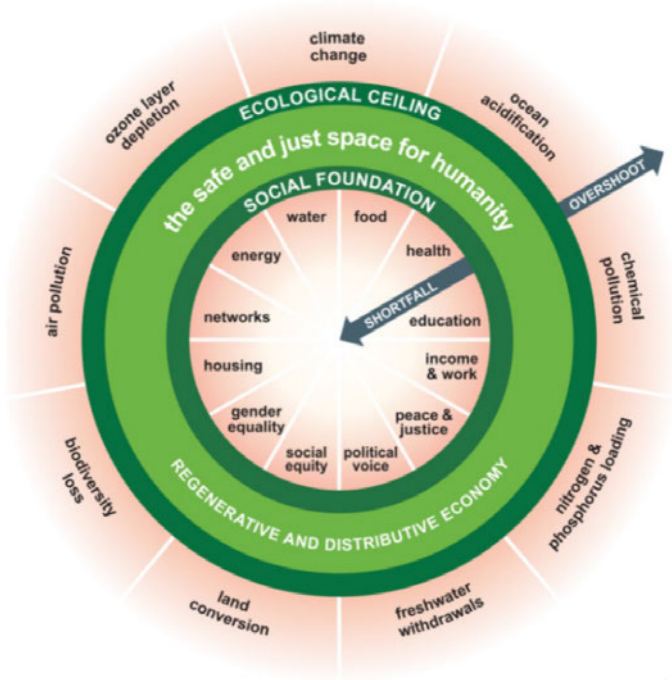


Figure 1:

The Doughnut of social and planetary boundaries. Kate Raworth and Christian Guthier. CC-BY-SA 4.0. Raworth, K. (2017), *Doughnut Economics: seven ways to think like a 21st century economist*. London: Penguin Random House.

2. DEFINE THE PROBLEM AND YOUR CRITERIA FOR SUCCESS

- From all your understanding of the context in step one, you should be getting a feel for the key issues present in Makers Valley. Start discussing them in your team and keep asking 'why', it's recommended to ask why at least five times (the 5xWhy tool). Through asking why (e.g. why does this happen, why do people do that etc) you're starting to uncover the key issues that are causing the problems. From here you can start to define your own problem statement.
- At this point also reflect on the criteria for success, ensure you have criteria that are related to social, environmental and economic objectives or limits, e.g. it must reduce waste, it must be inclusive of the local community, it must cost below X (number in local currency to be defined by you!). These are part of our [marking criteria](#) and we're expecting you to define them and demonstrate how you've used them in your decision making throughout the design cycle.

3. EXPLORE LOTS OF OPTIONS

Don't just go with your first idea, explore lots of ideas and think outside the box. Do this in an open manner and don't discount any ideas whilst you are exploring them. When you have a long list, use your problem statement and design criteria to determine the most appropriate ideas to move forward with.

4. JUSTIFY YOUR RECOMMENDATIONS AND EXPLAIN HOW IT WORKS

- To be sure of your chosen proposal, continue to question yourselves and think critically about whether you are meeting the design criteria. Using and questioning your judgement is something you will be relied upon to do as a professional in the engineering sector.
- Trial different tools to help keep testing your idea, e.g. sketching, prototyping (we recommend doing this with cheap materials like cardboard and paper), PESTLE analysis and SWOT analysis. These are also helpful in demonstrating the appropriateness and success of your idea to others, be they your peers, educators, members of the community or future investors.



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