HOPE CONSULTING

PSI Liberia Sanitation Business Models

Business Model Design Session

April 17, 2014

Reminder: Our Understanding

RFP Overview

- Per the RFP, the BMGF and UK DfID are looking for proposals where:
  - A clear mandate exists to provide sanitation services to all
  - Sanitation services are based on a public-private model that safely collects and disposes of waste
  - A clearly-identified municipal, state or nationally-sanctioned organization that has a clear mandate, budget and faces measurable performance targets for delivering quality sanitation services to all, especially non-sewered customers
  - The private sector is engaged with P4P (pay for performance) contracts

Project Overview

- PSI is partnering with the Monrovia City Corporation and the Bill & Melinda Gates Foundation to:
  - Design commercially viable business models for pay-for-use shared sanitation, and emptying, disposal, and treatment of fecal sludge
  - Create an enabling environment that ensures sustainable and equitable provision of sanitation services
  - Inform the design of public private partnerships to increase access to and use of hygienic sanitation throughout the sanitation value chain in urban Liberia

Key Questions to Answer

- Can a **commercially viable business model(s)** be developed for community pay-for-use sanitation facilities that increases access to hygienic sanitation among poor, urban residents of Monrovia?
- Can a business model(s) be developed that increases the quality of service and safety of fecal sludge emptying and disposal that **incentivizes private providers to enter the market**, improving their efficiency and capacity for safe collection and disposal?
- What **public policy, regulations, and/or finance mechanisms** can be developed and feasibly implemented to support private sector market entry for businesses across the sanitation value chain?

Recall: Our Sanitation Value Chain Framework

Sanitation Facilities

- Technology
  - i.e. Plastic port-a-potty, camping toilet, permanent cement, etc…
- Application level
  - i.e. Community pay-per-use, household rental, etc…
- Ownership / management
  - i.e. Entrepreneur/ franchisee, salaried employee, household
- Price structure
- Costs
  - Capex inputs
  - Operations & Maintenance (O&M)

Collection & Transport

- Method
  - i.e. Trucks, hand-carts, multiple, sewer, etc…
- Ownership
  - i.e. Existing third parties, government, etc…
- Costs
  - Capex
  - O&M

Treatment (Including disposal / reuse)

- Technology
  - i.e. Treatment plant, reuse facility, etc…
- Ownership
  - i.e. Government, NGO, private corp, etc…
- Economics
  - Capex
  - O&M costs
  - Revenue potential

Agenda

Value Chain Assessment Takeaways

Consumer Assessment Takeaways

Business Model Design Options

Next Steps

As part of the value chain assessment, we talked with a majority of the players across the value chain…

