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BUSINESS CASE

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Team 9

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Part 1: Business Case & Project Outcomes

Introduction

Since we share everything on Earth with every living thing on the planet, what happens in one area affects everything too, no matter how far away. Pollution of waste materials in our environment has negative effects on the ecosystem we rely on.

A small informal town called Imizamo Yethu which is a home to about 20-25 thousand (initially 15 538 as of 2011) has been having waste disposal issues since it was established as a living area. The waste causes several problems such as when the waste is irresponsibly dumped in the streets, some of the waste gets washed by rain into the river and some ends up in sewage systems which cause blockage. The blocked drains bursts and the sewage water ends up on the streets which results in health issues.

The Western Cape government as well as a Non-Profit Organization called Thrive have been involved in trying to solve this issue for a long time. Though the Western Cape government was not hugely involved in the project they did supply the community with space for the town's recycling compound to be built, the rest was all left for the NGO Thrive to solve the problem. Thrive has proposed a lot of solution-based projects, some of which did work in the past for a limited amount of time and later failed. Now, there are no current projects in place to counter/fight pollution problem.

This project was then initiated by the UCT Information System department to work together with Thrive as well as the community and find a much better long-term solution(s) that will be implemented again to counter the irresponsible waste disposal in the community. A group of Final year student are required to investigate the causes of pollution and what resulted to the failure of the previous projects thus will understand the problem and make a long-term working solution.

Business Objectives

The community's population is growing, not shrinking, and currently, each person adds significant waste to the environment over his or her stay time in the community. And recycling is one of the best ways for community members to have a positive impact on the community and environment in which we live.

The team will be mostly working with Thrive to tackle this pollution problem. The main objective for Team is to find 3 independent solutions that could be applied in the community to solve the issue or decrease the amount of waste being dumped on the streets.

The objective is to also help the community understand and make use of their waste by focusing on reducing, reusing, or recycling waste as well as to educate the community about the dangers of irresponsible waste dumping and the benefits of recycling.

Problem Definition

Problem definition- The problem which project team are attempting to solve in this project, is the issue of waste management in the township of Imizamo Yethu and how can the project tea promote recycling practices in the community in a manner that the community members are not inconvenienced and unmotivated to be involved in these practices. We achieved this by looking at the project's users, context, and needs to have a better understanding of what is required for this project to be successful

- Users- The users of this project will be the residents of Imizamo Yethu. However, the problem relating to the users can be seen in the previous attempts of this project, where the residents complained that they had nowhere to store their trash bags and the systems put in place for waste management was too inconvenient for them, so they resorted to dumping the trash in the streets again like before. Therefore, convenience is the primary problem relating to the users in this project and is what the project team are attempting to solve within this project

- Context- Imizamo Yethu is a tightly congested township with little to no support from the government in relation to their waste management systems. This then causes the problem of having nowhere to store waste and the fact that the government doesn't come to collect the residents waste means that each household's refuge ends up in the streets of the townships, where the polluted streets create an unsanitary environment which is worsened by the townships high congestion making its residents more vulnerable to health and sanitary issues.

- Needs- After discussing the users and context of the problem it can clearly be seen what the needs are in this project. They are that Imizamo Yethu needs to have a waste management practice put in place that makes it as convenient and simple as possible for the resident of townships while also promoting the concept of recycling to further strengthen the idea of the possibilities that proper waste management can result in

Assumptions and constraints

This project is constrained in several ways and assumes the following:

Constraints:

- Thrive has little to no budget: Currently Thrive has no financers or benefactors to pour money in the project, and as such is looking for a solution that won't cost much to implement, at least initially.
- A salaried workforce not maintainable in the long run (Due to budget constraints)
- Limited space/land to work with (Think space that can be used for containers)

Assumptions

- Thrive will get more funding eventually
- Government is assumed to provide aid with the project.
- Households want to participate and are willing to sort their trash.
- There will be people in the community willing to work for Thrive for minimal compensation.
- Thrive will have methods in place to educate members of the community on how to recycle (This could involve having people go door to door teaching about recycling or posting flyers at convenient locations)
- The content of the bags to be collected by recycling company is assumed to be sorted and of the right stuff.

