

Assessment of the Langrug WaSH Facility

Conducted by the WPI WaSH Team, 2013



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Introduction

Langrug is an informal settlement in the Municipality of Stellenbosch. Members of the Langrug community have been working with Community Organisation Resource Centre (CORC) and the local government on improving their Water, Sanitation and Hygiene (WaSH) systems in the settlement. In 2011, students from Worcester Polytechnic Institute (WPI) began working with the Langrug community on the WaSH upgrading. A year later in 2012, WPI students and the stakeholders worked together to finalise plans for a new facility. Construction was completed and the facility opened in April 2013.

A new team of WPI students arrived in October 2013 to assess this facility for the purpose of replicating it in other areas. Based on this assessment in the sections that follow, the team identified the following key aspects that should be considered in future WaSH facilities.

1. Community Involvement

To ensure the social sustainability and overall success of a WaSH facility, the community must be invested in the facility from construction to operation. In this facility, a working team of community members and community leaders were actively involved in the planning and construction of the facility. Community members operate the facility and take ownership of its upkeep regardless of whether or not they getting paid. This dedication is essential to the success of the facility.

2. Management of the Facility

The work of the caretakers in the daily management of the facility plays a large role in the success of the facility. The caretakers and security guards constantly monitor the facility to prevent disrepair, theft and vandalism. They are primarily responsible for the prime condition it is in. Having a clear and organised management structure will be vital for a successful long-term operation of the facility and its institutional sustainability.

3. Multi-Stakeholder Involvement

The facility could not have been conceived and implemented were it not for the collaboration of all the stakeholders (community, Municipality, CORC, WPI). Such healthy partnerships are essential for the planning and implementation of WaSH facilities.

4. Multi-Purpose

The WaSH facility is ideally used as a community centre. It is the role of the community to use the facility as a social space for a variety of purposes. The community uses this WaSH facility as a post office and as a meeting space for leaders and social groups, such as the HIV AIDS support group.

5. Promotion of Public Health

WaSH facilities in their functionality promote public health. They can also be used as social, educational centres for public health. The current facility recently implemented improvements to make it more accessible to children so that the youth of the community engage healthy and sanitary practices. The facility can also be used to promote the public health of all community

members. One way to do this would be the sale of discounted health supplies (nappies, toothbrushes, soap, etc.).

Structure of this Assessment

Section 1 describes the WaSH facility from construction to operation, including an analysis of the cost to construct and maintain it.

Section 2 analyses the sustainability of the facility.

- Though the uniqueness of this prototype facility justifies the high cost to construct and maintain, this facility is not economically sustainable.
- The general acceptance and use by the community makes the facility socially sustainable.
- The facility incorporates some environmentally sustainable features (i.e. solar geyser), but also has some features that are not as environmentally sustainable as they could be.
- The facility management structure is fairly institutionally sustainable, but leaves room for improvement.

Section 3 outlines improvements that could be made to the existing facility based on interviews, observations, and this assessment of sustainability. Such components should be considered in future WaSH facilities. These improvements include:

- Expansion of social programmes, especially for children, that utilise the facility as a central community social space.
- Record keeping of income and supplies for the caretakers maintaining the facility
- Minor technical improvements to the environmental sustainability of the facility, including but not limited to:
 - Rain water collection and reuse
 - Grey water channel re-routing
 - Window coverings for exposed sides of the facility
- Operational improvements to ensure the institutional sustainability, including:
 - Establishment of a WaSH coordinator to oversee caretakers
 - Training of caretakers, particularly in public health education
 - Expanding the promotion of public health through sales of basic health supplies
 - Establishment of basic emergency procedures

Section 1: Current Conditions

Section 1.1: Description of Facility

Physical Structure

The WaSH facility is located in the M Section of Mandela Park, which is one of the three regions that form Langrug. The facility stands along the main road, which will be paved within the next two years according plans from to the municipality. A concrete lot large enough to hold two or three cars lies in front of the facility next to a wendy house, which now contains remnant materials from the facility's construction. A water tap is built into the exterior wall of the facility facing the road. Currently, the spout of this tap consists of a rubber hose, with excess water from the tap and roof spilling into a sewer drain.



Figure 1: Section map of Langrug, WaSH facility highlighted

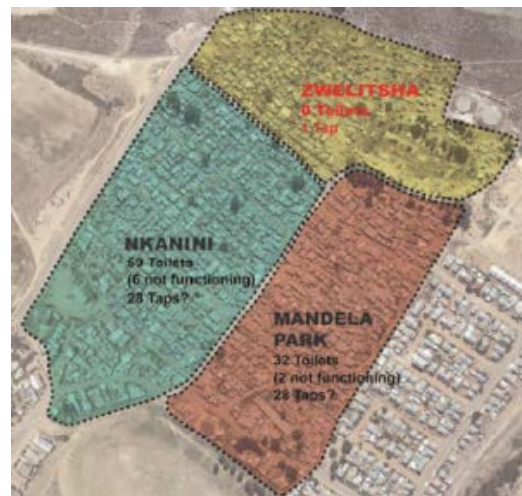


Figure 2: Region map of Langrug, as of 2011



Figure 3: Outside view of the front of the WaSH facility

The frame of the facility is made of wood, with corrugated zinc enclosing two of the walls and roof. The other two walls have a brick lower half and metal bars on the upper half, allowing airflow and sunlight into the facility. Two doors provide access to the facility on two sides. The door on the front of the building facing the road is more commonly used, while the other door is frequently locked.

The facility contains two urinals and eight toilets: three for females, two for males, two for children, and one unisex handicapped toilet. The toilets are operated by a push button and the plumbing is enclosed in the concrete floor to prevent theft and vandalism. There are three hand-washing sinks with soap dispensers, two in the main area and one in the handicap bathroom. There is also a shower and changing area for both the men and women. A solar geyser on the roof of the facility provides hot water to the showers and hand-washing sinks. This utilises the sun's heat to warm the water. The geyser is connected to an electrically powered back up to heat the water when there is insufficient sunlight.

