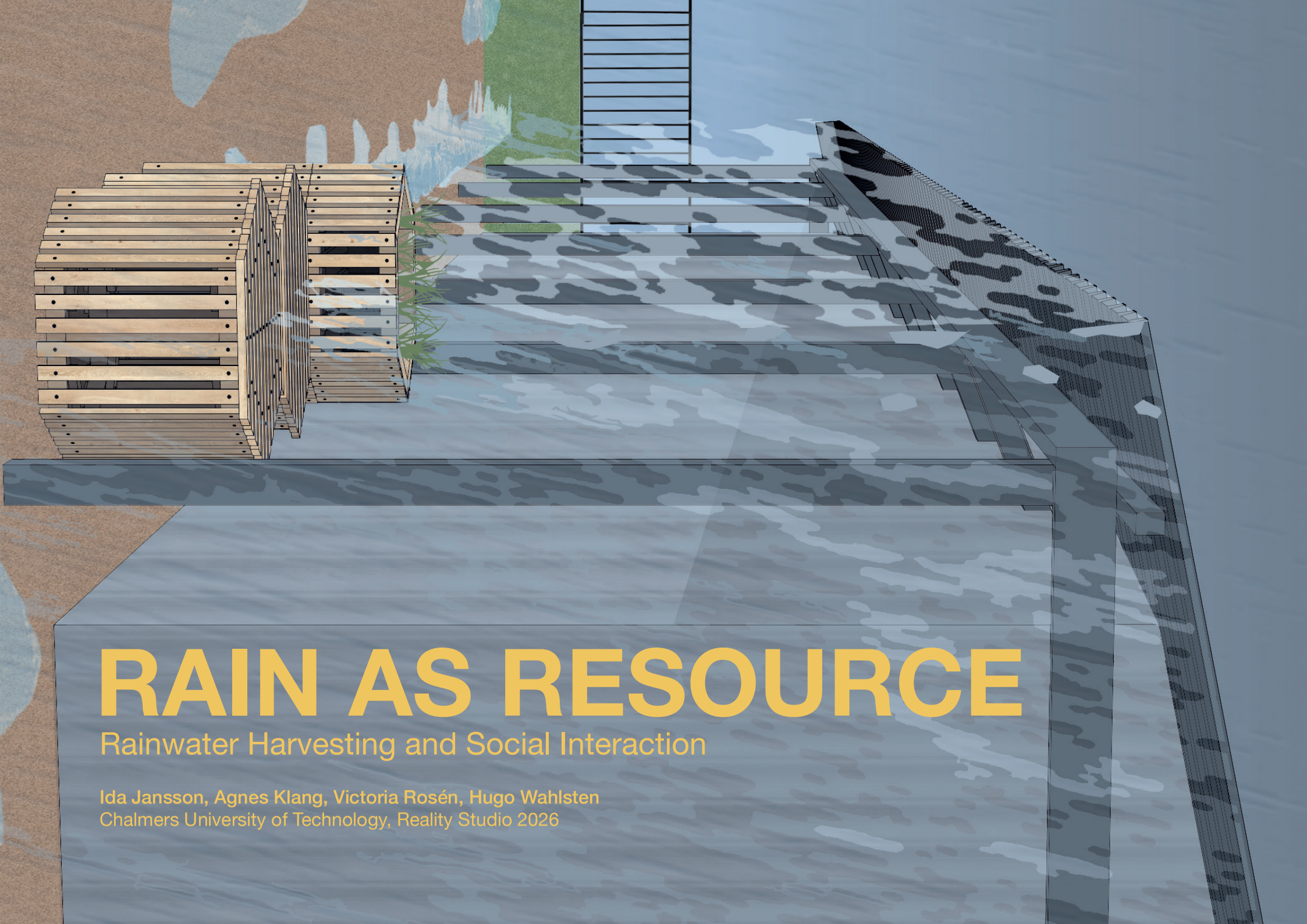

RAIN AS RESOURCE

Rainwater Harvesting and Social Interaction

Ida Jansson, Agnes Klang, Victoria Rosén, Hugo Wahlsten
Chalmers University of Technology, Reality Studio 2026

ACKNOWLEDGEMENTS

To begin with, we would like to extend our thanks to everyone who made this field study such a memorable and joyful experience.

A special thank you to the staff at MYDO, especially Hlakudi, Shane, and Thompson for your kindness and warm welcome throughout our stay. We are extra grateful to Gladys for taking us under your wings and working alongside us to bring this project to completion.

Thank you Dr Karen for your kindness and generous plant donation, and to Jason for introducing us to the community and to the architecture students at UP. The trip would not have been the same without them.

Finally, thank you to our tutor Marli and examiner Liane for the guidance both on site and in Sweden.

ABSTRACT

This project was carried out in collaboration with Melusi Youth Development Organisation, MYDO, a youth center located in the informal settlement Melusi in Pretoria, South Africa. The area is shaped by significant socio-economic inequalities and limited access to essential services such as sanitation, electricity, and clean water (IIED, 2022). MYDO provides both a safe and supportive study environment for children, as well as training programmes for youths to strengthen their skills and improve future employment opportunities (MYDO, 2026).

The aim was to co-create, together with MYDO, a scalable and adaptable intervention that addresses water management challenges while improving social spaces. Through a frugal design approach, emphasizing locally resourced materials, the prototype shows how simple and effective solutions can inspire similar initiatives in other contexts. Co-design and co-building methods played an essential role throughout the project, with workshops and meetings strongly shaping both the design process and the final outcome.

The water harvesting bench is a modular structure designed to serve multiple functions, including rainwater harvesting, social interaction, and gardening. Constructed from reused materials sourced on site, the bench can be adapted and replicated in different scales and variants.

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1 INTRODUCTION

The following chapter introduces the starting point of the project through an overview of the course description, project aim, and authors.

1.1 COURSE DESCRIPTION

Reality Studio focuses on the designer's role in challenging and changing environments. The course purpose is to give the students tools needed in processes of change in different system levels, from urban structures to detailed product plans.

The course is divided into three phases. Two weeks of pre-field studies containing planning, getting to know the context and lectures about ethics, power, agency, and coloniality. The following five weeks of field studies focusing on relationship building, finding needs, frugal design, and co-creation. The course is concluded with four weeks of post-field studies, where the field studies are analyzed and summarized in a report and exhibition.

CHALMERS

Reality STUDIO

1.2 AIM, OBJECTIVES AND RESEARCH QUESTIONS

The project aim is to create a scalable community managed intervention that can inspire replication or similar projects elsewhere. By improving rainwater management, we aim to reduce local flooding and create a well-functioning daily workspace.

As Swedish students in a new context, collaboration with local stakeholders is crucial. We utilize participatory and frugal design methodologies. Reuse of local materials and working with limited resources are important strategies for prototyping to support financial and environmental sustainability.

“How can we combine our design skills with local knowledge from an informal settlement to create a useful and appreciated intervention?”

1.3 THE AUTHORS

The Mediator - Ida Jansson

From Linköping, Sweden, Ida brings peace and structure to the team. With her lists and organized approach, she keeps everything running smoothly. Her mediation skills and positive energy makes collaboration easy.

The Influencer - Victoria Rosén

Born in Leksand, Sweden, Victoria is someone you can always count on to get things done. Through photos and weekly catch-ups, Victoria was the influencer of the team and ensured that the world was updated on our progress.

The Networker - Agnes Klang

Born in Strängnäs, Sweden, Agnes is a natural networker who builds connections wherever she goes. Her warm smile makes her approachable and easy to talk to, allowing her to bring people together.

The Handyman - Hugo Wahlsten

From Karlstad, Sweden, Hugo is the team’s go-to handyman. He understands the importance of taking breaks, stepping back when needed to recharge and return with fresh energy.

2 BACKGROUND

This chapter outlines the theoretical background, the context of the project, including a stakeholder analysis. It also presents the targeted Sustainable Development Goals (SDGs) and the methodologies used throughout the work.

2.1 THEORETICAL BACKGROUND

Prior to the field study, the group studied literature on ethics and methods used in research projects in vulnerable communities. Some of these readings have laid the foundation for the goal, approach, and the design process.

Damage Centered Research

Author Eve Tuck (2009) discussed the topic of damage centered research in her text “Suspending Damage: A Letter to Communities”. She described how research throughout history has portrayed vulnerable communities as deprived and broken. This perspective has led to some positive change, but also leaves the communities feeling damaged. Tuck (2009) points out that this type of research is insufficient and we should shift to a desire-based research that also shows hope, vision, and wisdom of communities.

This text made us think about our preconceptions going into the informal settlement Melusi. Media portrayals and damage-centered research has influenced what we expected to encounter in the area. The question we asked ourselves was: how accurate is this description and what aspects might be overlooked behind these negative narratives?

Vampire Projects

IIn the text “Challenging Practice” (Architecture Sans Frontiers, 2022), both the potential and the difficulties of participatory work are acknowledged. Designing in an inclusive way means bringing multiple perspectives together and bridging the gap between the designer and the user. ASF (2022) argues that the process is more important than the final result in participatory design.

However, participatory work is not easy and there is a risk for “vampire projects”. This is where experts extract knowledge from a community and use it for their own benefit, without giving much in return (ASF, 2022).

Small Change

The book “Small Change” (Hamdi, 2004) describes that: “... in order to do something big. .. one starts with something small and one starts where it counts.”. This means that a project does not have to be large-scale to succeed, a well-thought-through project has the potential to be great.

Hamdi (2004) also describes the potential of changing your own perspective and inviting others to the table. Through participatory work we look for multipliers and go to scale, “...a small idea grows by inspiring others”.

The Architect as a Catalyst

The text “The New Professionalism for Architecture Practice” (Tovovic, 2009) points out the important aspect of the architect transitioning from being a provider to a supporter and a catalyst. The shift to community architects means a shift from being a top-down expert to a bottom-up participant, an approach that is essential in this course. To truly facilitate inclusive work it is important that all voices are heard, making it the architect's job to recognize who may be quiet in the background.

Another important and relevant topic that Tovovic (2009) brought up is: “We have a lot to learn from squatter communities – about making do with less, about efficient uses of materials and space.”.

2.2 CONTEXT

This project has been carried out in the context of an informal settlement in Pretoria, South Africa. The country is characterised with a subtropical climate, humid coasts, and a dryer climate inland (Britannica, 2026), and is known for its history of early human evolution (South Africa, 2026), colonisation and struggles for independence (Odyssey Traveller, 2024). South Africa remains one of the most unequal countries in the world, although there are people and organisations working to improve the situation (Hamann & Horn, 2022).

South Africa

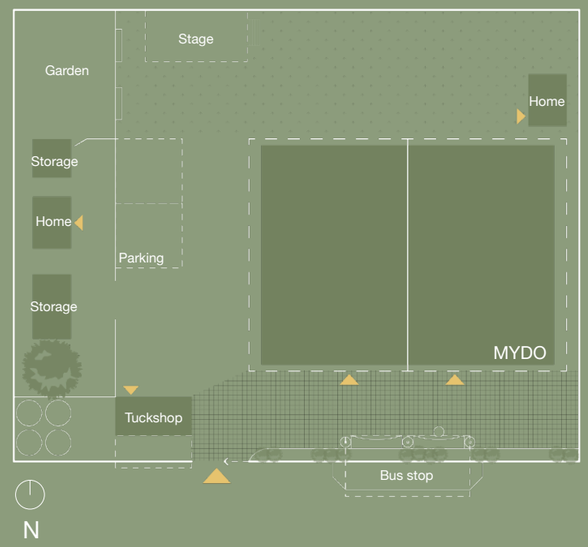
After most of Africa broke free from colonialism in the 1960s, South Africa's Apartheid Racial laws remained in the country until the early 1990s, a system of institutionalized racial segregation and discrimination. "This policy enforced severe restrictions on the rights and movements of non-white populations, aiming to uphold the political and economic dominance of the white population which was a minority." (UNESCO, n.d.)

In 1994, following the end of apartheid, South Africa was reorganized into nine provinces as part of an effort to dismantle the apartheid system and decentralize political power. Pretoria, one of South Africa's three capital cities, serves as the administrative capital and is home to the national government (Alexander, 2025).

Informal Settlements

Rooted in the legacy of apartheid segregation and rapid urbanization, South Africa continues to face severe socio-economic challenges. These inequalities are physically reflected in the urban landscape, where gated luxury communities coexist alongside neglected informal settlements (Hamann & Horn, 2022).

Informal settlements are residential areas lacking formal government recognition and limited access to adequate sanitation, electricity, and clean water (IIED, 2022).

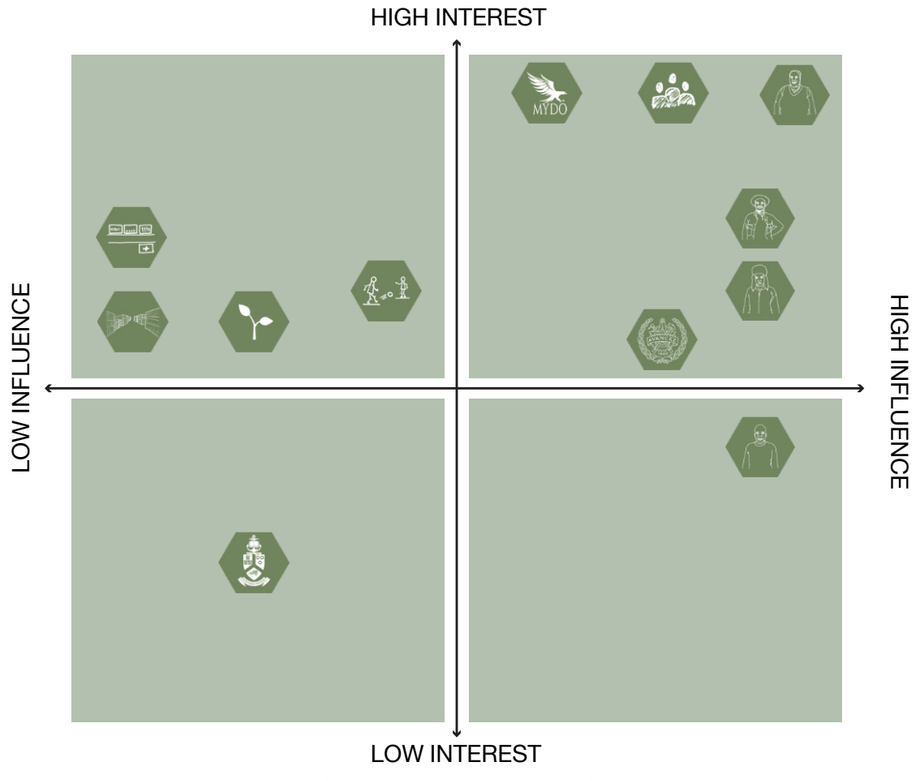


The Youth Centre MYDO

The informal settlement of Melusi is located in Pretoria West. Situated within the settlement is the youth centre MYDO, Melusi Youth Development Organisation. Founded by Mr Hlakudi, the organisation is guided by the vision: "We do not just "help" children; we prepare them for life." (MYDO, 2026).