Stakeholder Analysis
Stakeholder Context Diagram (External)

The stake holder diagram encompasses the information about our different stakeholders and collaborators. It shows our relationship with them and their respective impacts or footprint in the project itself. It also tells the participation roles of each of the project members who will be involved in the project iteration.
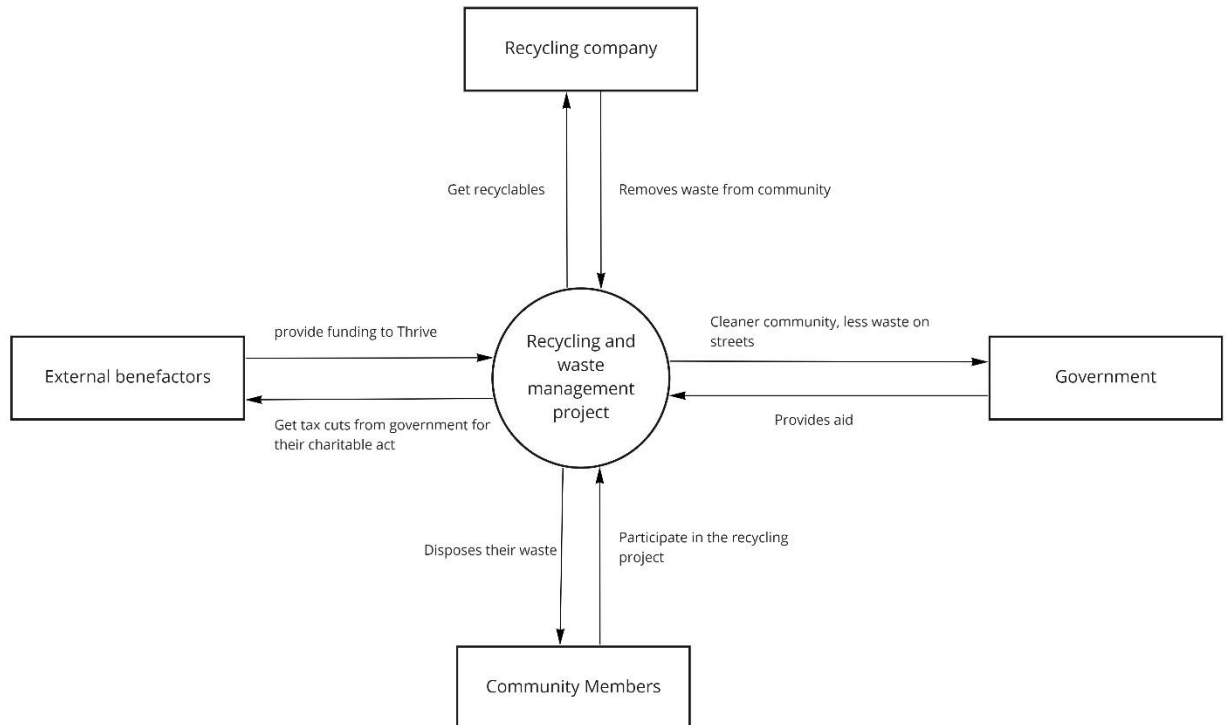
Proposed Solutions

To come up with the solutions the design thinking principles were used so that the solutions are reliable and valid. The team had to thoroughly understand the problem by setting up multiple meetings with sponsor as well as the recycling people. The team also observed and investigated the problem by visiting the actual community and the recycling center for deeper and more detailed understanding and had a clear idea on what the problem solution is going to be about. There are three solution that have been proposed to tackle the problem of pollution and help boost recycling in the community.

Solution 1: Salary-incentivized eco heroes

This solution can only commence once Thrive has acquired funds. This solution is an improved better version of last project iteration. Eco heroes will be hire and will be compensated with actual money as their salary for the work they have done. An Eco leader will be hired to manage all workers and have good social ties, and this will ensures accountability on the part of each and every eco hero.

Eco heroes will be given a unique color codes to identify their working block in the community. They will go door to door informing and educating households on recycling and try to recruit the household under their color. They will be accountable and responsible for their color households and they will have to pick up recyclables from each households' doorsteps.

Eco heroes will then be paid per household they collect from this ensures fair pay for fair work between the eco heroes while also incentivizing the eco heroes to convince more households to participate in recycling. A site supervisor then counts each color-coded bag that the eco heroes bring in and logs the number to be compensated at the end of the week. Each eco hero's efforts will be judged by the number of collected recyclables.

This project needs to take a phased approach in order for it to succeed- I.e., pilot system with multiple iterations improving on each previous iteration.

Solution 2: Voucher-incentivized eco heroes

30 community members will be carefully selected to pick up recyclables. The criteria used will be that the person is struggling to meet their basic needs and have a tough time finding employment. This will help them get basic foods as well as other things for survival while also enquiring skills.