There is an open area between the men and women bathrooms, in which there are four laundry basins and benches for people to sit on while they do laundry. There is also a table and attached benches, in addition to a chest of drawers used for sorting mail. Signs posted around the facility advertise its features and promote public health by reminding users to wash their hands.

Management

Inside the facility, there is also a caretaker's office and hair salon. Three caretakers are paid to maintain the facility during operating hours of 06:00 to 20:00 hours. Caretakers clean the facility upon opening in the morning, every half hour as needed throughout the day, and upon closing the facility at night. One caretaker is typically scheduled to work at a time, and the shifts are 06:00 hrs. to 14:00 hrs, and 14:00 hrs. to 22:00 hrs. However, it is common for other caretakers to socialise at the facility even when they are not on duty. The office contains supplies for the operation of the facility. Any needed materials or broken equipment are recorded by the caretakers/guards and reported to CORC. One guard works at night, from 22:00 hrs. to 06:00 hrs. A woman rents the hair salon for R350 per month, which is open on weekends.



Figure 4: Women's Bathrooms and Shower



Figure 5: Men's Bathroom and Shower



Figure 6: Hand-washing Sinks



Figure 7: Laundry Basins



Figure 8: Hair Salon and Caretakers' Office

Section 1.2: Usage of Facility

The caretakers are occasionally responsible for recording facility usage data (see Figure 9: Facility Use Tracking Sheet). The caretakers use a tracking sheet system to help CORC and WPI analyze the usage demographics in the assessment of the facility. This tracking sheet is used to record the number of users, aspect of facility use, and time of use. The first set of data was collected in July, when caretakers first began working in the facility. Caretakers, with guidance from CORC, recorded the gender and home region of each user, among other aspects. More data was collected in mid-November, some of it under supervision of the WPI student team. There were more users of the facility during the second round of data collection. This may be due to warmer weather, increased community comfort with the facility, or more reliable data collection procedures as the student team supervised some of the time. The pie charts below indicate the most recent usage data obtained by gender, housing section, type of usage and usage by time.

LANGRUG WASH FACILITY-Tracking Sheet. CORC												
DATE (d)	/ (m)	/2013	Caretaker on Duty:									General Comment About the Facility
User No.	ADULT USER (V-Tick where Applicable)		CHILD USER (V-Tick if Applicable)	RESIDENCE (E.g From M29, J32)	TYPE OF USE (V-Tick where Applicable)					Time of Visit 00/00 hrs	Signature	
	MALE	FEMALE			Water	Laundry	Toilet (WCs)	Urinal	Shower			
1												
2												
3												

Figure 9: Facility Use Tracking Sheet

Specific Findings

Based on recent observations, the new WPI team was able to gather more information about the social aspects of the facility beyond the demographic data that was collected by the caretakers. From observation, it has become evident that more females use the toilets and laundry basins than males do. In contrast, males use the showers more frequently than females. Females use the WaSH facility as a social space. While they perform their WaSH responsibilities, they also spend time with other women and share local news. Women also feel comfortable in bringing along their children when they are doing laundry. The caretakers also say that children from the crèches travel to the facility during their breaks throughout the day.

The usage data (shown in Figure 10) corroborates these observations, indicating a more women using the facility than men. The time of day in which the facility is used is spread fairly evenly throughout the day, with a slight peak in the early evening (16:01 – 19:00), around the time many people return from work. Toilets are the most frequently used feature of the facility, with fetching water and retrieving post also common activities. The usage of the facility as a post office is especially noteworthy since it was not a feature of the original design, but was implemented solely by volunteers in the community.

The data also shows that although the facility is used by most of the Langrug community, it is used primarily by those who live in the M section and the other sections near the facility. This correspondence to proximity is to be expected. However, it does indicate that people are less likely to travel long distances to use this facility if there are working toilets closer to their homes.