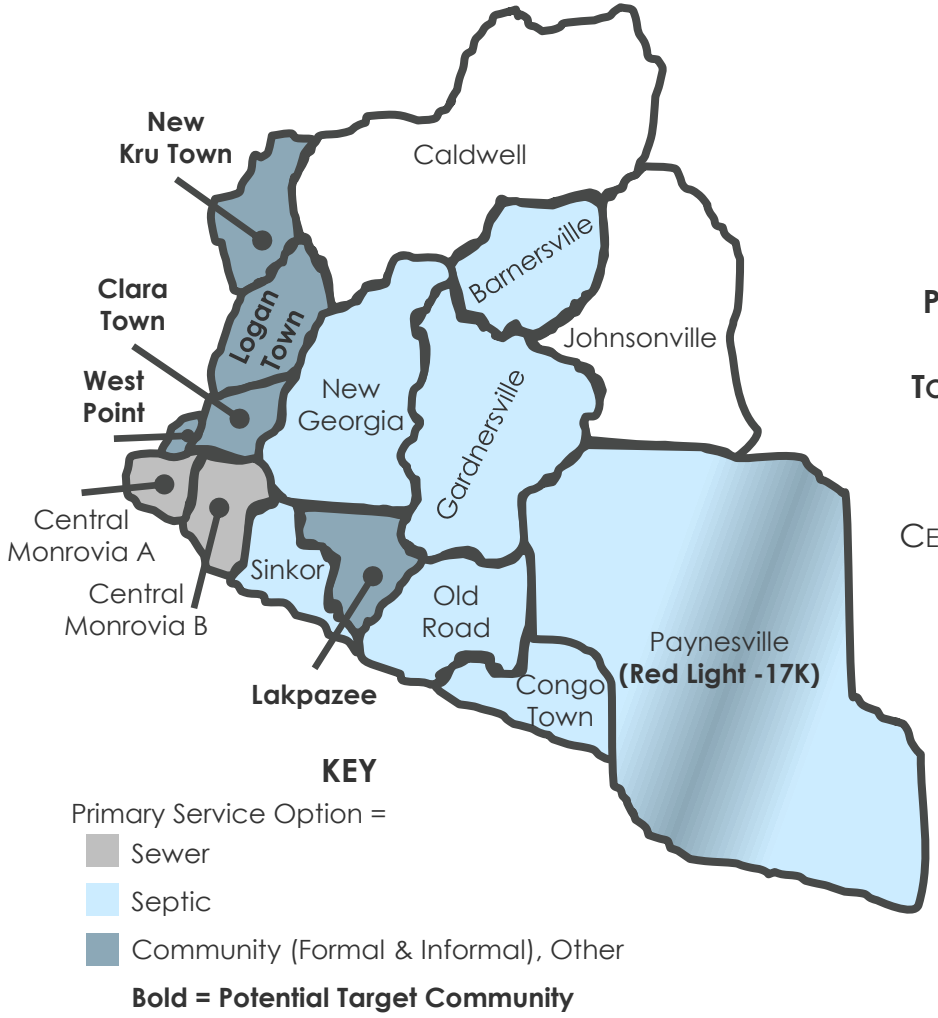
- Ansu Duala, Duala Group, Inc.
- Assistant Minister George Yarngo, Ministry of Public Works
- Cathy Stephen, WASH Technical Coordinator at Oxfam
- David Watako, WASH / Oxfam
- Edwin Rogers, UNICEF
- Ellen Pratt, FISH Project Leader at MCC
- James Stroler, NC Sanitators
- Joe Togba, Biofil & Rubber Farm Owner
- Piet deVries, Chief of Party at Global Communities

…to understand commercially viable options, and what is needed to enable these models to succeed

The value chain assessment sought to answer the following questions by understanding the activities and capabilities of the existing value chain players:

- What sanitation facilities are most viable in Monrovia's target communities?
- What factors limit the options available?
- Is there enough collection capacity today, to support facility expansion in target communities?
- Are treatment options sufficient?
- Where are gaps in current regulations to meet BoP demand and implementation thereof?

PSI's target communities lack access to improved sanitation options, both in terms of facilities and safe waste removal



	Population (2014 Est.)*	Est. Daily Toilet Waste
Clara Town	64K	27K gal
Lakpazee	46K	19K gal
Logan Town	64K	27K gal
New Kru Town	85K	36K gal
Paynesville (Red Light)	17K	145K gal
West Point	35K	15K gal
Total Target Population	**311K**	**131K gal**
Barnersville	41K	17K gal
Caldwell	N/A	N/A
Central Monrovia A & B	97K	21K gal
Congo Town	29K	12K gal
Gardnersville	93K	39K gal
Johnsonville	N/A	N/A
New Georgia	67K	28K gal
Old Road	56K	23K gal
Paynesville	329K	145K gal
Sinkor	48K	20K gal

* Based on 2008 census data of 970K scaled by 1.13x to 1.1 M

Note: WASH/ Oxfam is doing a mapping to understand current sanitation facilities in different areas, which PSI should leverage in its proposal

While a spectrum of options exist to serve the BoP, limited activity, cost and operational issues limit user access to toilets

	Household	Shared Household	Single Public	Public Blocks
Planned Activity	None, at HH discretion	Moderate	None	Heavy
Current Activity	Ad-hoc built by HH	Ad-hoc built by HH	Limited informal activity	Limited or needs repair
Provider	Homeowners / landlords	Planned: NGOs (200+) Current: HH builds	Local entrepreneurs	Gov't & NGOs
Current Mgmt. Model	Household	Multiple households	Local entrepreneurs	Community & limited private mgmt.
Revenue Model	N/A	N/A	Pay-per-use	Pay-per-use
Target Segments	Upper class & working poor	Working poor	Bottom-of-pyramid	Bottom-of-pyramid