The facilities provide a space where children can go after school to do their homework and take part in various activities. During the day, the organisation also offers training programmes aimed at improving future job opportunities.

2.3 STAKEHOLDER ANALYSIS



Interest-Influence Matrix *of involved stakeholders, apart from the project group, who has a high interest and influence.*

Gladys

Gladys is the human resource and administration director at MYDO. She is the head of the arts- and sports programme and has a close relationship with the children. As our community field worker, she showed us around the site and the neighborhood, while remaining highly active throughout all its phases.

Thompson

Thompson is the finance and programme director at MYDO. Despite a busy schedule, he participated in the workshop of mapping out the needs and in the building phase.

Shane

Shane works as an administrator at MYDO and was the community field worker for another group of students. He was always on site to greet us when we arrived in the morning and took part in every step of the process.

Hlakudi

Hlakudi is the founder and executive director at MYDO. He entered our project in the co-design phase and has taken part in the final decision-making.

Melusi

Melusi is an informal settlement located in Pretoria West. It is a densely populated area with 15 000 households and 55 000 residents (H. Malatji, personal communication, April 13, 2026). Infrastructure for electricity, water and sanitation is installed in some parts of the settlement, but far from everywhere.

MYDO

MYDO is a youth center located in Melusi. It was founded in 2015 and has since evolved from an informal structure into a formal study facility with the help of non-profit organisations. MYDO is working to support youths who live in impoverished communities to complete their education, by supplying a safe and inspiring study space (H. Malatji, personal communication, April 13, 2026).

Staff at MYDO

Apart from the earlier mentioned staff members at MYDO, there are other people keeping the organisation going every day.

Children and Youths at MYDO

At the core of the organisation are the children, aged 6 to 18, coming to MYDO after school to do their homework. After the age of 18, there is an opportunity to join the training programmes until the age of 28.

University of Pretoria

The Department of Architecture at University of Pretoria, more specifically the Unit for Urban Citizenship, has a long history of working with the community in Melusi and MYDO. They provided tools for the construction of our prototype. Our contact person from UP was the architect, researcher, and lecturer Jason Oberholster.

Dr. Karen Bobes

Dr. Karen Bobes is a senior lecturer at the Department of Architecture at the University of Pretoria. She has taken part in previous and current projects at MYDO regarding agriculture. Her expertise in plants and previous contact with MYDO made her an interesting stakeholder by guiding us and providing onions for our flower bed.

Chalmers University of Technology, Reality Studio

Chalmers University of Technology and the course, Reality Studio, sets the guidelines for the project's scope and how it is conducted. The University also has an interest in the project by maintaining relationships with international stakeholders.

Nearby Organisations

Along the street where MYDO is located, several other facilities and functions can be found, some of them related to MYDO. These include a health clinic, a community hall, and two crèches, one of which is the Happy Sabby Daycare (our first project site).

2.4 SUSTAINABLE DEVELOPMENT GOALS

This chapter describes the targeted United Nations Sustainable Development Goals for this project.

6. Clean Water and Sanitation

Goal six focuses on ensuring the availability and sustainable management of water and sanitation. The goal is divided into different targets and this project will work towards target 6b: “Support and strengthen the participation of local communities in improving water and sanitation management” (United Nations, 2026a). The project contributes to this by ensuring that available rainwater could be collected and used wherever appropriate.

11. Sustainable Cities and Communities

The goal eleven focuses on making cities and human settlements safe, inclusive, resilient, and sustainable. The project aims to contribute to target 11c: “Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials” (United Nations, 2026b). It achieves this by using local materials and developing a solution that can be built using local methods, making it accessible and applicable for everyone in the settlement.

12. Responsible Consumption and Production

The twelfth goal is about ensuring sustainable consumption and production patterns. The project aims toward target 12.2: “By 2030, achieve the sustainable management and efficient use of natural resources” (United Nations, 2026c). The project will support efficient use of water by collecting rainwater, which can be used for gardening or other purposes where the water does not need to be drinkable. Since water is a limited resource in the settlement and water shortages are a major issue, this collected resource will serve as a valuable reserve.

2.5 METHODOLOGY

During the pre-field study, a preparatory literature study and seminars were carried out. These created the theoretical framework that the project is based upon and gave an understanding of the context relating to history, politics, and social hierarchies.

To map the project site and understand the needs of the organisation and its stakeholders, we conducted a series of workshops. The results from these workshops helped us prioritize potential projects based on urgency and interest. The following methods were used:

Walking and Talking

The Walking and Talking Workshop has the purpose of understanding the current environment, in the specific context, through conversations with residents and a tour around the area (‘Walking & Talking’, 2014).

Mapping the Surroundings

Mapping the Surroundings, investigates the community through a 2D map where main issues are being discussed and pinned out on the map (‘Mapping the Surroundings’, 2014).

Dream Wall

Dream Wall consists of ideas in different forms like drawings, quotes, and maps, to be placed on a physical board (‘Dream Wall’, 2014).

Dreaming Through Drawing

Dreaming through Drawing captures dreams from the stakeholders through the use of drawing. Facilitators observe and question the drawings to understand the meaning behind them, as well the importance of spaces (‘Dreaming Through Drawing’, n.d.).

Participatory Design

The starting points for the prototyping are co-design and co-building. The goal of the project is to work as bottom-up participants rather than top-down experts. This means designing and building together with the community is at the center of the process. Brainstorming ideas, solving problems, selecting materials, and assembling the prototype together are all part of the co-creation process.

Frugal Design

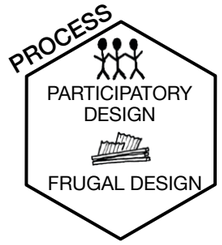
Frugal design is a central methodology due to a strict budget and the goal of making the prototype replicable, involving local materials and building techniques.

Manikin Evaluation

To get an overview of the stakeholders reflections on the project, we will use a manekin-inspired evaluation technique. This method gives participants a hands-on task, asking them to place stickers on emojis, reflecting their level of satisfaction across different topics. In addition, we will ask follow-up questions based on the written prompts to get more detailed responses.

3 PROCESS

This chapter presents how the project took shape, allowing the process and the relationships formed along the way, to guide the design.



3.1 PROJECT TIMELINE

COURSE INTRO & CONTEXT ORIENTATION | UNDERSTANDING NEEDS & DECIDING FOCUS AREA | DEVELOPING DESIGN & BUILDING PROTOTYPE | EVALUATION & HANDOVER

Pre-field study	Field study					Post-field study
Week 1 - 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8 - 11
Lectures, readings, and films on context background and South African history Readings and seminars on community, co-design, and workshop methods Group formation, preliminary project formulation, and preparations	Arriving in Pretoria **07/04** Welcome braai with our local mentor and students from University of Pretoria **08/04** First site visit in Melusi, meeting the stakeholders Starting to map the needs **10/04** Repairing the clinic's broken pipe Workshop: Walk and Talk	**13/04** MYDO introduction by the founder, Mr Hlakudi **14/04** Study trip on reuse with UP-students to Johannesburg **16/04** Staff workshop: Mapping the needs **18/04** Kids workshop: Relationship building and mapping needs **19/04** Hike with our stakeholders	Material hunting in and around Melusi with Gladys and Shane Initial design ideas, iterations **22/04** Co-design workshop 1 with our stakeholders	Rework on design, iterations Collection of materials and tools **28/04** Co-design workshop 2 with our stakeholders **29/04** First building day	Finalizing three prototype variants over five building days: the bench, the stool, and the table Repairing existing structures on the site: a bench, and the stage's backdrop **07/05** Exhibition, evaluation, hand-over, and goodbye!	Documentation: handbook on the structure, report, and presentations, exhibition in Gothenburg Handover material to open for future development of the prototypes and scaling

3.2 ESTABLISHING AND BUILDING RELATIONSHIPS

The outcomes of this project were made possible by the relationships formed throughout the process. Rather than limiting ourselves to a strictly professional relationship, we got to know our primary stakeholders on a personal level and shared activities outside of the project work. This created an environment where everyone felt comfortable contributing their own ideas, and made the process more rewarding.

The Daycare Centre

The first visit to Melusi marked the beginning of the stakeholder relationship-building process. Prior to departure, the intention had been to work with a daycare centre located next to MYDO, a relationship that was entirely new, with no prior collaborative history between us, Chalmers, or the University of Pretoria (UP).

The contact established by UP proved to be a former colleague at the daycare, meaning staff had not been informed of our visit nor of our purpose or areas of studies. The expectations communicated during the initial walkthrough of the facility did not align with the scope of work the course could realistically offer. In consultation with our teachers, we made the decision to redirect the project toward MYDO as the primary stakeholder, an organisation with an existing relationship with the course and a more grounded understanding of the scale and nature of student-led design projects in our timeframe.

Relationship-building Activities

The relationship-building occurred naturally through the time spent with stakeholders during work on site by talking and working alongside one another. This resulted in a relationship both professionally and personally. The most meaningful moments, however, tended to emerge in between the structured project work. Arriving a little earlier or staying a little later in Melusi created space for casual conversation and observation.

During the construction days, we alternated with the other group working at MYDO in preparing lunch for everybody involved, and these meals became an opportunity for warm and open conversation. On one occasion we prepared Swedish pancakes, which offered a small but meaningful cultural exchange through us bringing something of our own background into their context. Beyond the project itself, we went on a hike together with the stakeholders and were invited to attend a netball game with them.

Connections also extended beyond MYDO itself. During the first week, we helped the clinic across the road repair a broken pipe which had left them without running water for two months. Through the workshop we held with children at the community centre on the same street, we established connections not only with the children attending MYDO, but also with the staff of that building.

3.3 MAPPING THE NEEDS

After establishing relationships with our stakeholders and a growing familiarity with the site's context, the focus shifted toward understanding the needs of MYDO. This process combined on-site observation, open conversations with stakeholders representing different interests, and three organised workshops. Each workshop was designed to find potential areas of improvement through different settings and with different target groups. In between these sessions, work consisted of workshop planning, reflection on findings, observation of latent needs, idea generation, and sketching.

An important aspect of this phase was balancing openness with managed expectations. Stakeholders were encouraged to express needs freely, regardless of scale, but we also emphasised the constraints of the project: a student-led design course with no budget, spanning five weeks on site. The needs, exceeding our scope, were still kept to potentially be addressed at a smaller scale with a different approach.

Walk and Talk

Date: 2026-04-10
Aim: Finding expressed needs and potential focus areas to work on. Establish a field worker contact, and an idea of how we could work together.
Participants: Gladys and Shane, at separate times.

Description

Walking around MYDO and the adjacent community hall together with the stakeholders, allowing them to talk freely about the site, how it is used and problems they face. During the walk, we asked prepared and spontaneous questions as a semi-structured interview to guide the discussion towards needs.

Results

Six possible project areas:
1. Playground in the backyard
2. Expand MYDO's gardening
3. Develop seating area at the entrance
4. Work with the garden storage
5. Developing the fence at the parking space
6. Improving the tuckshop's visibility from the road

In addition, leftover wood on the site was found that could be used as building material.

Reflection

The Walk and Talk gave several ideas on potential projects and we discussed wishes, needs, and impressions of each space. We were most interested in the play area, located in the backyard of MYDO, as this would involve the children to a greater extent. Other identified projects, such as the seating area and the fence, were mostly focused on repairs, which would limit the design and size of the project.

Needs Mapping Workshop

Date: 2026-04-16
Aim: Confirm and extend the list of needs from the Walk and Talk, decide what to work with, and start discussion of relevant people to work closer with.
Participants: MYDO staff members with different roles: Gladys, Shane, Thompson, Johanna, Kgabo, and Shaila.

Description

This workshop was a collaboration with the other group working at MYDO. It was divided into two mappings: what works and what needs there is on the current site, followed by a dream mapping. The participants placed post-it notes on two maps reflecting their thoughts, which were then prioritised by marking with star stickers. A final stage of summarizing and managing expectations was led by the two mediators of the meeting.

Results

During Mapping the Surroundings in the first part, the participants highlighted their appreciation for most spaces at MYDO and the purpose they serve. A few examples the staff mentioned were the parking lot, the stage, the backyard, and the tuckshop, with room for improvement. For example, paving and shading to the parking or more activities in the backyard.

For the Dream Wall, the discussion turned mostly to indoor areas, where expressed dreams were more computer labs, larger offices, heat management, and solar panels. As our intention was to use frugal methods, we moved the discussion to less formalised to outdoor areas. In the end, we found a few focal points:

WATER: Sloping towards the building creats issues with rainwater management
STAGE: A changing room for the outdoor stage and expanding it
GARDEN: Bigger garden, use as fundraising
STORAGE: Not enough space for storage on site
TUCKSHOP: Bigger tuckshop area
PARKING: Pavement for the parking and a metal shading roof that does not let rain through
PLAY AREA: More activation on the outdoor play area (seating and activities)

"I love the back of MYDO as play area"

"I love the stage"

About the temperature in the building: "Boiling"

Reflection

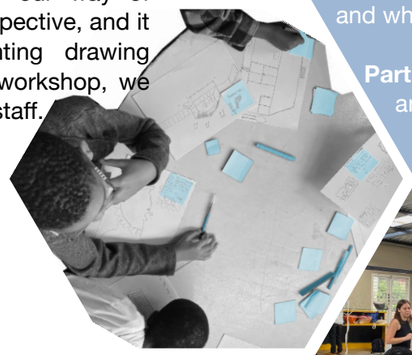
This workshop provided insight into both the needs and the dreams of the staff and MYDO as a whole. Many points of interest were outside of the scope and scale of the course and this was something we made sure they were aware of when wrapping up the workshop. In discussion with the other group we decided on themes for our projects: our group would be working on rainwater management and the other group on the play area. Our focus on water management was motivated by the wish for improvement of the parking that gets muddy with big puddles during rain.