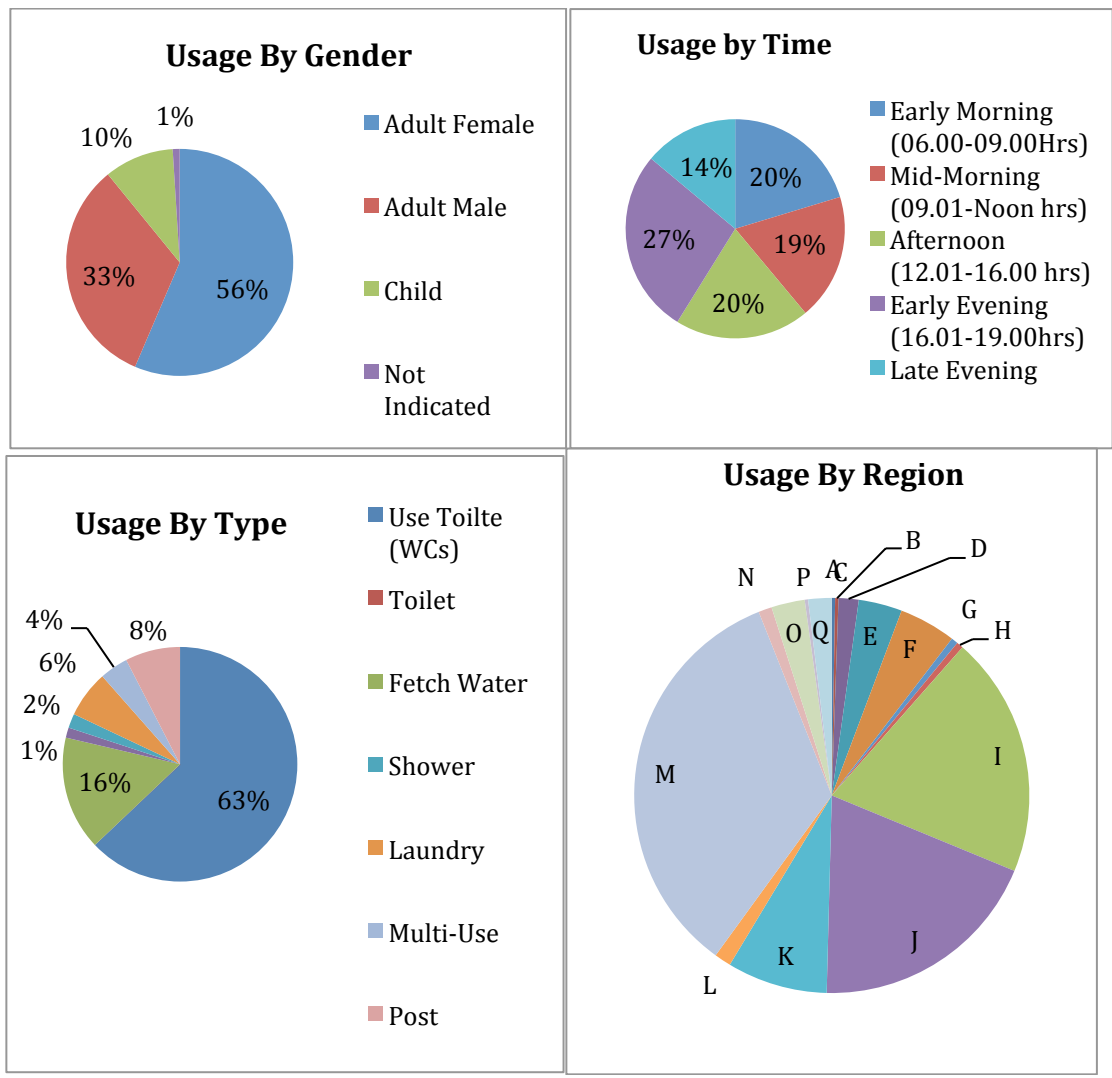


Figure 10: Data on usage of the WaSH facility

Section 1.3: Operational Procedures

The success of the WaSH facility is partially due to the daily maintenance conducted by the caretakers. Caretakers are mainly responsible for the cleanliness of the facility. The following procedures and organisational responsibilities were gathered through observations and conversations with the caretakers and CORC representatives.

Stakeholder Roles and Responsibilities

- **Community Organisation Resource Center (CORC):** CORC is a non-governmental organization (NGO) that supports professionals and grassroots activists in empowering communities to improve themselves. CORC seeks ways to support the facility in Langrug, and often becomes a voice between the facility and the municipality. Members of CORC visit the facility at least once a week to check on operations, collect receipts, or buy more supplies. Payment for caretakers and supplies goes through CORC, and the municipality reimburses the cost.
- **Municipality of Stellenbosch:** The Municipality of Stellenbosch is currently responsible for funding the caretakers and security guards through CORC. They pay for electricity and water to the facility. Municipality officials visit the facility regularly to check on operations.
- **Community Leaders:** Community leaders are responsible for checking on the facility and reporting any issues or observations to CORC and the municipality.
- **Caretakers:** The Municipality funds employment for three caretakers who report to CORC about their duties and hours. Report problems and damages to Community Leaders, CORC, and the municipality for repair.
- **Community Members:** Report any issues to caretakers.
- **Regular Community Users:** Includes HIV support group, post carrier, and salon owner. Report any issues to caretakers.

Current Daily Operational and Maintenance Procedures for Caretakers

Opening the Facility

Thoroughly cleaning the facility when it is opened at 6am:

1. Scrub toilets, washbasins, and hand-washing sinks.
2. Sweep and mop the floors (and throughout the day as necessary)
3. Clean and organise the caretaker room.

Toilets and Urinals

1. Greet the visitor(s).
2. Hand them toilet paper if they did not bring their own.
3. Check each stall after each use or every 30 minutes, depending on the user frequency. If need be, make sure toilet is flushed and clean surrounding area using gloves.
4. Restock the cardboard box of toilet paper when the supply is running low.

Shower

1. Visitors will bring their own hygiene products.
2. Collect R5 from the user.
3. Store the collected money in a money-box (no money recording system).
4. Each use takes about 15 minutes.
5. Check and clean rooms after use when necessary.

Wash Basins

1. Visitors will bring their own detergent and/or dishwashing soap.
2. Check basins after use and clean as necessary.

Supplies

Supplies include gloves, broom, toilet cleaning chemical, floor cleaning chemicals, hand washing soap, and toilet paper. CORC visits the facility once a week to check the status of the supplies. The supplies usually last anytime from two weeks to a month. When there is a need for these supplies, the CORC representative purchases them at Build It, the local hardware store. The municipality reimburses CORC.

Closing the Facility

1. Check to see if each stall and washing area is in good condition.
2. Organise caretaker room.
3. Exchange places with the night guard at 22:00 hours.

Night Guard After Hours

1. Night guard will have the facility open 22:00 – 23:00 hours.
2. Handles any problems and reports major issues to community leaders.
3. Night guard will monitor the closed facility 23:00 – 6:00 hours.

Payment Process

Caretakers and night guards are paid through a direct deposit system. Baraka from CORC collects their bank account numbers and deposits their salary to their bank account. Baraka pays the staff biweekly. The municipality reimburses CORC.

Postal Service

1. Post carrier picks up the mail Monday and Friday mornings in Stellenbosch.
2. Post carrier brings mail to facility and organises by section and last name.

Community members travel to the facility to collect their individual mail.

Hair Salon

1. Renter pays CORC R350 per month.
2. Hair salon is open on Saturday, and Sunday.
3. Renter is responsible for the cleanliness.
4. Hair salon prices:

Service	Cost
Blow Out	R30
Soft 'n' Free	R40
Restore	R40
Revlon	R40
Wash	R20
Twist Small	R80
Twist Medium	R100
Twist Large	R120
Yanky	R60
Darung	R17

Emergency/Alternate Operational Procedures

Plumbing

In the event of major plumbing problems, the community leaders will call Aron Ndzondza, the local plumber from Ubuntu Plumbing. Aron installed the plumbing during construction and is generally available at any time for emergencies.