Each worker is given a waste picker tag to identify them as a worker to prevent others from oversaturating the scene. This ensures that there is enough work for each worker to go around and the waste pickers will have the responsibility of collecting trash from the streets. In addition to picking recyclable items on the streets, the recruited eco heroes are encouraged to go house to house asking for any recyclables such as bottles or plastic bags that they want to get rid of.

Once a waste picker has filled a bag with trash, they will go back to the recycling center to turn it in, only then will they be compensated with a voucher per bag they bring in. The vouchers can be redeemed for necessities such as rice, soup, milk, sugar, salt, bread etc. just so they can meet ends meet.

Solution 3: More waste containers

There will color coded bags relating to the color of the bin it belongs in. With the help from the government colour coded waste container will also be provided for the community, green containers which will represent recyclable waste and black containers which will store other non-recyclable waste. The containers Make will not be more than 50-100 meters from each household. The recycling company will pick up the waste from containers once a week. Signs will be put up everywhere in the community focusing on highly populated, busy areas.

Containers will be placed all around the outskirts of the community to reduce the distance between the containers and the households, one container will also be placed at the center of the community for the central households.

On the other hand, if government does come through, the same budget can be used to set up and run workshops intended to teach and educate the public about the benefits of recycling.

Final Solution

After thoroughly observing what effect, each solution has, a conclusion was reached with the sponsor on how all the solutions would be best to be implemented in stages. The final solution is to apply the solutions in stages.

Stage 1: Container stage - Final Solution: Container stage (in more detail)

The government will be asked to assist the foundation with colour coded waste containers. These containers will be placed at convenient locations and within walking distance of certain number of households

The community will also be educated on benefits of recycling and how to separate waste as well as supply the community members with colour coded bags (green for recycling black for general waste)

Flyers will also be handed out to help/educate with recycling and waste separation information and tips. Some waste will be picked every household that is separating waste accordingly (organic waste, recyclables, rubbish). The waste in the containers will get collected by the recycling company once a week. The recycling company will benefit with free raw materials in exchange for their waste refusal collection services.

After stage one has taken course and after a while the results start to decline, stage 2 will be implemented.

Stage 2: Voucher stage

This Stage starts once Thrive has received funds from partners and collaborators. This stage will commence once households' participation starts declining and when noticeable waste starts accumulating on the streets

30 community members will be carefully selected to pick up recyclables. The criteria used will be that the person is struggling to meet their basic needs and have a tough time finding employment. This will help them get basic foods as well as other things for survival while also enquiring skills.

Each worker is given a waste picker tag to identify them as a worker to prevent others from oversaturating the scene. This ensures that there is enough work for each worker to go around

and the waste pickers will have the responsibility of collecting trash from the streets. In addition to picking recyclable items on the streets, the recruited eco heroes are encouraged to go house to house asking for any recyclables such as bottles or plastic bags that they want to get rid of. Recycling company will still be expected to come picks up the recycled items from different containers.

Once a waste picker has filled a bag with trash, they will go back to the recycling center to turn it in, only then will they be compensated with a voucher per bag they bring in. The vouchers can be redeemed for necessities such as rice, soup, milk, sugar, salt, bread etc. just so they can meet ends meet.

For the voucher system to work, company providing vouchers needs to get into an agreement with local shops. Thrive will pay collaborators using the funds from partners, the collaborators will then print out R20 receipts to make up the prepaid total and the receipts are then used to make vouchers to compensate workers.

Stage 1: Installation of containers

Household members separate their waste into recyclables, food, and landfill waste. They then drop the recyclable at the nearest color-coded container

Recycling company collects dropped bags from container and takes them at sorting station

Recycling company sorts the recyclables at the sorting station

Non-recyclable waste is transported to landfill

Recyclable goods are kept in the recycling company's storage facility until further use

New products are created using the recycled materials collected

Stage 2: Voucher-compensated workforce

Household members separate their waste into recyclables, food, and landfill waste. They then drop the recyclable at the nearest color-coded container

Recycling company collects dropped bags from container and takes them at sorting station

Workers collect trash from the streets of discouraged households and transport the trash bags to the sorting station

Voucher workers pick up trash from the streets of discouraged households

Workers get compensated in vouchers per bag they bring in

Recycling company sorts the recyclables at the sorting station

Non-recyclable waste is transported to landfill

Recyclable goods are kept in the recycling company's storage facility until further use