While a spectrum of options exist to serve the BoP, limited activity, cost and operational issues limit user access to toilets (continued)

	Household	Shared Household	Single Public	Public Blocks
PROS	▪ Most private, convenient, and safe ▪ Addresses nighttime demand ▪ Users can customize experience to preferences	▪ ~$500 cost may be attainable for working poor ▪ Minimal land req. ▪ Increased privacy, convenience, and safety ▪ Addresses nighttime demand ▪ Users can customize experience to preferences	▪ Cost ~$500 ▪ Minimal land req. ▪ Increased privacy, convenience and safety ▪ Creates most jobs ▪ Increases access as large septic truck access is not a requirement	▪ Ability to serve a large number of users
CONS	▪ High facility and disposal even for working poor ▪ HH ownership or landlord approval required ▪ Mgmt. model to incentivize proper disposal is complex ▪ Doesn't create jobs	▪ ~$500 cost is difficult for BoP cover ▪ HH ownership or landlord approval required ▪ Difficult to keep outsiders from using ▪ Mgmt. model to incentivize proper disposal is complex ▪ Doesn't create jobs	▪ Current toilets lack proper disposal ▪ Does not address nighttime demand ▪ Requires new collection model to remove waste in hard to reach areas ▪ Regular waste removal is needed	▪ Current mgmt. models lack proper incentives ▪ High capital cost of ~$10-25K ▪ Difficult to find land ▪ Does not address nighttime demand ▪ Safety, cleanliness & maintenance issues ▪ Creates few jobs

Management models, land and other factors limit the options available to users across Monrovia

COMMUNITY MANAGEMENT MODEL – WHERE NGOS BUILD TOILETS AND "GIFT" THEM TO COMMUNITIES OR COMMUNITY SELECTED OPERATORS TO RUN – FOR PUBLIC BLOCK TOILETS IS NOT WORKING

- NGOs and other third parties incur the significant facility capital cost which eliminates the stake that communities and facility operators have in the success of each facility
- Soon after completion, many facilities due to poor management and oversight fail, becoming unhygienic with many being abandoned or non-operational
- MCC, Global Communities, and WASH / Oxfam are all investigating management models that will ensure public block facilities remain clean and safe to use
- UNICEF has suspended construction of additional facilities until they can figure out the appropriate model
- Global Communities has tried private management with two facilities but has experienced some issues
  - Continuously advising the community on contractual issues with private operators
  - Community leaders promoting the use of other community toilets as they don't get a cut of profits
- A Minister of Public Works believes these "luxury" facilities shouldn't be built as they are expensive and rapidly become dysfunctional after completion primarily due to management issues
- A potential factor in the limited success of this model may be due to a "tragedy of a commons" issue where people have less respect for community property than private property

OVERALL LACK OF FUNCTIONAL FACILITIES HAS CREATED DEMAND FOR INFORMAL OPTIONS

- In the Slipway area, one of four MCC facilities was operational, with that facility's waste draining into a river
- The lack of easy access to sanctioned functional public facilities has led to the construction of simple, pay-for-use toilets or shared household toilets
  - There is no oversight of these informally built toilets, leading to improper disposal of waste (i.e. toilets overhanging the water or pipes that drain into swamps) and are not safely constructed

Management models, land and other factors limit the options available to users across Monrovia (continued)

LAND CONSTRAINTS WILL INFLUENCE OPTIONS

- MCC, UNICEF, Global Communities, and WASH / Oxfam all noted the challenge of finding space to build large community block toilets
- A high water table will also impact design options as a means of safe storage and removal of waste is critical to prevent environmental contamination, eliminating options such as pit latrines, soak-away septic tanks, etc.…

NGOS AND THE GOVERNMENT NEED A COORDINATED STRATEGY TO AVOID COMPETING WITH EACH OTHER AND PRIVATE ENTRANTS

- In one area of Monrovia, an NGO that required the community to contract management of the facility out to a private operator saw usage decrease when another community toilet was "gifted" to the community
- Lack of coordination has and may continue to cause double entry into areas needing services, resulting in some communities being over served
- NGOs with subsidized overhead management costs can construct toilets at a cheaper cost than private enterprises potentially impacting the attractiveness of the market for private entrants