Children's Workshop

Date: 2026-04-17
Aim: Establish relationships with the children at MYDO, understand what they like about it, and what could be improved from their point of view.
Participants: 30-40 children and youths aged 7-16.

Description

This workshop was a collaboration with the other group working at MYDO and supported by the staff: Gladys, Shane, and Monica. The children were divided into smaller groups for different stations. These were: playing games, learning chess, and Dreaming through Drawing. The drawing station served as our way of understanding the children's perspective, and it was executed through presenting drawing prompts for the kids. After the workshop, we served lunch to the children and staff.



Results

This workshop was a great opportunity for establishing relationships with the children and it deepened our relationship with the MYDO staff. From the drawings and comments during the workshop, the participants expressed the wish for more seating and dreamed about playground equipment such as slides.

Reflection

Our focus on water management was less connected to the kids, but the workshop was still productive for us since we were able to build relationships. We could also use the inspiration from the drawings to work with integrating more than one need into our design.

Our Own Observations

While most needs were found during the workshops, our own observations on site and reading between the lines of expressed needs, helped us find some latent needs as well. An example of this is the issue with rainwater, which we saw for ourselves when we arrived one morning. We observed the water running down from the roof onto the muddy parking space, and how the backyard was filled with puddles in front of the stage. These issues were later confirmed through wishes such as pavement and repairing leaking roofs.

3.4 TURNING IDEAS INTO DESIGN

After mapping stakeholder needs, we narrowed our focus to one project theme. Inspired by how rain affected the parking space, we chose rainwater management, which aligned with the stakeholders' expressed and latent needs we identified for MYDO.

Co-Design Meeting 1

Date:
2026-04-22
Aim: Discuss design ideas on water management.
Participants: Hlakudi, Gladys, Shane.

Description

The co-design session was held as a meeting supported by a slideshow, see Appendix 6. We presented our focus on rainwater management and explained our initial ideas. We also showed our sketches on a gutter to initiate a conversation and how to further address the issue.

Results

This meeting allowed us to dive deeper into the topics relevant to our ideas and interests. However, when presenting our early ideas, it was difficult to explain the sketches in a clear and accessible way. It was also challenging to brainstorm new ideas after our initial sketches had already been presented.

Reflection

The stakeholders confirmed the relevance of focusing on water management and were positive to our initial ideas. We had expressed concerns about drilling into the roof to install a gutter, although the stakeholders indicated that it would not be an issue. We also discussed potential ways to repurpose the collected water, including storing it in existing tanks, and using it for gardening. In addition, we explored sources for reusable and local materials, such as Africa Scrap Yard and considered potential sponsors like Coca-Cola, which has previously sponsored the organisation.

Co-Design Meeting 2

Date:
2026-04-28
Aim: Discuss new and re-worked design ideas on water management.
Participants: Gladys, Shane.

Description

After receiving feedback from the teachers, we reworked the design into several smaller scale proposals for the second meeting. These emphasise simpler solutions to a complex problem. This time we were more careful about presenting several detailed sketches before the stakeholders shared their thoughts and ideas.

Results

During the meeting, we confirmed a new prototype proposal and received feedback on a few adjustments. Afterwards we felt confident that the project was feasible within the remaining timeframe.

Reflection

During this meeting, we received more feedback from Gladys and Shane than previously. This may have been because they felt more comfortable expressing their opinions when the CEO was not around.

It was still challenging to communicate design ideas with people not sharing our design background. Some aspects of the design were still undecided when we left the meeting, but these decisions could be resolved as the project progressed.

3.5 CONSTRUCTION

The construction phase consisted of material sourcing, co-building, and co-designing on site. The co-designing proved to be more efficient when working with full-scale physical prototypes rather than sketches and small mock-ups.

Materials and Tools

The following tables show the materials and tools utilized during the building process. The material sourcing reflects a frugal approach, prioritizing local materials whenever possible.

Table of Materials		
Material	**Source**	**Amount**
Bottle caps	Taverna in Malusi	18
Buckets	Builders	3
Metal sheet	Africa Scrap	1
Nails 2 x 40	UP	18
Old woven plastic bag	MYDO	1
Screw 40, 50, 60 mm	UP & Builders	556
Wooden planks	MYDO	100 m
Wood sealer	UP	1,5 liters

Table of Tools	
Tool	**Source**
Bits	UP & Builders
Brush	Builders
Circular saw	UP
Colour tray	UP
Hammer	UP
Hand saw	UP
Pencil	From home
Power supply kit	UP
Protractor	Archneer
Rule	From home
Screwdriver	UP
Slide mitre saw	UP
Spirit level	UP

A core goal of the project was scalability, meaning it was important that the prototypes could be built using local methods. Power tools were used because of time constraints, but local methods were considered in the design. For instance, when electricity was unavailable, an angle ruler and a standard hand saw proved to be sufficient for cutting precise angles. Instead of screws and a screwdriver, nails and a hammer could be used, and nails would also lower the cost of the project. In total we spent 895.50 ZAR, for the full cost accounting, see Appendix 11.

The circular saw was used to reduce the thickness of the planks, as the available planks were too thick and heavy to be used as panels for the prototypes. If a circular saw is not available, alternative sourcing could be implemented. For instance, instead of reducing the thickness of the planks, wooden pallets could be found in Melusi as a substitute. Alternatively, the wooden panels could be replaced with sheet metal.

Construction Days

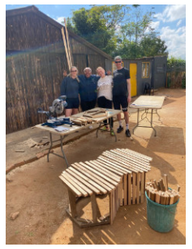
Wednesday 29/4

The first building day!

The day was spent planning the work and figuring out how to construct the frame. We completed the first hexagonal pillar and tested the wood quality by screwing through them.

Thursday 30/4

We finished the frame and began assembling the panels, and discussed panel spacing with Gladys. All pieces for the lid were cut, and we started planning the plant bed. Dr. Karen confirmed she would provide onion seedlings.



Monday 4/5

This day the bench and flower bed were nearly finalized. We then decided to build a stool instead of a second bench to demonstrate the prototype's scalability and variability. We also had Swedish pancakes for lunch, which Gladys and Thompson really enjoyed.

Tuesday 5/5

We painted all the prototypes, with wood sealer and found a woven plastic bag for the flower bed in a storage room. This day it became clear that the co-building process had generated a sense of ownership among the stakeholders.

"This is our bench!" - Gladys

Wednesday 6/5

The table was assembled and the prototypes received a second coat of wood sealer. Thompson suggested using bottle caps as washers to protect the plastic bag from tearing. We also helped with small repairs at MYDO by fixing the net behind the stage and a broken bench behind the bus stop.

4 THE FINAL PROTOTYPES

The construction week resulted in three full-scale prototypes, each meeting specific needs at MYDO while demonstrating that the design can be used in many different ways. For manufacturing instructions, see Appendix 1.

4.1 CONCEPT AND ARRANGEMENT POSSIBILITIES

The final prototype is a modular bench with a hexagonal design that integrates a rainwater harvesting system, a flower bed, and seating into one unit. Its shape allows scalability in several directions depending on need and preference. The bench is built from reused wood, reflecting a frugal design approach.

The bench addresses the challenge of managing rainwater pouring from a roof without a gutter. When placed along the roof's edge, it collects rainwater and reduces flooding and soil erosion. The seating areas, as well as the flower bed, are removable, providing access to the buckets inside each module. Rainwater is collected either through the flower bed or through gaps between the seating panels, enabling the system to function even when the bench is placed away from a roof. The stored water can be reused for a variety of everyday purposes, such as gardening, washing dishes, and laundry.

The Bench

The bench comfortably seats two people and suits larger-scale needs. Each module includes a base that provides storage and rainwater-harvesting capacity, while the top can be customized as seating, a flower bed, or a combination of the two.

The Stool

The stool features a single seating area and is designed for smaller-scale or more flexible applications. Lightweight and easy to move, it can be repositioned as needed and is also adaptable to serve either as a seat or as a flower bed.

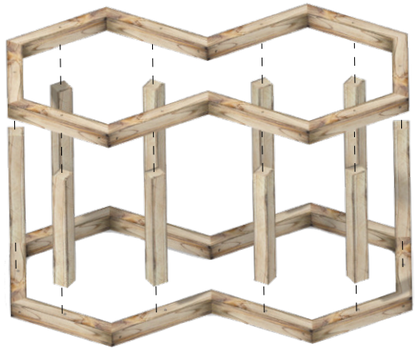
The Table

The table explores the material flexibility of the prototype, using plywood and sheet metal to demonstrate alternative construction options.

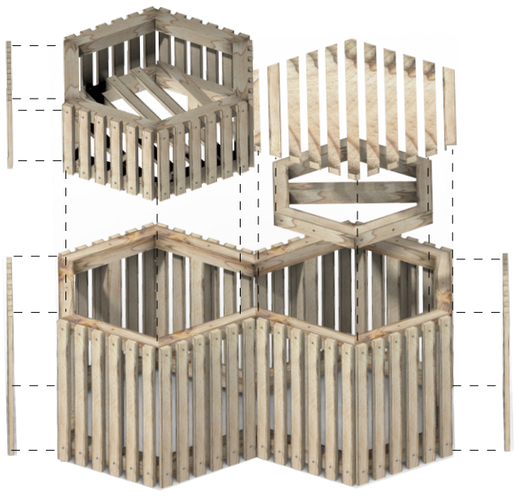
Variability and Scalability

Both the bench and the stool offer flexibility and scalability through their hexagonal geometry, allowing the modules to be arranged in various configurations and expanded as needed.

4.2 THE BENCH



Frame
The frame consists of two horizontal double hexagons connected by vertical studs. All horizontal pieces are cut at 60 degree angles and assembled using screws.

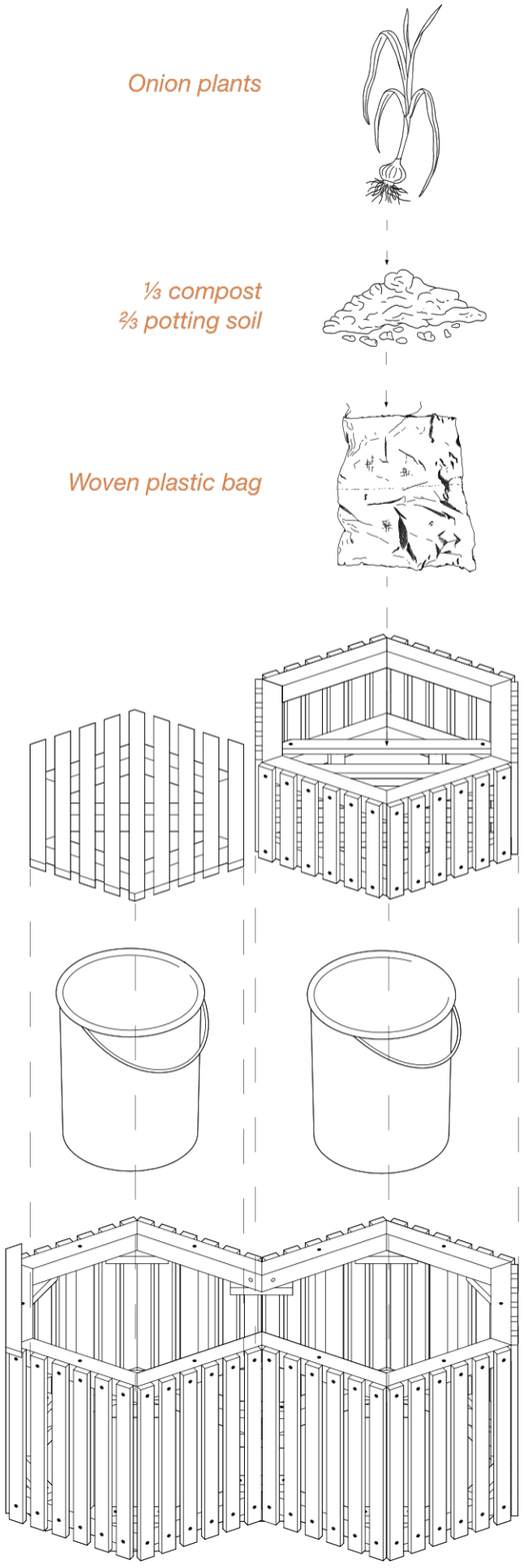


Seating and Flower Bed
Panels are then attached to all sides of the frame. The seating section is constructed as a smaller hexagonal frame with panels mounted on the top, while the flower bed consists of two hexagonal frames enclosed by panels on all sides.

Final Result
Buckets are placed inside and the bench is completed by positioning the seating and/or flower bed on top.

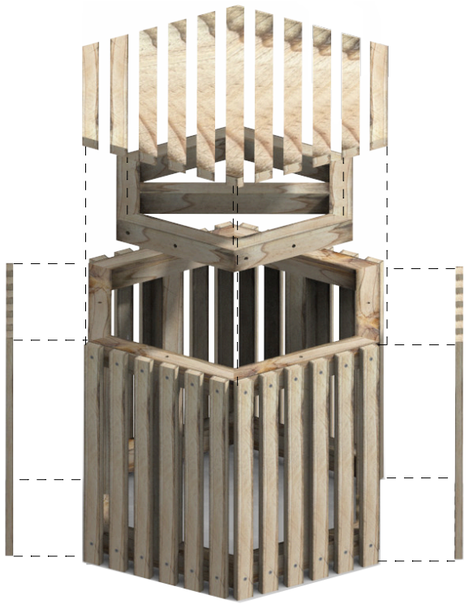
The Flower Bed
The flower bed serves as an alternative to a seating module while taking advantage of the bench's rainwater harvesting function.

A woven plastic bag is fitted to the bottom and sides of the flower bed. Its semi-permeable surface allows water to pass through and be collected in a bucket below while preventing soil loss. The planter is filled with a mixture of two-thirds soil and one-third compost, in which spring onions are planted.



4.3 THE STOOL

Frame
The stool is constructed using the same principles as the bench. First, the studs are cut out to the correct dimensions. Two hexagonal frames are then assembled and connected by vertical studs to form the main structure.



Seating and Paneling
Once the frame is complete, panels are attached to all sides. The seat is constructed separately as a smaller hexagonal frame with panels mounted on top.

Final Result
Finally, the seat is placed into the stool frame, creating a compact and versatile seating unit suitable for flexible use.