New products are created using the recycled materials collected

Part 2: Project planning & implementation

Project Objectives

- To reduce waste using efficient waste management programs by the implemented in IY township by May 2022.
- Increase recycling in the township of IY by expanding on already existing recycling practices in the township by May 2022.
- To reduce local unemployment and provide means of making a living through the recycling initiative.
- To help stakeholders in motivating community members to be involved in waste management by implementing educational systems for the community by May 2022

## Stakeholder Analysis (internal)

Stakeholder Roles and Responsibilities

stakeholder roles and responsibilities diagram shows the responsibilities and roles of each stakeholder in the project as well as other details such as the Names the Organizations they work for or they are from and the contact details of each stakeholder.

| Role	Name	Organization	Contact Information
Project Sponsor	Paul Robinson	Thrive	Paul@thrive.org.za
Project Mentor	Rethabile Modise	Information Systems Tutor at UCT	MDSRET001@myuct.ac.za
Project Manager	Vainqueur Mahirwe	Computer Science student at UCT	mhrvai001@myuct.ac.za
Project communicator	Andrea Lemme	Information systems student at UCT	Lmmand005@myuct.ac.za
Project secretary	Buntu Mkhuhlane	Business Computing student at UCT	MKHBUN002@myuct.ac.za
Project team quality control	Julio De Rose	Computer Science student at UCT	DRSJUL001@myuct.ac.za

Stakeholder Context Diagram

The stake holder diagram encompasses the information about our different stakeholders and collaborators. It shows our relationship with them and their respective impacts or footprint in the project itself. It also tells the participation roles of each of the team members who will be involved in the project iteration.
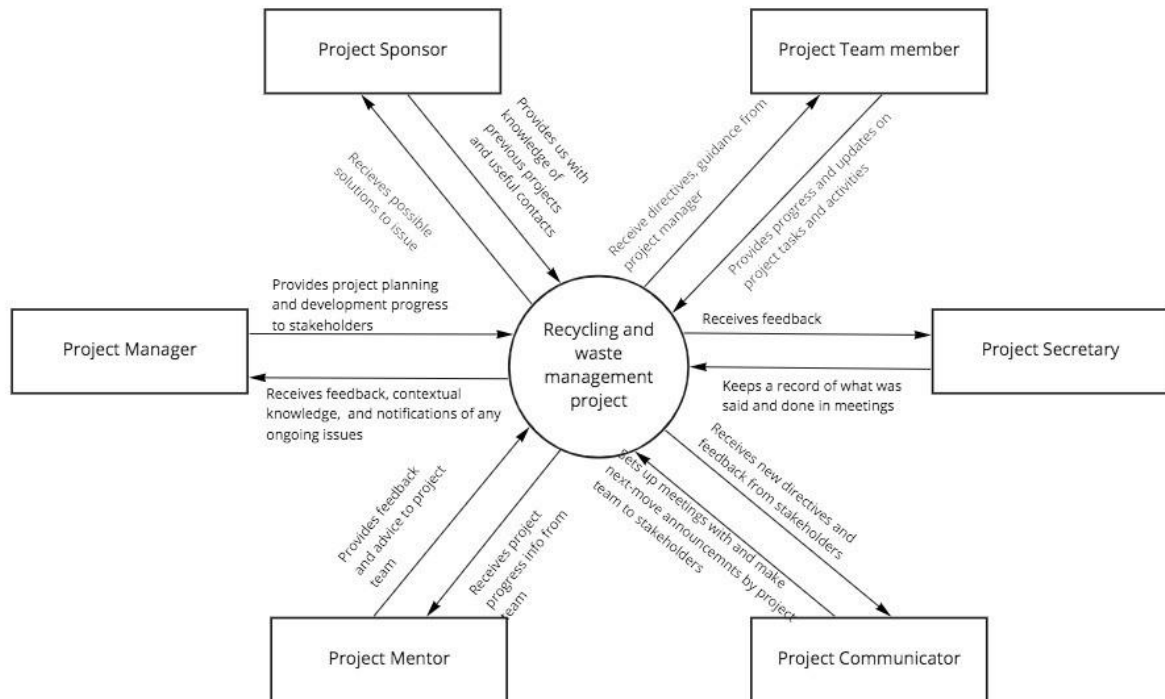
Work Plan
Work Breakdown Structure