There have been no major plumbing problems to warrant the implementation of this procedure. The Municipality of Stellenbosch will pay for the repair costs through CORC. Recently a spout on one of the sinks was loose. The community leaders and the caretakers did not view it as a major plumbing issue. Aron only fixed when he was visiting the facility on unrelated business. According to Aron, it was an easy fix for a plumber with the proper tools.

Flooding

In the case of flooding, especially from the grey water channel surrounding the facility, the water is mopped and the flooded area cleaned.

Fire

Fire is a major problem facing the informal settlement of Langrug. In the event of a fire at the WaSH facility, the Stellenbosch fire department will be called by a community leader. It can often take thirty minutes for the fire brigade to reach Langrug. There is currently no alternative plan within the community for putting out fires.

Medical Emergencies

According to community leaders, there is no one in the community with formal medical training in the event of a medical emergency. Ambulances from Stellenbosch can take thirty minutes to arrive in Langrug.

Section 1.4: Construction of the WaSH Facility

Construction began on the WaSH facility in November of 2012, two weeks before the WPI students were scheduled to leave. Professor Scott Justo, advisor to the students, took on the role of construction manager for this period. Construction resumed in 2013 under direction of community leaders Trevor Masiy and Alfred Ratano. The facility opened shortly thereafter, with three women volunteering to maintain the facility until they were hired to be full-time caretakers.

This section outlines the roles of the stakeholders throughout construction, the process that was followed, and problems that arose throughout construction.

While WPI was in Langrug:

- Construction Management
 - Professor Scott Justo oversaw construction for the first two weeks, with help from Trevor Masiy, Langrug community leader
 - Students and Olwethu would work on designs while construction was occurring
 - Changes/miscalculations in construction would alter these designs
 - List of tools was posted to keep track of location
 - Materials purchased directly by WPI
- Process
 - Preparation Work:
 - Cleaned area
 - Broke up existing concrete slab
 - Repaired grey water channel
 - Purchased supplies
 - Staked out area
 - Primary Steps
 - Planted exterior poles
 - Plumbers laid pipework
 - Trenches and frames for laying of concrete
 - Poured concrete
 - Framed walls
 - Put up zinc walls
 - Placed interior poles
 - Finished zinc roof
- Hiring and Payment
 - Working team that had been working with students throughout the term worked on construction
 - Trevor hired additional workers to lay foundation
 - Workers were paid by WPI GE Grant through CORC representatives

- Problems
 - Tools stolen
 - Construction delayed by farmer riots
 - Poles placed in different location than plans

After WPI Left:

- Management
 - Trevor and Alfred managed construction
 - Design changes approved by Olwethu, CORC architect
 - CORC representatives would monitor construction through semi-weekly site visits
 - Workers continued getting paid through CORC
 - Materials purchased through CORC
- Process
 - Aron Ndzondza installed the plumbing
 - Exterior and interior walls completed
 - Brick floor laid
 - Interior features installed (table, post box, shelves, etc.)
- Problems
 - Less workers available after WPI left
 - Delay in delivery material due to reimbursement process
 - Reordering of materials (e.g. sinks and toilets) due to miscommunication
 - Progress seemed more significant on days CORC representative were on site

Section 1.5: Cost Analysis

Costs			
Construction			
Type	Cost		
Materials	231015		
Labor	26660		
Trucking	500		
Total	258175		
		Total Construction Cost:	258175
Utilities/Supplies			
Service/Items	Usage	Unit Price	Monthly Cost (Rand)
Toilet Paper	~180 rolls/month	R175/48 pack	700
Hand Soap	~ 7 L/month	R90/5 L	126
Toilet Cleaner	5 L/month	R50/ 5 L	50
Floor Cleaner	10 L/ month	R72/ 5 L	144
Electricity	Payment/month	R100/2 weeks	250
		Total Monthly Operational Cost:	1270
Income			
Service/Items	Usage	Unit Price	Monthly Income (Rand)
Rent for Hair Salon	1 payment/month	R350/month	350
Shower	6 showers/day	R5/shower	900
		Total Monthly Income	1250
Salaries			
Workers	Shifts Per Month	Cost per Shift	Monthly Cost (Rand)
Caretakers	62	R 100	6200
Night Security	31	R 100	3100
		Total Monthly Salaries:	9300
		Total Monthly Cost:	9320

This cost analysis was compiled using records of construction on the WaSH facility, conversations with the caretakers of the facility, and data from Baraka Mwau, a CORC representative responsible for the management of the WaSH facility. The total cost of construction was R258175. It costs R9320 per month or R11840 per annum to operate and maintain the facility. These recurring costs include electricity, cleaning supplies and salaries for three caretakers and two night security guards. At the time this analysis was conducted, the facility had income from the shower use and rent from the hair salon. Beginning in December 2013, the hair salon no longer has an occupant paying rent. A new initiative (see section 3.2) may bring in supplemental, but likely insignificant income.

Section 2: Sustainability Analysis

Analysing economic, social, and environmental sustainability is essential when assessing the current WaSH facility. Economic sustainability is the ability to maximise the facility usage while minimising the cost required to run it. Social sustainability includes the ability of the facility to meet the needs and approval of the community members it serves. If the community does not approve or feel comfortable at the facility, they may not embrace the facility as a crucial part of their community and thus neglect it. Environmental sustainability is ability to use resources efficiently, and with minimal negative effect on the surroundings. Resources such as water and electricity are also scarce in Langrug. Thus, it is important for the long-term functionality of the WaSH facility to be environmentally sustainable.

Institutional sustainability is the ability for a WaSH facility to endure while considering economic, environmental, and social sustainability. In order to be institutionally sustainable, the multiple stakeholders invested in the facility must have clearly defined roles in the management of the facility, so that they can effectively collaborate. By striking a balance of involvement and in the different aspects of sustainability, the stakeholders will ensure the institutional sustainability and lasting quality of the facility.