4.4 THE TABLE

A Table from Scrap Pieces
The table is constructed from scrap materials generated during the building process, combined with a metal sheet sourced from the Africa Scrap yard, located next to Melusi.

It demonstrates how the intervention can be replicated using alternative materials besides those used in the main prototype. In Melsui, sheet metal is often more easily available than timber, making it an important material alternative to explore.

Material Variability
The tabletop is a reused wooden board cut into a hexagonal shape to align with the overall design language of the other prototypes. The base is formed from a simple frame of wooden scrap pieces used as studs. A metal sheet is then wrapped around the base to conceal the structural frame and create a more refined exterior finish. Finally, the wooden top is mounted onto the base, completing the table.

5 FUTURE POTENTIAL

The water harvesting bench has three foundational functions: rainwater harvesting, social space, and gardening, which is demonstrated in the prototypes. The hexagonal shape enables spatial configurations, scalability and adaptability. The aim is to have the prototype replicated in private homes in similar contexts. Therefore, we prioritised frugality by creating different versions with other materials and simpler shape, while keeping the foundational functions.

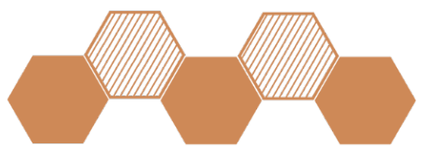
5.1 SCALABILITY

The modular nature of the bench makes it perfect for scaling up along a wall to collect water pouring from the roof. As shown in the previous chapter, it can be assembled as benches or stools, and scaled up or down in number. This makes it easy to fit along any length of wall, increasing the water harvesting capacity.

Upscaling the prototype creates interesting spatial possibilities. Placing it in a line against a wall is optimal for water collection, but it can also be arranged as a freestanding unit in an open space. Water is still collected, but with more arrangement possibilities.

Bench

Flower bed

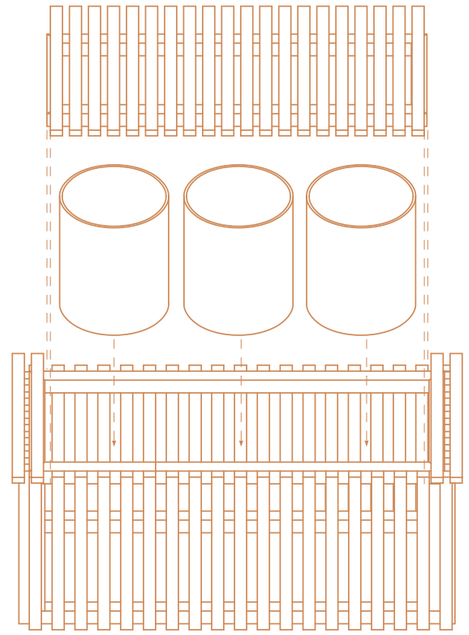


5.2 VARIABILITY

We adapted the design for MYDO using leftover wood found on site, but other materials are equally viable. For example, the side table was built as an experiment where the vertical panels are exchanged with sheet metal.

The hexagonal shape gives the bench a distinctive character but also demands more precision during construction. We therefore suggest a simplified rectangular version of the bench using only perpendicular angles, which serves the same purpose. The length of this can be adjusted to fit the chosen location but is less modular.

Beyond its initial purpose as a rainwater harvester, the built interventions demonstrate how the prototype can serve as both a social space and a planting bed. We purposely built the double module half flower bed and half seating to show that it is possible to do both. If more gardening space is desired, more flower bed modules can be made. The bottom part of the prototype still remains the same and can be used for water harvesting, or general storage if that is preferable.



6 EVALUATION

The evaluation of the project was conducted in two parts: one during the final day with the stakeholders, and another in Sweden with the four members of the project group. This chapter presents the conclusions and reflections from both discussions.

6.1 THE STAKEHOLDERS' THOUGHTS

As an evaluation method we used a manikin-inspired approach in which stakeholders placed stickers on emojis representing their level of satisfaction in response to a series of questions.

When being asked questions about the workshops and the co-design and co-building process, they were happy with the outcome. Extra attention was given to the level of involvement and being included in every discussion and decision.

"You didn't make a decision without me. Every time when you have a meeting, you involve me. When you had to do the measurements, you involved me. When you were about to cut the planks, you did involve me. I was so deeply involved in the project. Day in and day out." - Gladys

"We were working as a team" - Gladys

"I want the staff to build more benches next to the facade." - Hlakudi

However, there is room for improvement in the way we communicated and presented our ideas throughout the project. Gladys mentioned that she initially was sceptical during the second co-design meeting, as it was difficult to fully understand the proposal based only on sketches and verbal explanations. She also thought the time frame seemed tight, and that we would leave something half finished. Her perception changed once the prototype began to take physical shape, making the concept easier to understand and relate to.

"When you showed us the photos, during the presentation, I wasn't really sure. I was a bit sceptical. I wanted to see the final product." - Gladys

To summarise, the stakeholders expressed great satisfaction, pride, and joy with the final result. They appreciated the time we spent together and valued the skills and knowledge we shared with them throughout the process.

"I want to build one myself" - Sarah, clinic worker

6.2 OUR REFLECTION

Our project got off to a rocky start when our initial project site did not work out. Having to redo a week of preparatory work and mentally shift focus to a different stakeholder was challenging. Already adjusting to a new context and many unfamiliar impressions, the uncertainty at the beginning of the project left us feeling overwhelmed.

We learned to approach the project one day at a time and not be afraid of rethinking decisions when something did not feel right. This mindset later proved valuable in taking on other challenges that emerged during the project.

Another challenging aspect was co-designing. As we moved into the design phase of the project, we encountered a form of language barrier. This was not related to spoken language itself, but rather to the design specific vocabulary and methods we were used to. Communicating ideas in a manner that invited discussion and collaboration, rather than appearing as finalized decisions, proved difficult. In future projects, introducing small mock-ups earlier in the process could help dialogue and create more shared understanding of the design concepts.

Through this process, we learned that co-design does not end after the final design meeting, but continues throughout the co-building phase as well. One important agreement within the group was to always speak English on site during the building phase. This was a deliberate choice to ensure that stakeholders could participate in ongoing discussions about the prototype. We also came to understand that co-design is not only about making major decisions collaboratively, but also about creating involvement through continuous communication, information sharing, and asking questions.

6.3 COMMENTS FROM THE PRESENTATION

During the exhibition there was a discussion regarding whether this prototype could be implemented in Gothenburg as well. This made us reflect on the possibilities of the prototype outside informal settlements. As the bench's functions are universal, there is a great potential to implement it in other contexts. For example, gardening communities could benefit from it.

After the presentation we got a question regarding mosquitos gathering in the harvested water, spreading diseases. A suggested solution was to place mosquito nets covering the buckets, to prevent the risk of the water getting contaminated. We think this is a good suggestion and it would be interesting to look further into if mosquitos could be a problem in Pretoria.

7 DISCUSSION

Media representations of informal settlements have heavily influenced our expectations, leading us to expect something else than what Melusi is: a strong community spirit and resilience. This biased perspective aligns with what Eve Tuck (2009) describes as damage-centered research, narratives that portray a community by focusing solely on historical deficits and problems. For example, with a small budget, we drew inspiration from our surroundings and used the material on site in a resourceful and asset-based mindset, viewing scraps as something valuable instead of signs of lack.

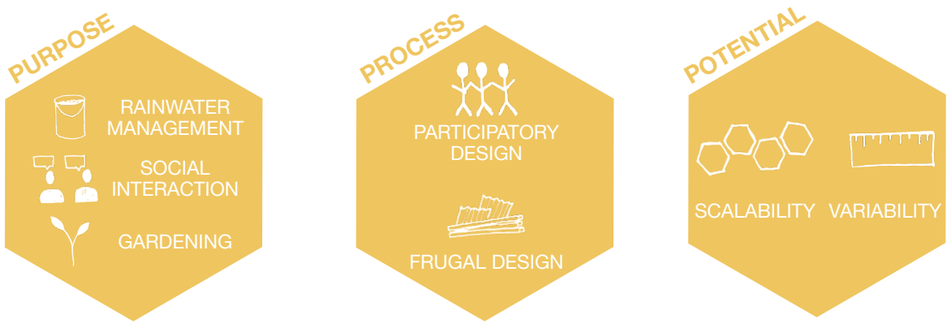
The process of co-creation allowed us to step away from the traditional role of an outside expert, and instead establish a mutual relationship built on equal terms. This collaborative approach allowed for an exchange of our design experience with the local knowledge. A clear example of this was when Thompson suggested using old bottle caps as bricks for the nails securing the woven plastic bag. This moment aligns with Hamdi's (2004) claim that when you invite others into a process, a small idea has the potential to grow and inspire.

Another key insight is that strict plans are difficult to maintain and uncertainty is a large part of projects of this kind. This became evident on our first day when our initial plan to collaborate with a local daycare center did not work due to lack of communication and misaligned expectations. Instead of forcing a predetermined project, we remained flexible and changed direction toward MYDO. This experience highlighted that not everything can be mapped out before arriving on site and that adaptability is crucial.

Hamdi (2004) argues that in order to make a large impact, one must begin with something small, and begin where it counts. Our project embodies that philosophy by a simple solution to a large problem where a gutter would usually be preferable. We wanted our solution to be applicable by others in the community, which resulted in a solution that can be scalable and adapted to fit different contexts around the world.

To answer the research question, co-creation and relationship building is key to combining skills, creating something appreciated. Being open minded and establishing a relationship based on equal terms is essential for the process to reach its potential.

"How can we combine our design skills with local knowledge from an informal settlement to create a useful and appreciated intervention?"



6. Clean Water and Sanitation

Through co-design we are implementing a rainwater harvesting system that improves water management, and provides a sustainable source for activities such as gardening. The prototype targets the goal of organizing and managing water resources. Through co-design it also supports and strengthens "... the participation of local communities in improving water … management." (United Nations, 2026a). The final prototype opens up opportunities for scalability and is applicable in the entire community, acting as a small-scale solution to a structural problem.

11. Sustainable Cities and Communities

The prototype aims at improving the facilities at the youth center, contributing to the goal of making human settlements more inclusive, resilient and sustainable (United Nations, 2026b). By combining a co-design process with the usage of local materials, the project focuses on sustainability and community participation. As a result, the prototype not only upgrades the facilities but also creates a sense of ownership and pride among the stakeholders. The project contributes toward target 11c, since it utilizes local materials and local construction methods. It helps MYDO become more resilient towards flooding and makes the space more attractive by offering seating and space for gardening.

12. Responsible Consumption and Production

By adopting a frugal design approach, the project relied heavily on reused and recycled materials. Through this approach the project targets the Sustainable Development Goal 12 that involves "... reduce waste generation through prevention, reduction, recycling and reuse." (United Nations, 2026c). Furthermore, the co-design process helps the community develop skills and knowledge that support more sustainable ways of producing and using resources. The prototype can be constructed by using local, non-electric tools, such as saws, nails, and hammers. By repurposing local scrap material, the project demonstrates how local low energy construction can address needs.

8 CONCLUSION

The project demonstrates how small scale, local materials, and methods can deal with complex challenges within informal settlements. By focusing on collecting rainwater, the project resulted in a multifunctional solution that decreases flooding in the backyard, while creating a valuable social space with flower beds. By aiming the design towards UN's Sustainable Development Goals 6, 11, and 12, the project proves that a lack of resources can be met with smart sustainable solutions.

The core of the project is the co-creation process. The process has created a mutual relationship, where learning from each other has been the highlight. Consequently, this collaborative approach has created a feeling of ownership and pride among the stakeholders. The journey has also proven that uncertainty is a large part of the process, highlighting the importance of remaining flexible.

The prototypes built at MYDO are just small examples of the water harvesting bench's potential. The use of local methods, tools, and scrap material, makes the solution adaptable and scalable. Together with the instruction manual, the project inspires residents in Melusi to implement similar solutions to their own homes.

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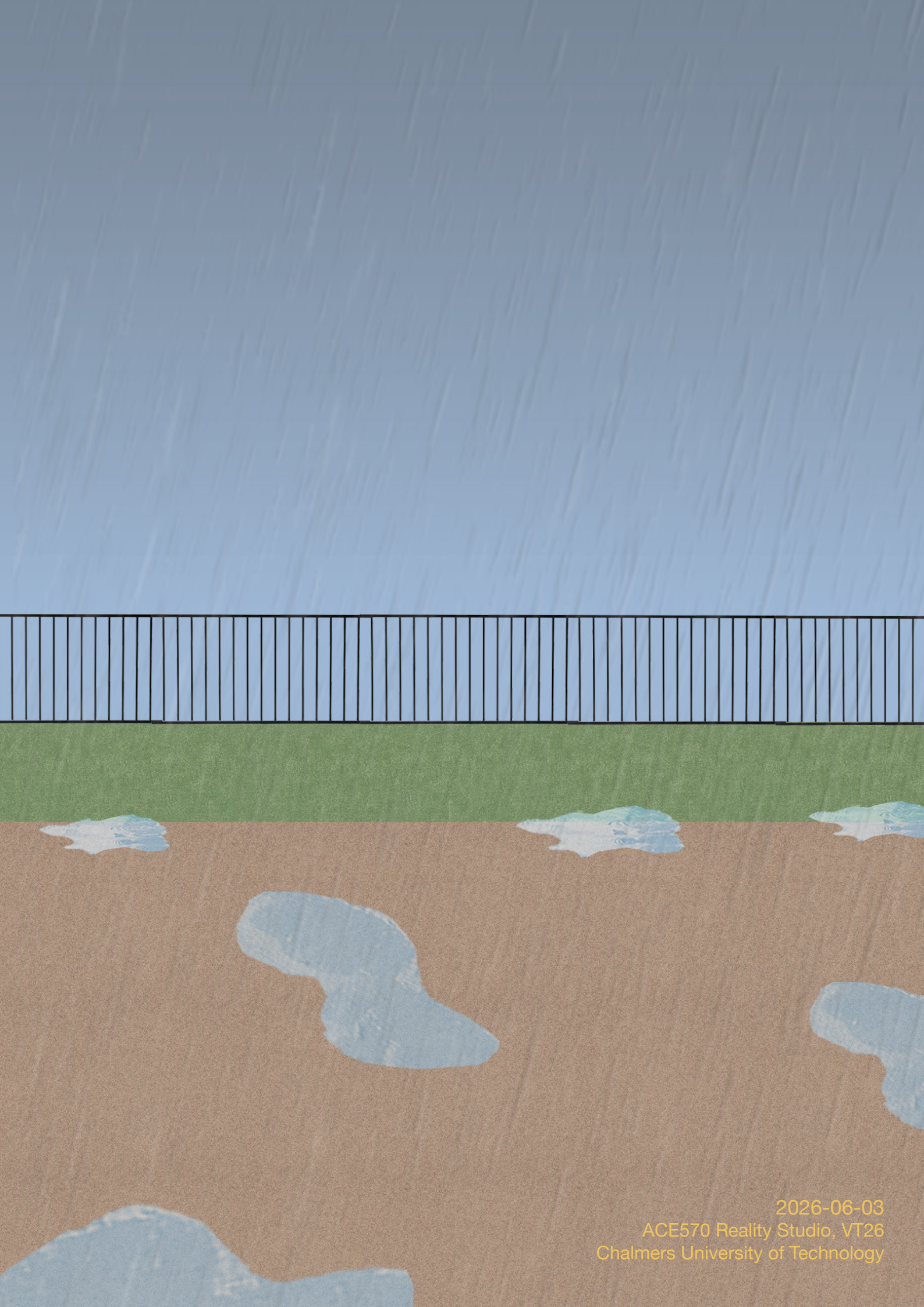
AI Statement

In this report AI has been used as a tool in assisting with cleaning up and clarifying sentences written by the authors. It was also used to brainstorm ideas for project names.