The work breakdown structure diagram below was created to visually represent how the project team would breakdown all the steps required to complete necessary tasks in the project. The steps are listed in chronological order to show which tasks should be completed first, second, etc and were also given an estimate of the number of hours required to complete each of steps to make sure the project team stays on schedule for each of their deliverables.
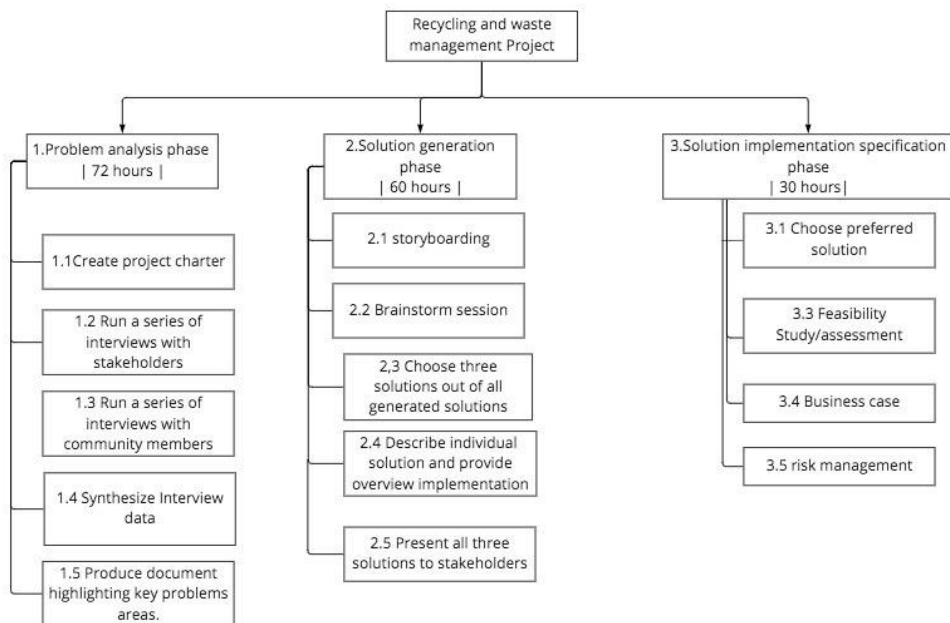
Product Breakdown Structure

The product breakdown structure works in correlation with the work breakdown structure but instead of showing what steps need to be taken to complete each task of the project, it visually represents all the tasks that are required to produce the final completed project itself. These tasks are also listed in chronological order that the project team will follow to make sure no task is left out and that the project has been correctly completed.
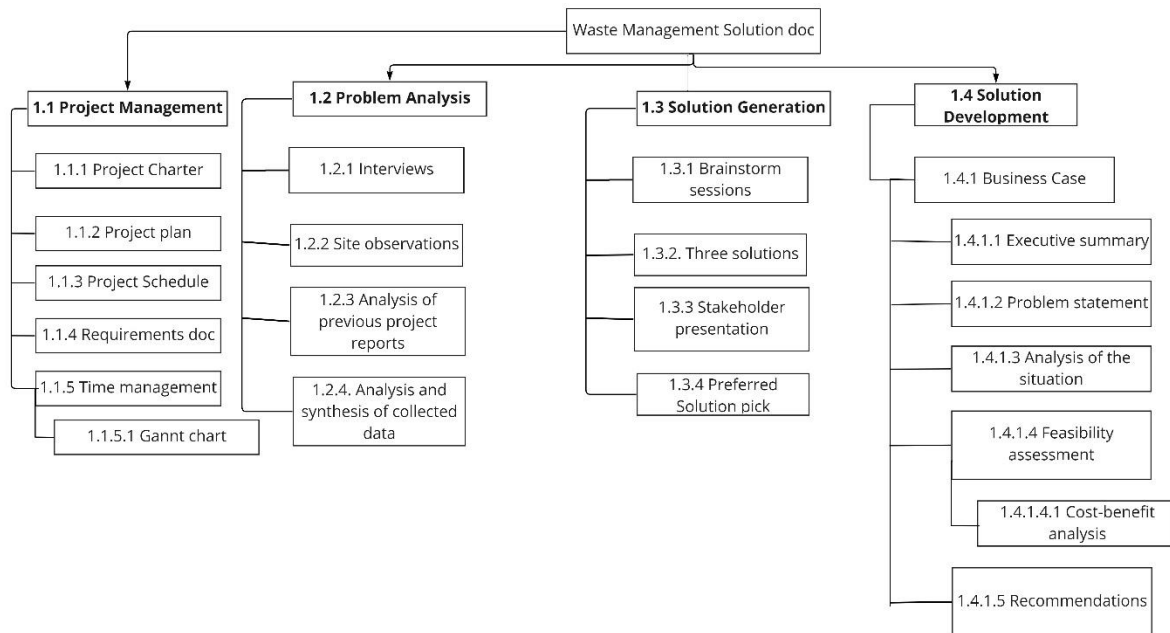
Network Diagram

network diagram visualizes the sequential and logical relationship between tasks in the project setting. This visualization relies on the clear expression of the chronology of tasks and events. Each box on the diagram represents a task that will be done by the team on a certain day and how long the task will take as well as which task will follow until the end of the project iteration where the team will be presenting the final solution.