Section 2.1: Economic Sustainability

The construction cost for the facility was higher than necessary and could be reduced in future iterations. In the need for quick implementation, much of the structure was custom-made by the working team out of wood, a relatively expensive material. Using modular components, such as pre-made bathroom cubicles, could reduce the costs of materials and labor. In addition, during the two weeks that WPI was working, many of the tools were stolen and needed replacement, wasting both materials and labour. Furthermore, many of those working on construction had little prior experience, and more skilled workers could probably have completed construction in fewer labour hours. However, experienced workers could cost more per hour, and the learning experience of working on the facility was invaluable to all involved.

The salaries of the caretakers and security guards are the biggest monthly expenditure. It is necessary at the current WaSH facility to have this constant supervision because there is a lot invested in the facility not only financially but socially and educationally as well. It is a unique prototype facility, the effects of which are still being studied. It also has a profound impact not only on the sanitation of Langrug but on the community that uses it as a social centre. Economically, much time and money was invested in the facility. The constant presence of a supervisor protects the financial investment and reduces the cost of repairs due to vandalism or theft.

Section 2.2: Social Sustainability

Caretakers

The caretakers were volunteers before they were paid for their job. They did not receive any formal training in public health procedures and education. Through frequent interactions and interviews, the WPI WaSH team found that the caretakers generally do not think of their shifts in the facility as merely a job. They show their pride and appreciation of the facility by fulfilling their duty of maintaining a welcoming and clean facility. The caretakers are devoted women who want to be involved and feel responsible for the upgrading of Langrug. They are eager to maintain the WaSH facility as a centerpiece of their community, and they demonstrate this through their hard work.

Social Benefits

Beyond providing water and sanitation to Langrug, the WaSH facility serves as a social centre for the community. It is an open and welcoming space where women frequently spend the day socialising in its shade. They are comfortable bringing their children to the facility particularly when doing laundry due to the relatively high volume of fellow community members who provide additional supervision. Social groups, such as an AIDS support group use the central space to hold meetings. By having the meeting in such a public location, the group is more widely accepted into the community and members feel welcome. Recently, the facility has been used as a post office, where community members can pick up their mail. The facility also serves as a welcoming meeting area for visitors to the settlement.

Acceptance

Feedback on the facility has been very positive. As the data indicates, the facility is used for all of its intended functions. Usage of the showers is relatively low compared to the other services provided by the facility. Recently the facility has been serving as a post office. A community member volunteers her time to bring post for the community from Stellenbosch to the facility, saving other members the trip into town to retrieve their post. This unintended feature of the facility has attracted even more users.

Comfort

As previously mentioned, women feel comfortable bringing their children to the facility while doing laundry. Benches at the laundry basins allow users to sit while doing laundry, augmenting their comfort at the facility. This simple feature is not found at most other laundry facilities in the settlement. Additional seating at the table and low walls make visitors to the facility more comfortable while waiting or socialising.

Not all users feel completely comfortable at the facility. Male users have expressed discomfort at the lack of privacy for urinals. Currently there is only a small piece of hinged plywood shielding urinal users from the front of the facility. Heads and feet of those using the urinals are

visible from the street. Additionally, some users have expressed discomfort of using the public showers for modesty reasons and during the winter, due to cold weather.

Section 2.3: Environmental Sustainability

In designing and implementing a WaSH facility, it is important to consider the effects on the environment around it, starting with the users and workers, and including the surrounding community, the regional environment, and eventually reaching the global environment. The mishandling of wastewater can lead to ground contamination, which can cause disease in the community. Additionally, proper health and hygiene practices in the facility can prevent the spread of germs and diseases among users and workers. The implementation of a successful, sustainable, and clean WaSH facility can benefit the global environment as it can be replicated in other needed areas.

Grey Water

There is a grey water channel that comes down the hill and is diverted around the facility to flow behind it. The original design was for the grey water to flow under the facility in a deep channel. In heavy rain the channel flooded the facility, so the path of the grey water was diverted. Due to the sharp corners in the diversion tunnel, spillage and flooding still occurs in high volumes of water. The grey water channel is also often an area for garbage, which clogs the flow of water.

Rain Water

The roof of the facility slants to allow water to run off. The water runs into a gutter, which feeds into the drain located under the water tap on the outside of the building. The drain connects to the sewer, disposing of the rainwater without reusing it.

Hot Water

The facility successfully utilises solar energy to heat water for showers and hand washing using a solar geyser. This environmentally sustainable feature also reduces the electricity cost of heating the water, and makes the facility more socially sustainable by providing the luxury of hot water.

Section 2.4: Institutional Sustainability

Stakeholder Involvement

The current involvement of the WaSH facility stakeholders is outlined below.

- **Municipality of Stellenbosch:** The Municipality of Stellenbosch indirectly funds the facility through CORC. Representatives from the Municipality check in on the facility when they are in Langrug on other business.
- **Community Organisation Resource Center (CORC):** Baraka Mwau and Olwethu Jack, two representatives from CORC, typically visit Langrug once a week. Baraka handles the management of the facility, particularly timesheets and payments for the caretakers and security guards, as well as the ordering of supplies. CORC explores opportunities to improve and expand the facility.
- **Community Leaders:** Community leaders frequent the facility and make immediate decisions for its improvements. As community leaders, they are often engaged in other responsibilities and cannot personally provide regular management to the facility.
- **Caretakers:** Maintain the facility throughout the day and report any problems to either the community leaders or CORC.
- **Worcester Polytechnic Institute (WPI) –** WPI does not play a role in the daily operations of the facility. The university is primarily focused on the planning and long-term assessment of the facility. WPI can utilise funds from the GE Foundation Grant to implement improvements to the facility.

Section 3: Areas of Improvement

Based on the analysis of the WaSH facility as it is, the WPI team has identified the following areas of potential improvement. Many of these improvements could be implemented in the current facility, and should be considered in future WaSH facilities.