2026-06-03
ACE570 Reality Studio, VT26
Chalmers University of Technology

APPENDICES

APPENDIX 1

Construction Handbook

See separate document:
Appendix 1 Construction Handbook

APPENDIX 2

NAIL

PROJECT BOUNDARY DEFINITION (NAIL)

Project Name/Title:
Rain as Resource: Rainwater Harvesting and Social Interaction

Team Members:
Ida Jansson, Agnes Klang, Victoria Rosén, Hugo Wahlsten

Ingress:
How do we create the conditions for a sustainable future in an area defined by its challenges? Through a collaboration between the MYDO (Melusi Youth Development Organisation), in South Africa and students from Chalmers University of Technology, this project emphasizes an approach of trust and long-term thinking. With the main focus areas of water management, social interaction and scalability.

Project Background & Context
The decision to undertake this project was driven by a shared interest in improving and supporting the daily needs of children and youth. We believe that the future depends on a stable and nurturing upbringing to act like a cornerstone for building a more sustainable and fair community. Furthermore, the project collaborates with MYDO, whose partnership with Chalmers University of Technology began in 2025. In a project of this nature, technical solutions need to be put aside from the main objective and instead focus on maintaining the relationship that previous Chalmers students already established with the stakeholders. MYDO is located in Melusi, an informal settlement in Pretoria, South Africa. Our project aims to improve infrastructural gaps that impact the facilities usage in wet weather conditions.

1. (N) Need Finding
1.1. Primary Stakeholder/User Groups

- MYDO - Melusi Youth Development Organisation
    - Staff
    - Kids
- Dr Karen Bobes, senior lecturer at the Department of Architecture at the University of Pretoria.
- Jason Oberholster, architect, researcher and lecturer working at University of Pretoria.
- Chalmers UNiversity of Technology

1.2. Guiding Questions

- What activities go on at a Youth Center?
- What are the needs of the children and the employees at a Youth Organisation?
- What does an ordinary day at a Youth Center look like?
- What does a useful space look like in this context?
- How was MYDO started, how has it developed and how will it continue to develop over time?
- What are MYDO's long-term goals?

1.3. Needs

1.3.1. Expressed

- Building:
    - Lack of space (small computer rooms and offices)
    - Not enough storage
    - Heat management issues
- Parking:
    - Inadequate ground material (the sand gets muddy and uneven in rain)

    - Insufficient shading roof (easily damaged and lets through rain)
- Stage:
    - Missing a backstage area
    - Shading-structure is broken
- Garden:
    - Insufficient (not providing enough produce)
    - High maintenance
- Play area:
    - Not much to play with
    - No seating area
- Repairs:
    - Roof of main building is leaking
    - Benches in front seating area are broken
    - Electricity and solar panel issues

1.3.2. Latent

- Water management issues
- Poor ventilation in main building

2. (A) Aim & Methods

2.1. Aim

The main objective with the project is to create a scalable intervention and a clear plan for potential further development that is manageable by the community. We hope to inspire others with simple, but efficient, ideas that can be multiplied in other contexts. The purpose of the project is to create a low maintenance, well-functioning and joyful space to work in everyday. This means developing a durable intervention that targets the water management issues at the site while improving social spaces. The tangible results the project will produce is improvements in rainwater harvesting and repurposing of collected water.

2.2 Methods & Design Criteria

Our initial idea is to do a walking and talking-workshop combined with a semi-structured interview, to get to know the primary stakeholders and the context in a less interrogative way. To map out the surroundings a workshop will be conducted with the staff where they map out areas that work well and spaces that could use some improvement using post-its and a map of the site. The workshop will also include a modification of the dream-wall workshop where the participants are allowed to dream big and inspire ideas for the project. To map the context from a children-perspective, we will host a drawing workshop with the kids. In addition to that, observations of the kids will be helpful to understand how the site is used, appreciated and what may need improvements. In general we will use an evaluating method to collect thoughts from the children, staff and from ourselves.

For the design process, participatory and frugal design are the guiding methods that determine the project's final outcome.

2.3 Timeline

Week	Task
15 (field)	- Mapping out needs - Building trust and creating a relationship with primary stakeholders - Orientation of the site (walking and talking-workshop)
16 (field)	- Needs and dreams workout with staff - Project formulation - Kids workshop for relationship building and design ideas - Start participatory design process
17 (field)	- Participatory design - Researching material options
18 (field)	- Finalize co-design - Collecting materials - Start prototyping/building
19 (field)	- Finalize building - Evaluation - Handover and future - Goodbye
20 – forward	- Summarize field study - Write report - Present result

3. (I) Impact

3.1 Indicators

- The parking space has less issues with puddles appearing during rainy days.
- Rainwater is collected in a mindful way, with the possibility to be used for watering the garden.
- The intervention is well used for its purpose and maintained over time.

3.2 Sustainability goals (UNSDG, National, Local)

GOAL	TARGET
6. Ensure availability and sustainable management of water and sanitation for all	Implementing a rainwater harvesting system improves water efficiency by providing a sustainable source for activities such as gardening.
11. Sustainable cities and communities	By improving the facilities at the youth center we contribute to the sustainable development of human settlements.
12. Responsible consumption and production	The project is made through frugal design, meaning that we use local and reused materials and local building technologies. Potential scaling to this project can be made through reuse.

4. (L) Logical Framework Matrix

	Project Description	Performance Indicators	Monitoring	Assumptions (Risk Assessment)
Overall Objective	Overall objective: decrease the amount of rain water contributing to landscape degradation and the possibility to harvest the water for other necessities. Definition: By decreasing landscape degradation, less work hours and means need to be invested. Collected water can be used for other activities such as gardening, washing dishes, etc., contributing to a sustainable society and more possibilities dependent on water. Scope: The intervention is developed in a frugal, durable, and manageable way, ensuring a long-lasting and scalable product.	Landscapes are in a better condition after a rain period compared to without the intervention. The harvesting of water is effectively used for other necessities. The intervention can be carried out using simple and affordable methods that don't require much money or special resources. Less hours get spent on landscape management. The prototype is durable and long-lasting.	Observations Surveys Reports Interviews with stakeholders Weather/climate data	Not required for overall objective.
Project Purpose	Purpose: An intervention collecting the rain water pouring from the roof. Definition: A finished prototype of the intervention working in action, demonstrating its functions and scalability. Scope of the project: A prototype of frugal materials, demonstrating its functions in MYDO's environment (specifically collecting the rain from the roof of the main building)	Comparing the parking lot before the incorporation of the intervention and after with pictures. How many liters of water that can be harvested. If the harvested water is used for other necessities.	Asking stakeholders at MYDO. History of typical weather data from articles/research papers.	Lack of rain when the intervention is being tested. Lack of time to finish the prototype. The wishes of different stakeholders. Problems that might occur at the site that are more emergent.
Results (Outputs)	Results: The water from the roof is effectively collected by the intervention. The parking lot is more even after a rainy day.	Less water left in the parking lot after a rainy day. The prototype is used for its various purposes.	Likert-scale Durability test Feedback from people who tested the results.	Material availability. Interest of the stakeholders. Participants available time.

	Definition: The intervention is completed and working as intended.			
Activities	Orientation and relationship building. Needs mapping and project formulation. Workshops and co-design. Material and resource finding. Building of intervention. Evaluation Handover	Knowledge of needs Personnel for design and building. Tools for design and sketching. Building materials. Equipment for assembling a prototype.	Cost for building materials, however, the goal is reuse and a low budget project. Transportation costs.	How many people are interested in partaking in the activities? Limited budget. Struggling to find building materials.

4.1 Stakeholder Analysis Matrix

Stakeholder and basic characteristics	Problems (How affected by the problem(s)	Interests (and possible actions to address it)	Potential (capacity and motivation to bring about change)
MYDO	Flooded facilities and unsatisfied children and employees.	Wishes for a well working establishment. Possible action: Approve of ideas and maintain them.	High - They are the ones making decisions regarding the establishment. The motivation is high since the organisation wants to remain.
Staff	Difficulties parking due to flooded facilities.	Improved outdoor areas. Possible actions: Giving feedback on what works or not. Providing local knowledge and future maintenance.	High - They work at the establishment every day and are very motivated to improve the facilities and the organisation.
Children	Unable to play outdoors in the rain. Wet and dirty feet.	A well functioning area to play and hang out in. Possible actions: Take part in a workshop and inspire ideas for the design.	Medium - The intervention improves facilities for daily activities.
Parents	Drying and washing the children's clothes.	Happy children, happy parents. Possible action: Give inputs to the project. Maybe help during building days.	Low - Could contribute with local knowledge to help improve the community.
University of Pretoria	*undefined	Has previous projects done at the site. Possible action: Contribute with knowledge and workforce during building days.	Medium - Could continue to build on our started project.

APPENDIX 3

Workshop 1 – Walk & Talk

“Walk and Talk” - Workshop

Date: 9/4-2026
Attending: Ida, Agnes, Victoria, Hugo, Gladys, Shane

Questions:

- What are some potential improvements or new ideas that you want to work on?
    - Creche, bus-stop, kiosk
- Is there something that works very well and you are proud of?
- How do you see this partnership working?
- How should we manage expectations?
- What is your schedule for the upcoming weeks?
    - Any events?
    - Regular day basis schedule
    - When is a good time to visit/work on site?
- Who are the people studying in the MYDO?

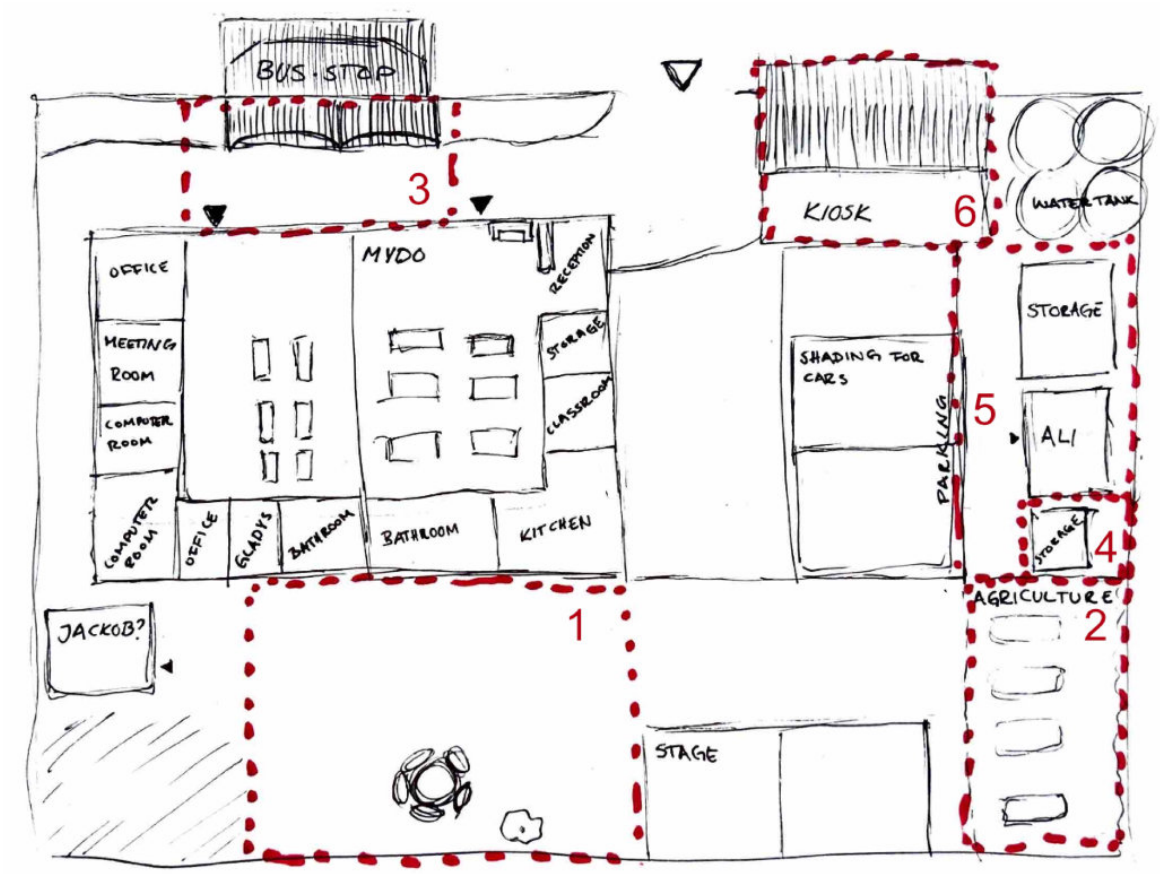
Preferable Outcomes:

- A list with needs to choose from
- Primarily finding a project at MYDO or Community Hall to focus on
- Established a field worker and started on a relationship with hen
- A time plan for next week.
- A structure for how we all work together and who is doing what

Roles:

- Agnes is the contact person for our group.
- Victoria is the social media co-creator.
- Ida is responsible for making sure everything looks cohesive (report).
- Hugo is the photographer during the field trip.