The network diagram below shows all the tasks, meetings, and activities that the project team will complete to complete the project. It shows the possible paths that the project team can follow to achieve this where the critical path is shown by the arrows in bold and indicates that this is the recommended path the project team should follow in order to complete the project.
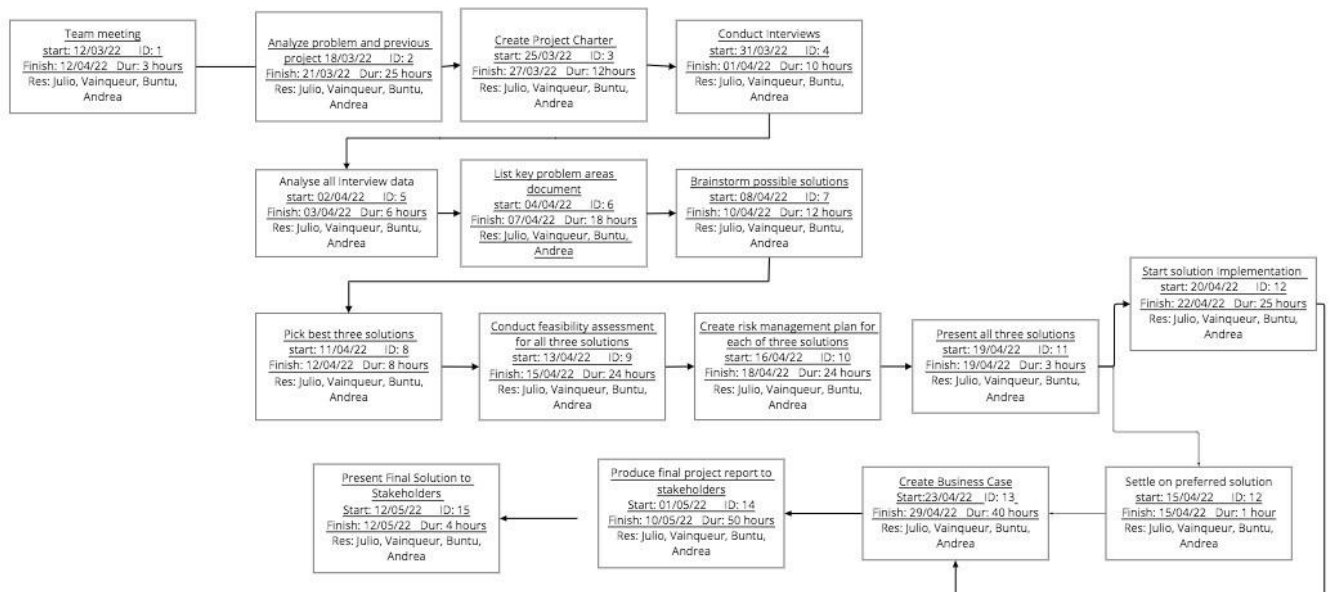
Gantt Chart

Gantt charts help teams to plan work around deadlines and properly allocate resources.

Activity ID	Activity Name	TimeScale(weeks)											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Team Meeting	■		■		■		■		■		■	■
2	Problem Analysis		■										
3	Project Charter creation			■									
4	Interviews			■									
5	Interview data analysis			■									
6	List key problems areas				■								
7	Brainstorm session				■								
8	Choose three main solutions					■							
9	Conduct feasibility assessment for chosen solutions						■						
10	Risk management plan for chosen solutions						■						
11	Present al three solutions							■					
12	Solution Implementation							■					
13	Business case							■	■				
14	Final Project Report									■	■	■	
15	Final Presentation											■	

Risk Management

Risk Identification

The risk identification diagram involves understanding what must be controlled in a construction project, risk identification entails identifying and classifying sources of risk. Risk identification is the first phase in the risk management process because possible problems must be discovered before the risk can be assessed, responded to, and controlled. The risks were listed as well as the conditions entailing those risks.