Area of Improvement	Possible Solution(s)	Implementer
Data Collection		
Record of supplies	Tracking sheet	Caretakers
Record of shower usage/income	Tracking sheet	Caretakers
Staffing and Training		
Training of caretakers	Public health training	CORC, with David Molorane's help
Emergency Plan		
Plumbing	Plan/decision maker	Community leaders,
Fire	Hose, hydrants, extinguishers	Community leaders, with Aron's help
Flooding	Diversion and/or expansion of grey water channel	CORC, with WPI help
Medical Emergencies	Training of caretakers	CORC
Child Development		
Children stalls	Stall painting	WPI Kiddies Team
Child play	Play area	WPI Kiddies Team
Operational		
Shower money	Alternate programs	Caretakers, CORC
Health product sales	Pilot program	Caretakers, WPI WaSH team
Aesthetic		
Atmosphere	Mirrors	WPI WaSH team, caretakers
Urinal privacy	Urinal divider	Community leaders
Technical		
Window protection	Window shades/covering	WPI WaSH team
Handwringer	Purchase of Handwringer	WPI WaSH team, caretakers
Rainwater Collection	Collection barrel	WPI WaSH team, Community leaders
Water Tap	Plastic water spout	Aron
Mail boxes	More drawers/reorganisation	Community leaders
Hand drying	Hand towel and towel bar	WPI WaSH team, caretakers

Section 3.1: Social Improvements

Child Development

- **Child Stall Painting:** Currently many people in the community use the children's toilets and children do not necessarily give them preference. Painting the toilet stalls to indicate them as for children could ensure that children are given priority to these toilets. Such paintings could also contain aspects of early childhood development, such as letters, numbers, or pictures encouraging sanitary behavior.
- **Play area for children:** The addition of a small area for children to play would give mothers more flexibility to come and do their laundry as they watch their kids play in a safe environment.
 - **Kiddie Pool:** The implementation of a small pool for children to play in on a hot day would give children a fun and safe place to play. Charging a small fee for use of the pool would also be a good means of income for the facility to subsidize the cost of running and maintaining the facility.

Aesthetic Additions

- **Mirrors:** There are currently no mirrors in the facility. The addition of mirrors will brighten the room, and give people a chance to see themselves.
- **Urinal Door:** A door or larger partition to the urinal area will provide me with more privacy when using the urinals, and may increase their use.
- **Sign:** A sign for the front of the facility would advertise the services offered and encourage use of the facility.

Section 3.2: Economic Improvements

Construction

Although the construction process resulted in a successful product, the rushed procedure was less than ideal. Construction costs were higher due to mistakes made, which could have been avoided with more careful planning. In order for construction on future WaSH facilities to be a successful and well organised, all designs should be completed before ground breaks. Design, budget, and responsibilities all need to be decided before construction begins. While a leap of faith is sometimes necessary in this kind of work, future iterations must be more carefully planned to ensure the success of the project.

Data Collection

Currently, the caretakers collect usage data (such as that analysed in Section 1.2) when they are asked to do so. It might be advantageous to have the caretakers collect this data on a regular basis, perhaps annually to assess the long-term usage of the facility.

In addition to collecting usage data, caretakers should also keep track of supplies such as toilet paper and cleaning chemicals. Such a system would be beneficial to the stakeholders because it would show them that the money for supplies is being used effectively. Currently the caretakers only have an estimated time frame in which the supplies are used. The supply log will assist the organisation of the facility and ensure that all of the supplies in the inventory are accounted for. It will also be easier for the caretakers to report more usage data to the stakeholders. They may use a simple recording system such as the chart below.

Supplies			
Item	Quantity	Date Product Purchased	Price (R)
<i>Hand soap</i>	<i>1</i>	<i>11-11-13</i>	<i>R90.00</i>

Figure 11 Sample Inventory Chart

Another type of a simple recording is a money-logging sheet. Because the facility has to pay for electricity, the caretakers compensate for this cost by charging users R5 for each shower. After an observation of the facility, there was no evident method for keeping track of the shower money. A money-logging sheet for the shower money such as the one below would help caretakers keep an organised system and ensure that the correct amount of being collected and used for the electricity bill.

Shower Money		
Date	Showers taken (✓)	Income (R)
<i>11-11-13</i>	✓✓✓✓✓✓✓✓✓✓ (10)	<i>R100.00</i>

Figure 12 Sample Income Chart

Section 3.3: Environmental Improvements

Technical Additions

- **Window covering:** Two of the walls of the facility offer only metal grating as protection from the elements. Some type of window covering, such as a transparent plastic sheet would provide protection from wind and rain to those inside the facility. Transparent coverings would allow natural light to be used during the day, reducing electricity costs. The coverings need to be able to be rolled up to allow for breezes and ventilation.
- **Handwringer:** Users doing laundry often have to make several trips to the facility partially due to carrying baskets that heavy with wet clothes. The addition of a hand-powered clothes wringer would help clothes to dry faster and would reduce the weight of carrying laundered clothes.
- **Rainwater collection barrel:** The rain gutter currently dumps water into the drain bellow the water tap on the outside of the building, which leads to the sewer. A barrel that collected the water could repurpose the water to be used for gardens or use in cleaning the grey water channels.
- **Grey water channel re-route:** Moving the current path of the grey water channel from the back of the facility to the front would follow the contour of the land better and keep grey water from flooding into the facility during periods of heavy rain.
- **Water tap:** Currently, the spout of the outdoor tap only consists of a rubber hose protruding from the wall. The hose could get broken, rendering the tap un-useable. The placement of a plastic waterspout at the wall would reduce the chance of breakage, though it could increase the chance of theft or vandalism of the tap.
- **Mail boxes:** The mail is currently stored in a set of drawers that takes up valuable floor space. Altering the storage system, such as using a chest with more drawers stacked taller than the current structure, would open up more space for people in the facility.
- **Hand drying:** There is currently no formal system for people to dry their hands after washing them.
 - Paper towels are not environmentally sustainable and would create an increase in trash.
 - Blow dryers are environmentally sustainable and sanitary. They require electricity and create noise that would interfere with the social culture of the facility.
 - Installing a bar on which to hang a cloth towel would be socially and economically sustainable option. Towels would need to be laundered regularly and replaced when they become worn out. The caretakers would be responsible for switching out the hand towels and laundering the soiled towels.