Outcome



Drawing of MYDO siteplan, 10/4-26, marked out areas are potential project sites.

Possible project areas

1. Backyard playground

Current state:

- Four big tires forming a “playful fortress”
- 50 kvm of lawn
- Sun is not a big issue since it is used in the afternoon and not for very long

Our ideas/comments:

- We are the most excited about this!
- Some kind of moveable playground installation
- Seating
- Multifunctional: not directed play and also for multiple ages (sitting vs playing)
- Educational agriculture in the left corner, to also divide from

Usage:

- Youths 5-16 years
- Approximately 30-60 minutes after homework in afternoon
- Independent play without equipments
- Weather dependant, if it is rainy they play in the community hall

2. Agriculture, Gardening

Current state:

- A few gardening piles, one of them is framed by glass bottles
- Wood and other materials lay in the corner between the garden and the storage.
- A storage with an unorganised chaos.

Our ideas/comments:

- Educational garden.
- Organising the garden and storage.

3. Back-side of bus stop (relax/dinner area outside)

Current state:

- Broken bench, exposed to a lot of sun during the day.

Our ideas/comments:

- Repairing of the bench and expanding the shading roof.
- More innovative seatings

Usage:

- Sort of a eating, hanging out, waiting area
- Seeks spots to sit in with shade

4. Storage connected to the gardening

Current state:

- Painting cans and other random stuff stored on the floor.

Our ideas/comments:

- Organise it, add shelves and functional furniture
- Integrate with the garden project

5. Fence dividing driveway from shacks

Current state:

- At the moment an unfinished structure. Kids running around among the water tanks is not good. Want to have the fence as something to divide the kids playing area from the staff/private area.

Our ideas/comments:

- Creating a multifunctional fence. Including benches and working more with the different functions on each side of the fence.

6. Independent driven kiosk

Current state:

- Hidden from people using the road
- Lacking of proper signs that advertises their business

Our ideas/comments:

- Wishes the structure to be closer to the road to be able to sell better.
- Better exposed and expresses more clearly prices, assortment, etc.

APPENDIX 4

Workshop 2 – Needs Mapping

“Mapping the Surroundings and Dream Wall” - Staff Workshop

Date: 16/4-2026
Attending:

- *Chalmers: Agnes, Ida, Baika, Juliane*
- *MYDO: Thompson, Shane, Gladys, Johanna, Kgabo, Shaila.*

Notes:

- Aim:
  - Confirm mapped out needs and decide what to work with, start discussion of who is relevant to work closer with.
- How: Mix of mapping the surroundings and dream wall
  - Discuss needs (from both sides)
  - What is most urgent/relevant/interesting?
- Expectation management: Explain what we are looking at doing, our assignment.
  - Identifying a need and by working together with you in a partnership coming up with an improvement to this need. In the shape of a prototype, meaning not just repairing but coming with something new.
  - Small scale, considering the time we have.
  - No budget, so as close to free as possible, looking into materials you have available in the area.
- Preparations:
  - A 2D-map of MYDO`s facilities
  - Post-its in different colors
  - Pencils
- Remember:
  - Discuss water management issue
  - Potential materials
  - Discuss potential projects we have seen, and confirm if they are interesting.

Plan:

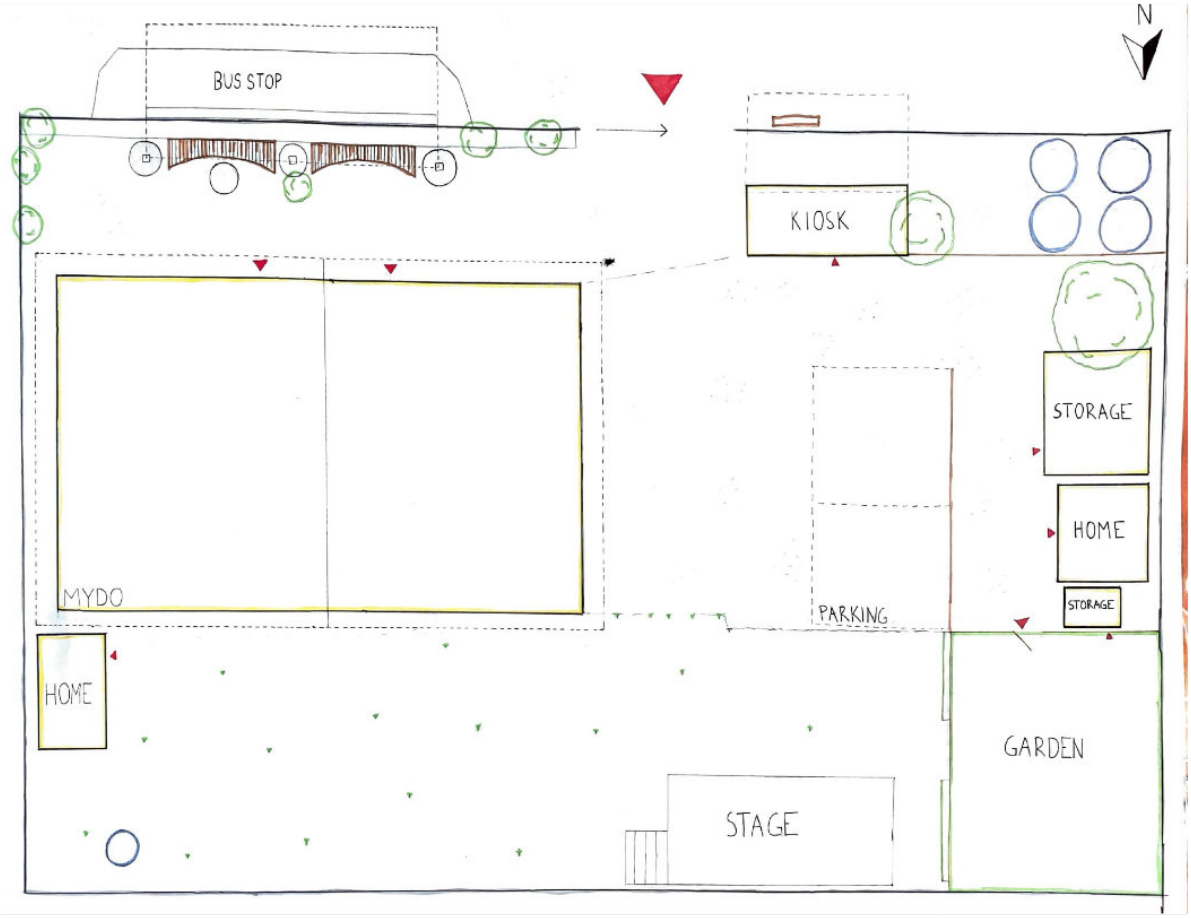
1. Current site (what works/doesn't)
    - Post its
    - Noted needs from us
    - Map out how different spaces are used today (yellow)
    - Write down things that work and does not on post its (green/pink)
2. Free dreaming
    - Post its, tape, pencils
    - Brainstorm different dream scenarios for different spaces (blue)
    - No money-limitations, its a DREAM SCENARIO
3. Prioritising (without expectations)
    - Put a star sticker on the area that is the most important to you and what you feel is the most urgent need.
4. Discussing why and narrowing down
5. Summarize result and manage expectations
    - Identifying a need and by working together with you in a partnership coming up with an improvement to this need. In the shape of a prototype, meaning not just repairing but coming with something new.
    - Small scale, considering the time we have.
    - No budget, so as close to free as possible, looking into materials you have available in the area.

- At later stage:
    - Equipment, material, labor, people/contacts/ -> options

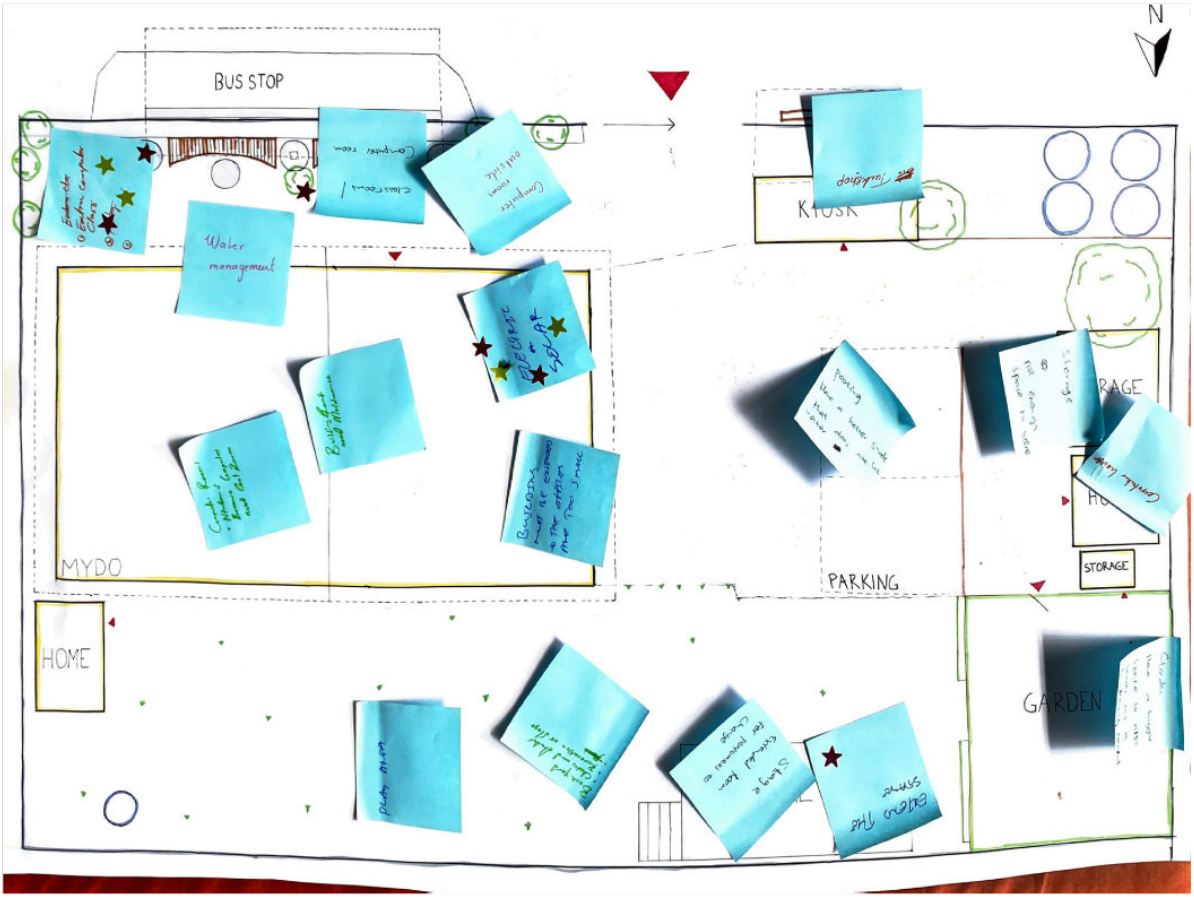
Evaluation:

Map 1 - Mapping out Needs

- Discussing the qualities and potential improvements of existing spaces at MYDO, focused on the outdoor area.
- A lot of spaces are appreciated, such as the parking lot, the stage, the backyard, the garden, in front of the house and the tuck shop/kiosk.
- There are a lot of potential improvements to a lot of these places such as paving and upgraded shading to the parking, more activation in the garden, fixing the backdrop and adding a changing area to the stage, and making the garden bigger, as well as improving storage in general
- Some comments:
    - Improvement parking: shade, paving
    - "I love da stage"
    - "I love da back of MYDO as play area"
    - About the temperature in the building: "Boiling"