Risk Number	Risk	Risk Conditions
1	Not enough data collected	Project taken longer to complete than estimated due to missing information not allowing for the easy completion of tasks
2	Internal conflicts	Stakeholder disagreements and arguments between team members.
3	Lack of cooperation with government	Solution could require approval from government officials but as seen in past events, government could be unwilling to cooperate and allow solution to be implemented into the community
4	Project exceeds due date	Incorrect schedule estimation with time relating to each phase of project, leading to project over proposed due date. Unexpected delays.
5	Poor communications with team and stakeholders.	Failure to communicate the latest project decisions, Lack of consultation with key stakeholders such as the sponsor.
6	Poor allocation of resource.	Not having enough people working on the project task and activity, lack of motivation, poor project organization and definition of responsibilities.
7	Team member doesn't complete their tasks in time	A team member may not have good time management and doesn't complete their assigned tasks in time allocated
8	Team member falls critically ill or dies	External risk out of project teams control resulting in delay in project
9	Scope Creep	Team goes out of scope when producing a solution and don't focus on the necessary problems at hand.
10.	Project cannot be funded	Brainstorming phase could be limited in what ideas are viable due to lack of funding in project
11.	Schedule conflicts	Primary Stakeholders cannot make themselves available on the same day for the planned meetings
12.	Lack of timely feedback from sponsors and other stakeholders.	Lack of time management and poor communication between project team, sponsors and stakeholders

Risk Assessment and Risk Analysis

A risk assessment is a comprehensive examination of the team's workplace to identify those objects, events, processes, and other factors that could harm mostly people. The team will assess and evaluate how likely and severe the risk is after it is identified. After a judgment has been made, the team can move on to deciding what steps should be taken to successfully eliminate or control the harm.

Risk analysis and management is an important project management approach that ensures the project runs smoothly with the fewest possible setbacks. While the team can never forecast the future with absolute confidence, they can use a basic and streamlined risk management method to anticipate project risks and reduce the incidence or impact. This increases the likelihood of a successful project completion and decreases the risks associated with it.

	Minor 3	Moderate 2	Major 1
Probable A		3,11,12	10
Possible B		4,5,9	1,6,
Improbable C		7,8	2

Risk Response Plan

A risk response plan will explain the strategies of the team that would be taken to mitigate negative project risks. It's part of the larger risk management plan that is subsequently part of any project management plan. Some risks that the teams come across might not be easily resolved. The risk response contains contingency plans that will be put into action should something occur. That is, having a Plan B when the team can't proceed the way they have projected in plan A.

No	Rank	Description	Probability	Impact	Category	Cause	Triggers	Owner	Mitigation	Contingency	Status
10	1	Project cannot be funded	High	High	Cost (not enough funds available from stakeholder)	Incorrect estimation of funds needed	Project requires 10% more funding than initial estimated cost to be completed	Project Sponsor	Have safety funds that are 20% initial budget and are only to be used when necessary and find areas where we can reduce cost	Have multiple fundraising events to raise funds	Green
1	2	Not enough Data collected	Moderate	High	Quality of Project (not enough information to create an effective usable project)	Lack of cooperation from community members to be involved in interviews	Project team is struggling to complete tasks effectively and delays project outputs by 10%	Project Team	Acquire a list of contacts from project sponsor of people who could help us interact with the community members	Reach out to project teams involved in the last project and request their interview data to use	Yellow
11	3	Schedule conflicts	High	Moderate	Scheduling (Poor scheduling of meetings)	Not having an accurate and complete picture of everyone's availability	20% of scheduled meetings end up being cancelled	Project Manager	Find out everyone's availability before scheduling happens.	Confirm everyone's availability for the remaining meetings and reschedule if need be.	Green
3	4	Lack of cooperation from government	Moderate	Moderate	Procurement (No assistance or support from government)	Government not interested in the project cause; may think it is a waste of time given the failure of the previous project	First request for using and reserving area as landfill or dump site rejected.	Project sponsor	Implement alternatives that find support elsewhere	Structure solution so that it does not depend too much on government support and assistance. Have alternatives in place	Green