Section 3.4 Institutional Improvements

WaSH Coordinator

As more WaSH facilities are implemented in informal settlements, an organised reporting hierarchy should be developed. Someone appointed to the position of WaSH coordinator could manage the operations of these growing facilities, including repairs, supplies, and management of workers. The establishment of such a structure would fill a leadership void in some communities and ensure the implementation of decisions and improvements to the WaSH facilities.

Caretaker Training

It would be beneficial to the community for the caretakers to be trained in public health education. With this knowledge, they could educate members of the community, especially children about health and hygiene. Such topics would include the importance of hand washing and the proper use of grey water channels.

Operational Improvements

The WaSH facility runs fairly smoothly. This section outlines some specific improvements that could be made to the operations of this facility. Appendix 3 includes a detailed Operations and Management Plan that is based on the current operations of the Langrug WaSH facility. This ideal plan could be applied to any WaSH facility.

Alternative Shower Programs

There is a fee of R5 in place for shower use in order to subsidize the cost of electricity for hot water. However, the showers go largely underused. The implementation of various shower payment plans could increase shower usage.

- Flat rate: Community members pay a small fee each month for unlimited shower use. This payment method would make people feel as though they are wasting their money by not frequently showering at the facility, and increase proper hygiene.
- Family plans: Families with several children may be hesitant to use the showers because the cost of a shower for each child adds up to a substantial fee for showers. By implementing a family discount fee, family members could all shower at a lower cost.
- Money collection: Currently the fee is handed directly to the caretaker on duty, and some members of the community think the money goes directly to the caretaker's pockets. A locked box that money is deposited into and usage checklist maintained by the caretakers could be an efficient double verification system to see the use of showers.
- Note: Caution should be taken when implementing new shower programs. Community leaders have expressed a concern that fluctuation in the shower rates could cause community members to distrust the recipients of their money.

Health and Hygiene Product Sales

WaSH facilities promote the health and hygiene of the communities they serve. In addition to the services the WaSH facility currently provides, it could also offer the sale of basic health products (e.g. soap, nappies, bandages, etc.) at discounted prices to encourage healthy practices at the facility and in the community. The income from these sales would offset the operations costs, making the facility more economically sustainable. In addition, the expanding of such conveniences to the community would increase the social sustainability of the WaSH facility, and overall institutionally sustainable as a centre devoted to improving public health.

Emergency Plan

Plumbing

Aron Ndzondza seems to be a reliable emergency contact for plumbing problems at the facility. However, the caretakers and community leaders seem hesitant to call him for minor problems such as the spout on the hand-washing sink being loose. A person should be identified who can make decisions such as what improvements to implement and to call a plumber when necessary. This person could be a caretaker, a community leader, or a supervisor. A WaSH Coordinator could be this authority to make such decisions.

Fire

There should be a well-defined plan about what to do in the instance of a fire. In such an event, caretakers should know to check the facility prior to leaving to ensure that all users have been safely evacuated. Community leaders would like to see fire hydrants installed in the settlement, especially near public structures like the WaSH facility. Fire extinguishers could be strategically placed in the facility and around the settlement. The community could also institute a volunteer firefighter program, in which community members volunteer to respond to fires and organise procedures to lessen them (i.e. a bucket brigade) while waiting for a fire truck from Stellenbosch. Another more simple solution could be to have a hose at the facility that could be attached to a water source and used to put out fires at the facility or nearby houses.

Flooding

The grey water channel could be diverted and made deeper to more effectively utilise the space around the facility and prevent future flooding.

Medical Emergencies

Caretakers should have basic first aid training in addition to their training in public health and education. Ideally, there would be at least someone in the community who has some knowledge of medical practices. If a multipurpose centre is ever constructed, the health clinic should be staffed with trained personnel.

Conclusion

The current Water, Sanitation, and Hygiene (WaSH) facility is a well-maintained and clean space that promotes the public health and sanitation of the community, different from any other toilet facility nearby. Beyond the toilets and taps, the facility serves as a social centre where women and children feel safe to gather, where social groups can meet and where visitors can feel welcome to the community. The services this unique prototype facility provides justify the high cost of construction and maintenance. The recommendations of this assessment will increase the efficiency of this facility, and will serve as guidelines for future, sustainable WaSH facilities.

Operations and Management Guide for a WaSH-UP Facility

Drafted by the WPI WaSH Team, 2013
Management Structure

WaSH-UP Coordinator

All caretakers of WaSH facilities in a particular settlement or region report to the WaSH-UP Coordinator.

The WaSH-UP Coordinator visits each facility twice a week to:

- Work closely with caretakers, community leaders and others to review how facility is performing and explore new opportunities to improve services and public health benefits.
- Work closely with caretakers to continually strengthen their commitment to public service and personal growth.
- Coordinate payment of caretakers (see *Payment Procedure* below)
- Collect income from facility
 - May include income from showers, health supply sales, and rent for small business space
 - Ensure reported income matches that collected
- Coordinate the purchase of supplies
 - Cleaning chemicals
 - Toilet Paper
 - Health supplies
- Make sure routine maintenance is completed
- Make decisions on improvements, such as aesthetic and repairs
- Assess community need for long-term WaSH projects
- Oversee master key locks (see *Keys*, below)
- Respond to any emergencies at any of the WaSH facilities

Payment Procedure

- The WaSH-UP coordinator collects timesheets of all workers bi-weekly.
- Workers will be paid through direct banking when available.
 - If direct banking is not available, the WaSH-UP Coordinator will pay workers at their next visit following the collection of time sheets.

Keys

- The WaSH-UP Coordinator, a community leader, and two caretakers should have keys to the facility at all times.

- Whenever someone with keys is leaving the area for an extended period of time, they will leave their keys with another worker or community leader.
- Any lost or stolen keys will be reported to the WaSH-UP Coordinator. Locks will be changed at the discretion of the WaSH-UP Coordinator.