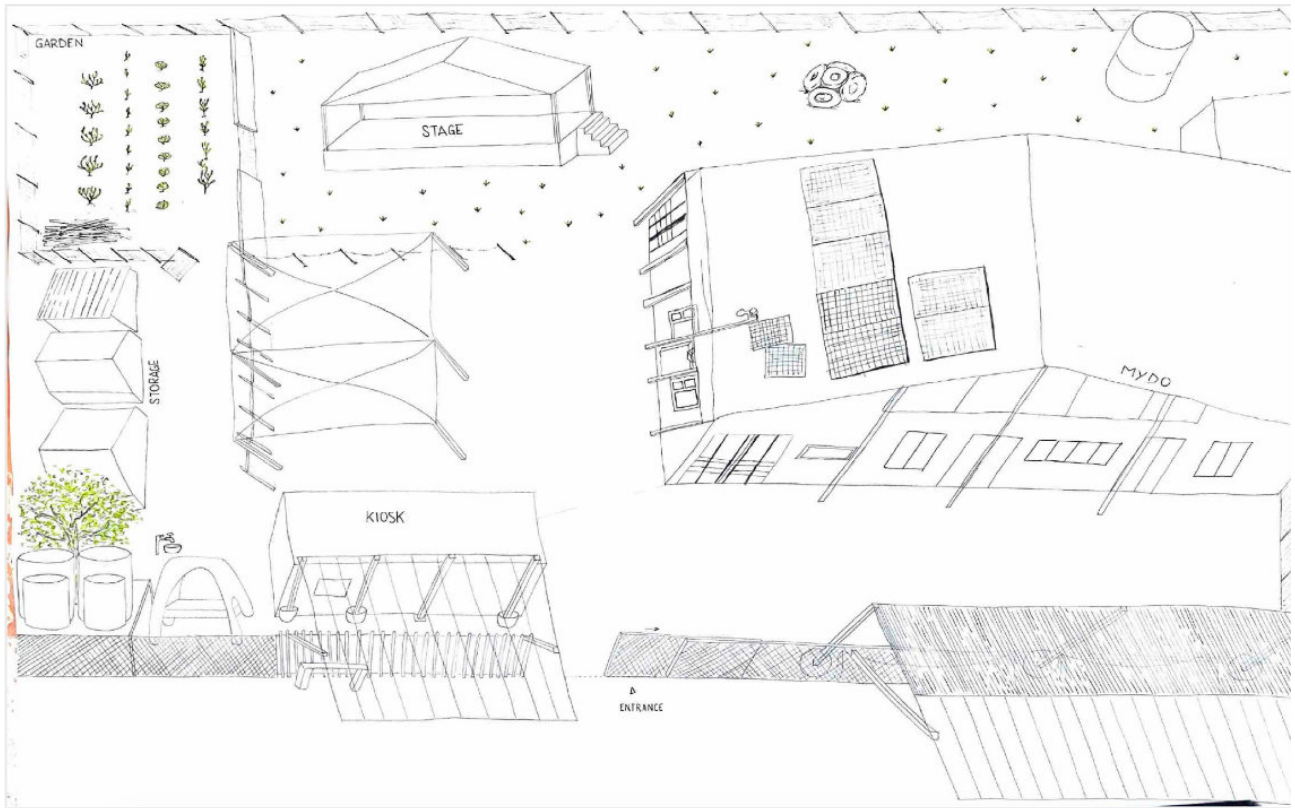
Mapping the Surroundings Map - Before



Mapping the Surroundings Map - After

Map 2 - Mapping out Dreams

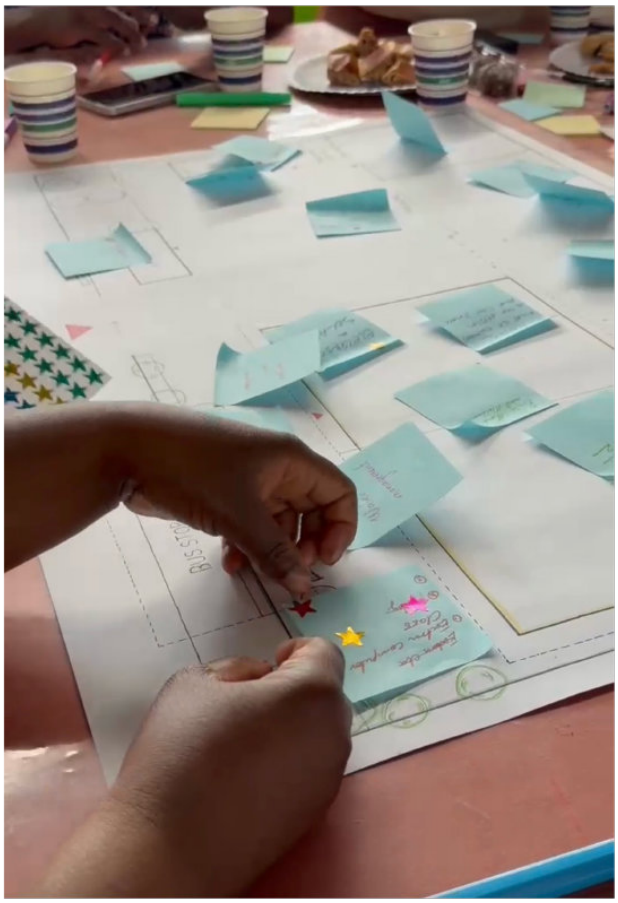
- The staff were allowed to dream big and have no limitations. The discussion became more focused on the indoor facilities.
    - Need for more computer labs
    - Heat management
    - Larger offices
    - Electric and solar-panels
    - Repairing roof
- Some outdoor dreams
    - WATER: The road slopes down to the building creating an issue with water management.
    - STAGE: Changing room for the stage and making the stage bigger
    - GARDEN: Making the garden bigger to function as a fundraising element
    - STORAGE: Not enough space for storage
    - TUCKSHOP: Making the area within and around the tuckshop bigger
    - PARKING: Pavement for the parking and a metal shading roof that does not let rain through
    - PLAY AREA: More activation on the outdoor play area (seating and activities)
- Most important (sticker):
    - Computer classrooms, electric and solar solution
- Conclusion:
    - Water management is our project!
        - Motivated by improvement of the parking that gets muddy and water that collects in the wrong spaces. Bonus is that extra water can be used for the garden.
    - Garden expansion is requested but might not be long lasting because of maintenance issues.
        - Continue discussion with Ally!
    - The other group will work with the play area.



Dream Wall/Map - Before

Dream Wall/Map - After

Pictures from the Workshop:



APPENDIX 5

Workshop 3 – Children's Workshop

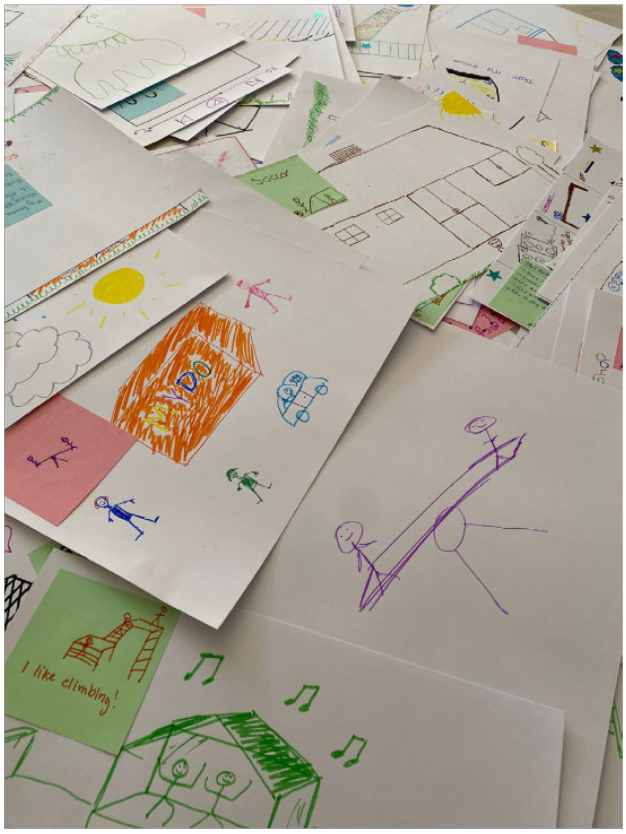
”Dreaming Through Drawing” - Children’s Workshop

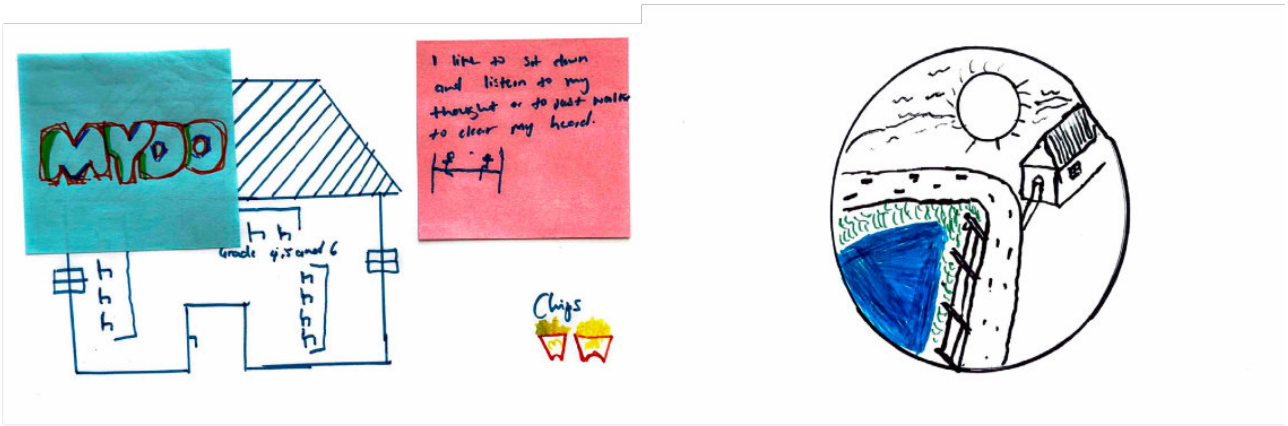
Date: 18/4-2026
Attending:
- *Chalmers: Ida, Agnes, Victoria, Hugo, Joshua, Julianne, Mathilda, Baïka*
- *MYDO: Staff and kids from MYDO*

Reflection:
- A lot of fun drawing, playing, and dancing.
- Building a great relationship
- They are all suuuuper friendly and happy to play and dance.
- It was very sweet that the children gave us letters to say thank you.
- We brought food (not their favourite) but swedish gifflar and candy was very much appreciated.

Drawing Station:
- We asked them to draw their favourite thing about MYDO and on a post it wrote what they enjoy most at the playground.
- Other questions such as their favorite color, food, what they like to do after school were also asked.
    - Many of them said art and soccer.
- I would say that getting them to draw something specific that could be “useful” was a bit tricky, but the focus today was to have fun and establish a fun and happy relationship with the staff and the kids.
- The kids are the core of MYDO so meeting them and showing the staff that we truly want to get to know them was important.
- The kids are great artists and really like to draw:
- Perhaps: When our intervention is finished, we can hold a workshop with the kids again where we paint the intervention/prototype.

Result Photos:





Pictures from the Workshop:

APPENDIX 6

Workshop 4 – Co-Design Meeting 1

Co-design Meeting 1

Date: 22/4-2026
Attending: Ida, Agnes, Victoria, Hugo, Hlakudi, Gladys, Shane

Plan:

- Send out a message (via Whatsapp) with the date and agenda for the meeting.
- Describe issue: Pictures from when it's been raining
    - Water is pouring down from the roof onto the parking, making the ground uneven and creating water puddles.
    - This water could be redirected and collected in a barrel, and later used for other purposes, such as gardening or playing.
- The scale we work on/concept
    - You have expressed that it would be good with paving but we have so little time our intervention will help in the meantime/as an addition
    - Rainwater harvesting from the roof to avoid the puddles from that
    - Use water for ex. gardening, doing dishes, play
    - Activate the rain harvester: bench or plant bed
    - Simple and cheap/free materials for scaling to other places
    - Avoid permanent solutions: ex as little drilling into current structure as possible
- Show our proposals:
    - Small structure, no imposing on current structure
    - Water collection from the ground

Questions:

- Feedback on our ideas?
    - What do you agree with and not? Ex. no drilling, and bench idea
- Is there anything we haven't thought of?
- Do you have any ideas of your own on how to solve this issue in a similar way?
- You have a similar solution for the tuck-shop, where did you find these materials?
- What material do you think might be useful for this type of structure?
    - Can we use the material next to the garden?
    - Is the chain used for anything?
- What could the collected water be used for?
- Is there someone that would be interested in helping us build?

The Slideshow:

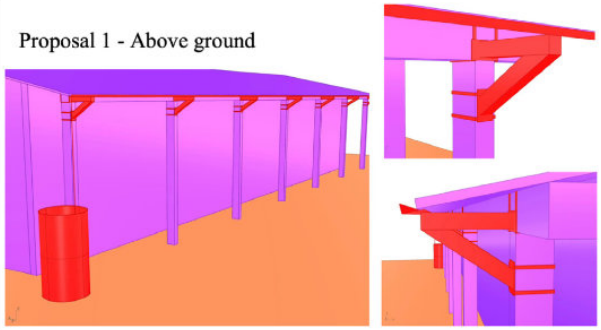
MYDO - When It Rains



Important points

- Small intervention that we can build during our time here
- Low budget
- Low maintenance
- Long lasting
- No damage to the existing building

Proposal 1 - Above ground

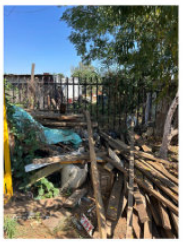


Proposal 2 - In ground

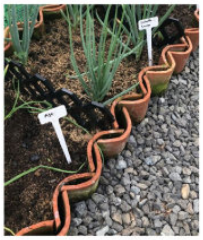
Available Materials



Available Materials

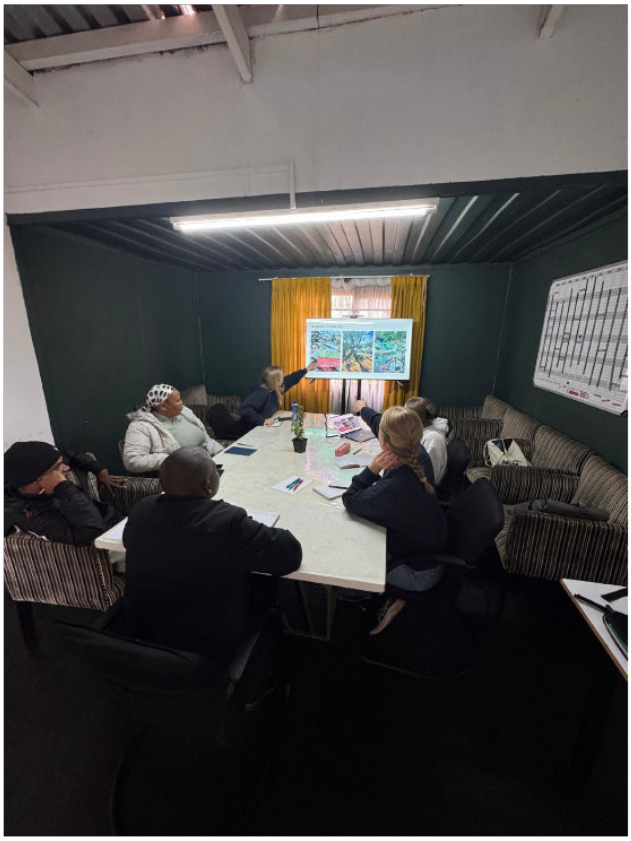
How do we repurpose the water?




- Gardening
- Playing
- Other ideas?

Appendix 6

Pictures from the Workshop:



APPENDIX 7

Workshop 5 – Co-Design Meeting 2

Co-design Meeting 2

Date: 28/4-2026
Attending: Ida, Agnes, Victoria, Hugo, Gladys, Shane

Plan:

- Completely new ideas and projects, created after discussion with teachers.
- Give a heads up to the stakeholders that there are new ideas.
- Go through slideshow
- Hold off with detailed sketches to get ideas from the MYDO staff before getting hung up on our ideas.

Wanted Outcomes:

- OK on the project from the stakeholders
- Who is participating in the co-building phase?