12	5	Lack of timely feedback from sponsors and other stakeholders.	Moderate	Moderate	Communication(poor communication between project team and sponsors)	Inexperienced communicator fails to communicate or fails to get a hold of busy stakeholder	Project team spends 3 or more not developing project due to them waiting for project sponsors responses on queries	Communicator	Acquiring the cellphone numbers of all project sponsors and stakeholders as a cellphone is the most effective form of communication	Have a meeting with all stakeholders and project sponsors with prepared queries to get them answered as well as ask what the best form of communication to obtain quick responses from them	Green
6	6	Poor allocation of resources	Moderate	High	Planning (incorrect estimates of what resources are allocated where)	Inexperienced team allocates resources with unrealistic figures	Project requires 10% more resources than initial resource allocation estimates in order to complete	Project Manager	Create resource allocation plan with realistic figures and the help of an experienced project mentor	Have a meeting with project sponsors and stakeholders to ask for an increase in resources allocated to them or meet with project mentor and discuss possible ways to decrease the amount of resources needed to complete the project	Green
4	7	Project exceeds due date	Moderate	Moderate	Time (poor time management)	Inexperienced project team fails to manage their time effectively	A task exceeds its estimated completion time by 10%	Project Manager	Add 10% to initial time estimates on more detailed tasks and remove 5-10% to initial time estimates of less detailed tasks	Approach stakeholders and sponsors about a potential extension for the due date of the project	Green
5	8	Poor communications with team and	Moderate	Moderate	Communication	Inexperienced team	Lack of preparation leads to poor resource allocation	Communicator	Establish communicator and encourage daily communication.	Frequently monitor all communication channels.	Green

		stakeholders.					and errors arising				
9	9	Scope Creep	Moderate	Moderate	Scope	Poor problem analysis, inexperienced team	Out of scope work leads to poor allocation of our resources and causes schedule delays and inadequate work.	PM	Ensure good understanding of problem and establish effective communication between members and stakeholders.	Be agile and restructure work and plan to better fit the scope of the project.	Green
7	10	Team member doesn't complete their tasks in time	Low	Moderate	Human resources (conflict in project team)	Project team fails to motivate team member and keep them up to date on their tasks	Team member is behind their task schedule by 10%	Project Manager	Have team bonding activities in place to make all team members feel motivated to work on the project	Approach team member and help where they need it in order to complete all their tasks on time	Green

Prototyping

The prototyping process of the final solution can be traced back from the moment the team presented three potential solutions addressing the problem to the sponsor to the moment a plan for the final solution was created. Due to budgetary constraints within the project, the sponsor recommended that the team combines two of the solutions by using a phased approach, comprising of the container and voucher-based solutions. The feedback was used in a brainstorm session that resulted in the creation of the final solution, which makes the container-based solution the first phase while the voucher one is made the second and last phase.

The first stage establishes a reliable waste removal process using containers and the recycling company, while also requiring no financial contribution from Thrive. This phase can last for as long it takes and for as long as Thrive does not have money to inject into the project. In contrast, phase 2 should only begin as soon as there is funding. By analyzing the results of the pilot project done in 2017, it is expected that household participation will decline over time, phase 2 will be implemented to counter this by having voucher incentivized workers collect trash form discouraged households.

Through this notion it can be seen how the project team has used input from the project stakeholder, data collected relating to the necessary aspects within the township and the various constraints within the project to formulate this solution.

Challenges and Limitations

Throughout this project, the team faced several challenges and limitations. These included transportation, communication, scheduling conflicts, and strict budget constraints. In what follows, each challenge is discussed in detail.

Transportation Issues
 The Imizamo Wethu township and Thrive are both situated in Hout Bay, twenty kilometers from UCT, and since UCT provided no transport assistance it was challenging to make the necessary travel arrangements every time the team had to go in for interviews or sponsor meetups. Furthermore, the recent rise in petrol price made each visit costly for the team.

Communication issues
 With the aim to understand the community and its existing practices of waste disposal, the team set out to the imizamo wethu township to find key members to interview. Unfortunately, the only suitable candidates that could be interviewed were limited in their capacity to speak English. Fortunately for the group, one of the team members knew how to speak one of the local dialects, and so the interview questions were translated, which made it easier for the interviewees to answer and ask for clarifications.

Scheduling conflicts

Other courses, tutoring and personal obligations made it exceedingly difficult to allocate a time period where the entire team was available. In times where a full team meeting was not possible at all, the team was forced to divide tasks in pairs and meet at a later date to merge the work together. This led to some communication issues and ultimately progress setbacks that were not accounted for.

Strict budget constraints

Thrive is a non-profit organization that relies on other organizations to raise funding for their various projects. As of now, the organization has yet to secure financing partners, which means any proposed solution to the waste removal and recycling problem must still work without budget, at least until funding comes in. This factor hindered the quality and limited the number of solutions that could be generated. Similarly, it was challenging to come up with a creative final solution that requires no budget and/or dedicated employees to help with the implementation.