Training of Workers

The WaSH-UP Coordinator is responsible for training all workers (caretakers, security, etc.) in the operational and management procedures outlined in this document.

In addition, the coordinator will arrange for each caretaker to be trained in public health education. Programs in or near the informal settlement of Langrug can be coordinated with David Molorane at Batho's Place.

Daily Caretaker Operations¹

The term “caretaker” refers to the person or people responsible for the daily maintenance of a WaSH facility. The caretaker can be someone hired to fulfill this role. However, the caretaker role can also be filled by a community social group that volunteers its members’ time to maintain this vital community centre. There are various social and economic benefits to either option. The caretaker structure does not change the operating procedure of the facility.

Opening of the Facility

1. Unlock exterior doors
2. Unlock caretaker office and any other interior doors
 - a. If appropriate, open any window coverings
3. Inspect the premises for signs of theft, vandalism or necessary repairs.
 - a. If minor repairs are needed that can be easily fixed, (e.g. writing, missing towel) fix it.
 - b. If there is significant damage, theft or vandalism to any part of the facility, (e.g. broken pipe, permanent vandalism, etc.) contact the WaSH-UP Coordinator.
4. Clean as necessary
 - a. Mop any rainwater that has come in.
 - b. Sweep any dirt that has come in.
 - c. Organise the caretaker office

Toilets and Urinals

1. Greet the visitor(s).
2. Hand them toilet paper if they did not bring their own.
3. Check each stall every hour, depending on the user frequency. Make sure toilet is flushed, and clean surrounding area, using gloves.
4. Restock the toilet paper when the supply is running low.

Shower

1. Visitors will bring their own hygiene products or purchase it from facility.
2. Collect money from the user.
3. Store the collected money in a moneybox.
4. Record income in the ledger.
5. Each use should take no more than 15 minutes.
6. Check rooms after each use.

¹ Not all WaSH caretakers will have this full list of responsibilities. Tasks to complete depend on the WaSH facility.

Laundry Basins

1. Visitors will bring their own detergent and/or dishwashing soap.
2. If user has a child with them, offer child education supplies to the guardian, before offering to the child.
3. Bring out table and chairs for children as necessary.
4. Check and clean basins after use or as necessary.

Health Supply Sales

1. While performing duties throughout the day, ensure the security of the health products.
2. When customer inquires about health product purchases:
 - a. State the price (according to the price list)
 - b. Offer information on the products if asked by the customer
 - c. Collect money from customer, and place in collection box
 - d. Record the sale in ledger
3. Offer supplies to users of the facility at the caretaker's discretion
4. When supplies are running low:
 - a. If a vital supply, contact WaSH-UP coordinator at earliest convenience; otherwise,
 - b. Inform WaSH-UP coordinator at their next visit

Changing Shifts

When one caretaker goes off duty:

1. Exchange any necessary keys with incoming caretaker
2. Inform incoming caretaker of any problems that occurred during their shift, and of the statuses of current users at the facility.
3. Remain at the facility until the incoming caretaker is settled and aware of all current proceedings at the facility.
4. Incoming caretaker counts the money in the moneybox and ensures that the amount matches the reported income.

Closing the Facility

1. Clean all toilets, sinks, and basins
2. Sweep and mop the floor
3. Count income for the day, and ensure it matches the ledger
4. If money does not match the ledger, record the difference.
5. Organise caretaker room.
6. Bring any outdoor facility features (e.g. children's table and chairs) indoors.
7. Lock money² and all interior doors.
8. If security guard is reporting for duty, exchange any necessary keys. Inform guard of any issues and proceedings from the day.

² The financial policy of the WaSH facility will need to be established by the WaSH-UP Coordinator and the caretakers.

After-Hours Security Guard

If the facility has a security guard to monitor the premises after hours, he or she should:

1. Report for duty 1 hour prior to the closing of the facility
2. Receive any keys or necessary information from the caretaker on duty
3. Guard the facility at night, and handle any incidents that occur at one's discretion, calling proper authorities when necessary
4. Report all major incidents and emergencies (see *Emergency Procedures* below) to the WaSH-UP Coordinator and/or proper authorities
5. Remain at the facility until a caretaker opens the facility. Inform the new caretaker of any issues or developments they should be aware of.

Emergency Procedures

The WaSH-UP Coordinator should be available at all times to respond to any emergencies. If s/he will at any point be unable to respond, they will appoint an emergency contact in their absence. Community leaders are also emergency contacts in immediate emergencies. A list of all emergency contact information (WaSH-UP Coordinator, Community Leaders, local law enforcement, hospitals, and fire department) will be posted in the caretaker office.

Plumbing

In the case of a plumbing emergency, the caretakers will notify the WaSH-UP Coordinator in a timeframe befitting the state of emergency.

The WaSH-UP Coordinator will arrange with the plumber of choice to respond to such emergencies.

Flooding

In the case of minor flooding, the caretakers will mop or drain the affected area. If problem persists, the WaSH-UP Coordinator will identify means of reducing or eliminating flooding at the facility.

Fire

In the event of a fire at or near the facility:

1. The caretaker or guard on duty should ensure that everyone is safely out of the facility before they leave.
2. The caretaker or guard on duty should notify the nearest community leader and/or the local fire department.

The ability to immediately response to fire at a facility will depend on the facility. When training the caretakers, the WaSH-UP Coordinator should ensure that all workers know how to respond to fire (e.g. water hose, fire extinguisher, etc. when available)

Medical Emergencies

Caretakers should be trained in basic first aid. The WaSH-UP Coordinator will arrange this training. In the event of a medical emergency at the facility, the caretaker on duty should be able to assess the severity of the emergency and apply a basic solution if that is sufficient medical care. There should be a first aid kit at the WaSH Facility. If necessary, the caretaker will call for professional medical help. The WaSH-UP Coordinator will be notified to make any executive decisions after this step, and to respond to any resulting issues (e.g. legal, etc.).