The Slideshow:

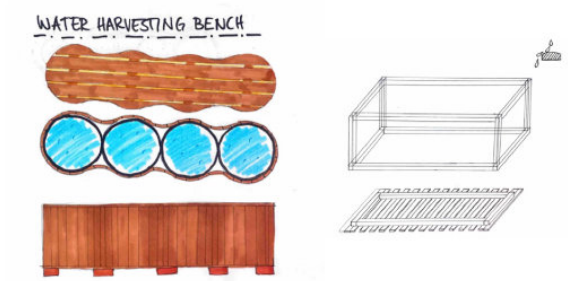
MYDO - When It Rains

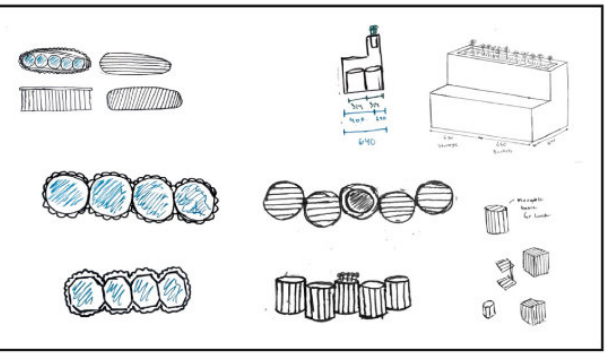


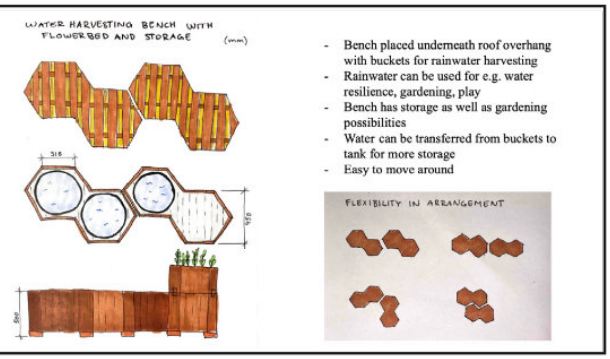
Important points

- Small intervention that we can build during our time here
- Low budget
- Long lasting
- Flexible and moveable
- Aim: low maintenance

- After discussion with our teachers: an intervention on ground in a smaller scale than before, not imposing on the building





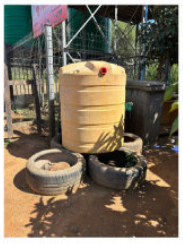


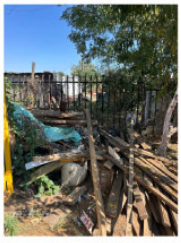
- Bench placed underneath roof overhang with buckets for rainwater harvesting
- Rainwater can be used for e.g. water resilience, gardening, play
- Bench has storage as well as gardening possibilities
- Water can be transferred from buckets to tank for more storage
- Easy to move around

Potential placements



Available Materials


Water tank (MYDO) - reserve


Wood (MYDO) - main building material

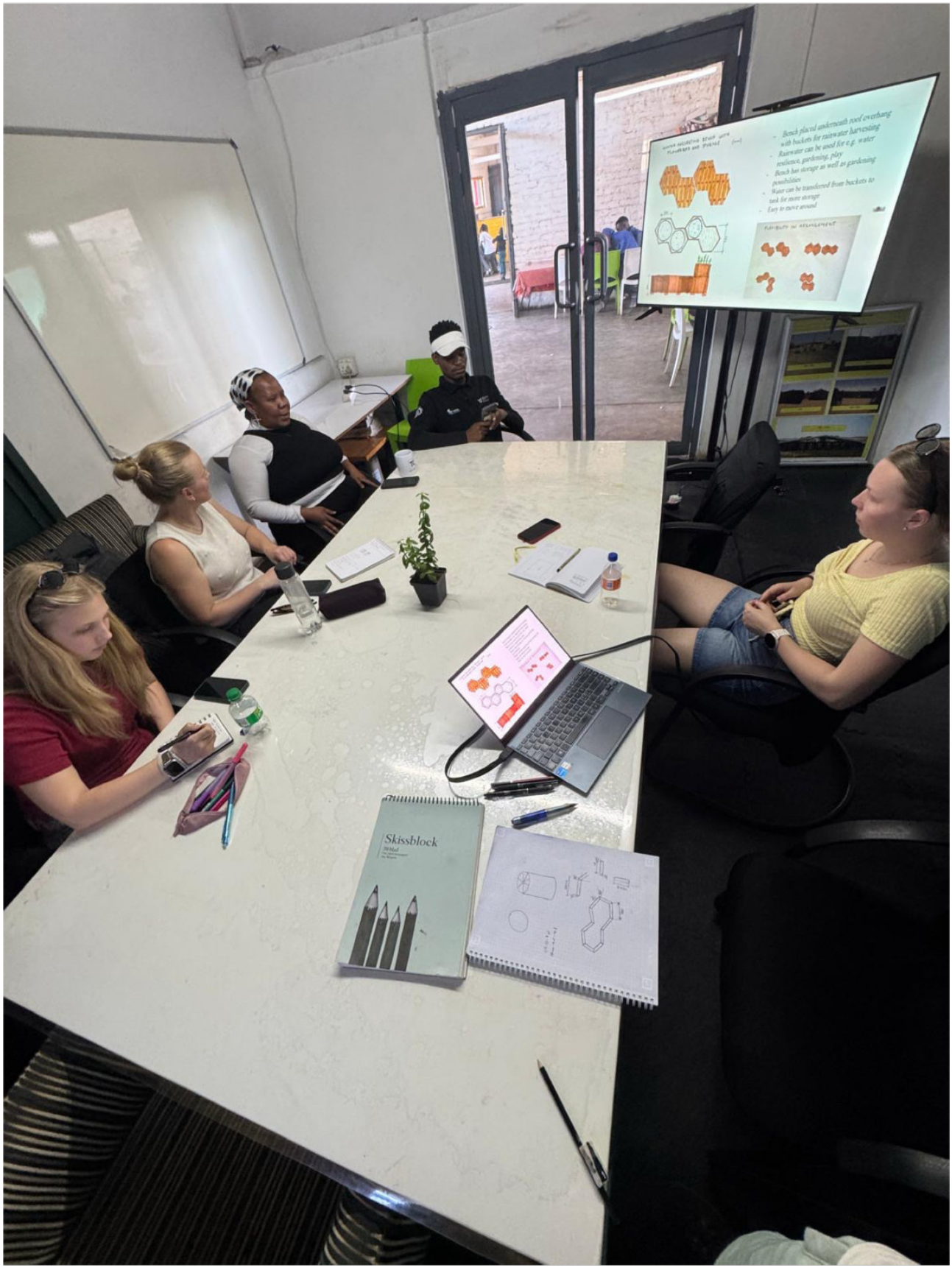
What to do with the water?

- Reserve
- Gardening

New materials - Cost estimation

	What	How many	Unit price (R)	Total price
2	Wood	100	0	0
3	Water tank	1	0	0
4	Screws 100pc 10x40mm	1	69	69
5	Screws 50pc 4x70 mm	1	49	49
6	Protractor (gradskiva)	1	31	31
7				
8	Paint			0
9	Buckets	5	85	425
10	Bricks (under the tank and bench)	12	0	0
11	Sheet metal?			0
12	Sand paper	1	60	60
13	Soil	1	22	22
14	Plant (spinach)	1	40	40
15				
16	Total			696
17	Total per person			174

Pictures from the Workshop:



APPENDIX 8

Evaluation and Handover

Evaluation and Handover

Date: 7/5-2026
Attending: Ida, Agnes, Victoria, Hugo, Gladys, Shane, Thompson, Hlakudi

Plan:

- Interactive: Manekin evaluation
- Maximum 30 minutes
- Roles:
    - Agnes and Ida: Talk
    - Victoria: Take notes
    - Hugo: Pictures and time

Questions:

- What are your thoughts on getting to know and working with us this month?
- What did you think of the process in general?
    - In which way did you feel involved? Was it enough, too little, too much?
- How did you experience the initial workshops?
    - Mapping out needs and dreams, kids workshop
    - What did you like? What can be improved?
- What was your experience during the co-design process?
    - Did you feel involved and like your thoughts and ideas were heard?
- What did you think of the co-building?
    - What did you like? What can be improved?
- Your thoughts on the final result?
    - Is there anything you would have wanted to do differently?
- How will this bench be used? Who will take care of maintenance? Do you think it will fulfill its functions?
- Your favorite memory with us?

Hand-over:

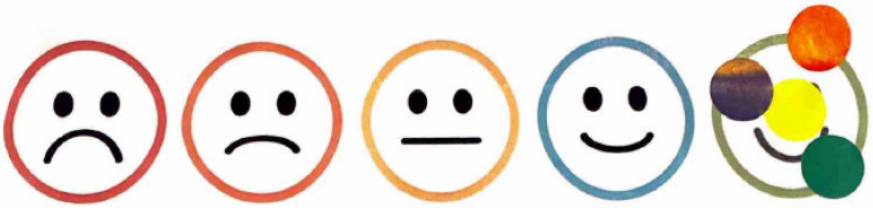
- Personal: Collage/image and frame (4 - MYDO, Gladys, Shane, Thompson?)
- At presentation: Short description, show how it can be used.
- Report: Drawings/sketches of how the bench is built/can be replicated (simpler versions) and how it can be used and modified.

Appendix 8

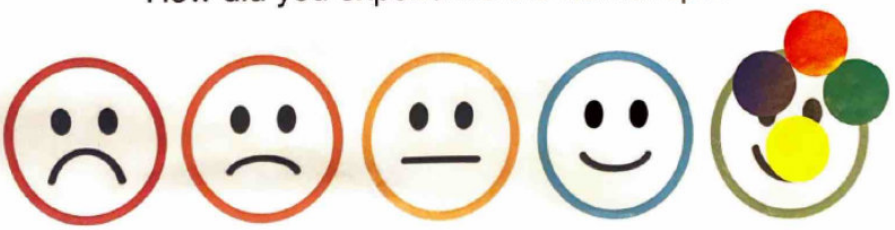
Result:

What did you think of working with us this month?

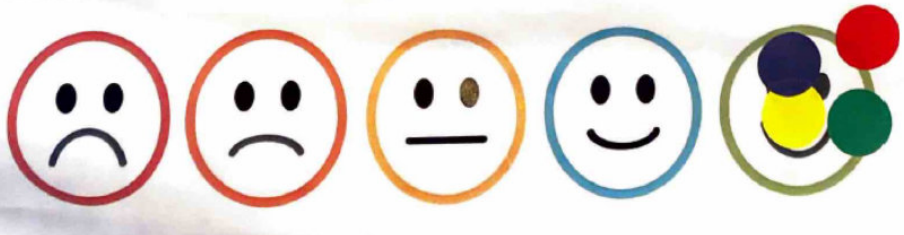
Did you feel involved in the process?



How did you experience the workshops?



Your thoughts on the final result?



Appendix 8

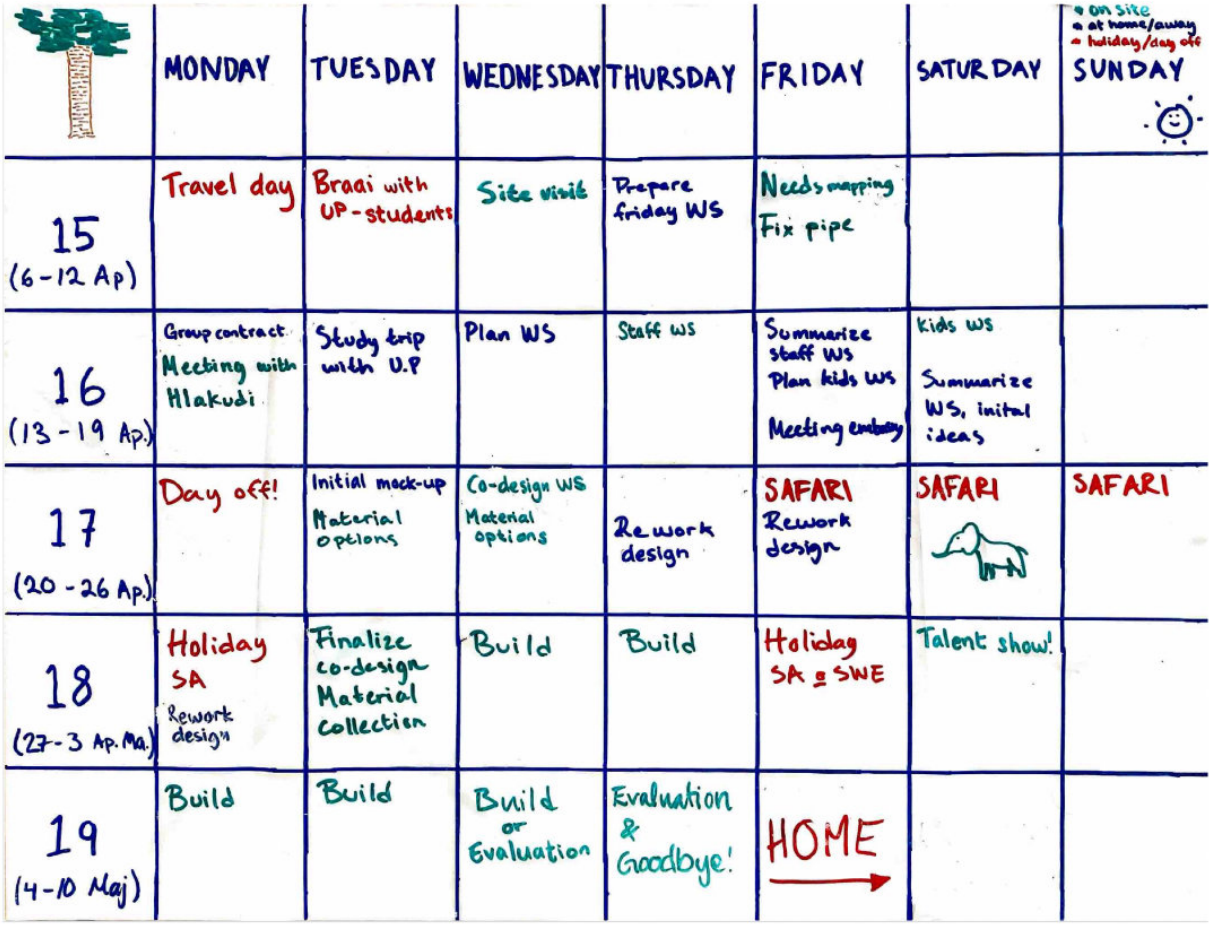
Pictures from the Event:

APPENDIX 9

Schedule

Schedule: Week 15-19

- Physical Schedule hanging in the hostel.



APPENDIX 10

Physical Model

Physical Model

APPENDIX 11

Cost Estimation

Appendix 11

Cost estimation			
Item	Amount	Unit price (R)	Total price
Bits	1	49	49
Brush kit	1	59	59
Buckets	3	85	255
Ear plugs	3	8	24
Gloves	4	20	80
Metal sheet	1	5	5
Protractor	1	18,5	18,5
Soil	1	45	45
Total		895.50	
Total per person		223.875	