MANY BOP FEASIBLE FACILITY COMPONENTS ARE AVAILABLE ACROSS MONROVIA

- Many components of the design – concrete, metal siding/ roofing, etc. – are available around Monrovia
- Flush and pour-flush toilets have to be imported as porcelain toilets are not currently produced in Liberia, which will likely have minimal impact on BoP facility design

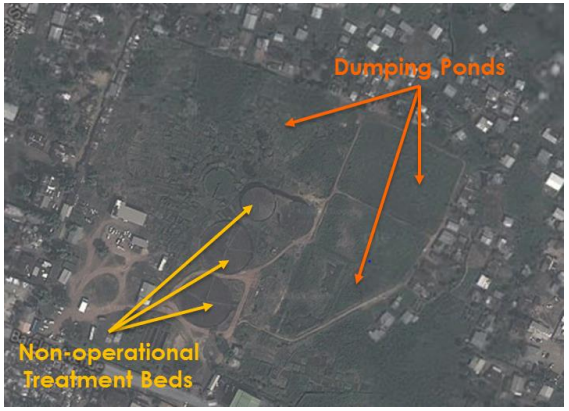
Investments in collection capacity and new collection methods will be needed to serve the BoP at scale

- Current and planned capacity (assuming 2 runs a day) is ~39K gallons a day, which is ~30% of the daily waste generated by target communities
- Current capacity is primarily large vacuum trucks which are not able to easily access many locations in target communities creating a need for a hub and spoke collection model to leverage this capacity
- The established truckload price is $150 per truckload with a range of $100 to $200
- Existing capacity will likely be enough to accommodate a pilot, but will need to scale along with facilities to ensure safe disposal of waste

COLLECTION & TRANSPORT PROVIDER OVERVIEW

	PROVIDER	PRIMARY CUSTOMERS	CAPACITY
Current	LWSC	Commercial	1 - 2,500 gallon truck
	NC Sanitators	Private & commercial	2 – 3,000 gallon trucks
	Libra	Private & commercial	2 – 3,000 gallon trucks
	Duala Group	Own port-a-potties	3 - 500 gallon tugs
	UNMIL	UN compounds only	Multiple large trucks
Planned	MCC	TBD	1 - 2,500 gallon truck 2 - 50 gallon tugs

MCC is building a new treatment facility that is critical to the value chain economics as the existing facility is non-operational



EXISTING TREATMENT

- Proper treatment facilities are essentially non-existent
- Existing LWSC facilities only include "storage ponds" where waste is not treated safely as homes, fields and schools are located next to the facility
- Current dumping charges are $20 per load
- Sewer does not work effectively in bringing waste to the treatment site, instead overflowing or draining into canals that lead to the river or ocean

PLANNED TREATMENT

- MCC via the AWF FISH project is building a 300-360K gallon treatment facility, expected to be finished in the next year
- Feasibility studies are still being conducted but end output should be a usable fertilizer
- Facility will not serve entire market, requiring additional investment with a focus on decentralized models

Completion of the planned MCC treatment facility is a critical assumption that drives the treatment and reuse economic model. Without this facility, significant subsidy will be needed

While the potential market for reuse may exist, significant barriers will likely need to be overcome to develop a profitable market

	Market Players	Barriers to Usage	Potential Market Size
RUBBER PLANTATIONS	▪ Firestone Rubber Corp. ▪ Liberian Agricultural Company ▪ Guthrie (Goodrich) ▪ LIBCO ▪ Cavalla ▪ Sinoe Rubber Corp. ▪ Agro, Inc. ▪ Rubber Planters Assoc.	▪ Perception that synthetic fertilizer is needed to speed tree growth ▪ Quality concerns ▪ Volume minimums	~2,500 tons*
PALM OIL PLANTATIONS	▪ Golden Veroelum Inc. ▪ Equatorial Palm ▪ Agro, Inc. ▪ Sime Darby ▪ Sinar Mas	▪ Perception that synthetic fertilizer is needed to speed tree growth ▪ Quality concerns ▪ Volume minimums	~600 tons**
OTHER FARMERS	▪ Farmers Association	▪ Perception of using human waste of food products ▪ Quality concerns	TBD***

*Assumes Firestone is ~50% of production on 200 square miles

**Assumes 27K hectares = 104 square miles, and utilizes similar amounts of fertilizer as rubber trees

***Not enough available information to estimate usage in this market

Policy / regulatory improvements and enforcement are needed to create an enabling environment…

BUILDING CODE AND DESIGN REGULATIONS ARE NEEDED

- Need regulations requiring buildings, houses and apartment to have toilets in order to be inhabited. If toilets are not in place then the building is not allowed to be inhabited
- Need a minimum design requirement for toilets and toilet facilities to ensure proper disposal but not a standard design requirement
  - NGOs noted that MCC, Public Works, and other government agencies should create minimum technical design requirements (i.e. Sealed collection mechanism, handicap accessible, etc.) but should not implement a standard design for toilet facilities as it limits innovation in solving the problem

ENFORCEMENT OF EXISTING REGULATIONS ON OPEN DEFECATION AND IMPROPER DISPOSAL IS NEEDED

- Enforcement of regulations preventing open defecation and improper dumping is non-existent; however, one should not rely on this enforcement happening quickly
- Enforcement could leverage a model similar to the MCC parking meter maid model to enforce laws around open defecation to motivate consumers to use toilet facilities
  - In West Point, an area once known for open defecation, has been cleaned up due to enforcement of open defecation regulations with a 500 LD fine. However, at night people still perform open defecation
- Night time enforcement of regulations preventing open defecation or improper disposal of "flying toilets" will be extremely difficult
  - Enforcement could be based on fining people for improper disposal of waste (i.e. dumping in rivers); however, proper disposal options need to be provided before this is enforceable

…along with a streamlined oversight process and better coordination across the sector

A STREAMLINED APPROVAL PROCESS IS NEEDED FOR CONSTRUCTING FACILITIES

- The current approval process is complicated and involves multiple different organizations
  - Process overview: 1) Find the land, often with the help of the municipality → 2) Ministry of Public Works approves zoning and design → 3) Municipality (MCC) and Ministry of Public Works issue building permits
  - EPA and Ministry of Health should be involved but no one is really sure where as the orgs function poorly
  - Multiple approval points increase process complexity and the risk of grafts
  - The Ministry of Public works current moratorium on construction will need to be worked through

BETTER COORDINATION ACROSS PROVIDERS IS NEEDED TO UNDERSTAND EXISTING FACILITIES, DEMAND, & PLANNED ACTIVITY

- A lack of coordination and knowledge sharing exists amongst the NGOs in the Liberian WASH consortium
- Many interviewees noted a need for collaboration to avoid duplicating efforts and maximize investment
- MCC as part of the AWF FISH project is working to establish a sanitation alliance which should facilitate improved coordination if managed properly

Recap: answers to key value chain questions

Q: What sanitation facilities are most viable in Monrovia's target communities?
A: Single public facilities

PREFERRED TO PUBLIC BLOCK FACILITIES

- More cost-effective: 20 – 50 facilities @ $500 each can be built for the price of 1 8-block facility at $10K-$25K
- Incentives more aligned: Franchisees invest their own capital in franchised properties; franchisor, franchisee, and operator all profit from a well-functioning franchise
- Job creation: 1 job is created for every toilet, vs. max. of 1 job per 4 toilets in a public block facility
- Less land required: A single public facility requires less space than block facilities, which is desirable given land constraints in target communities

PREFERRED TO SHARED HH FACILITIES

- More cost effective: Fewer facilities are required to serve the same # of households as under a shared HH model
- Incentives more aligned: Shared HH facility would require shared maintenance and capital improvements across HHs. Not likely to work
- Fewer land rights/leases required: Fewer facilities mean fewer land ownership rights or lease agreements needed to use land

Critical assumption, to be tested in pilot: Assumes that users are willing to sacrifice convenience and lower cost of a shared HH facility for cleanliness and pay-per-use of a single public facility

Recap: answers to key value chain questions, cont'd.

Q: What factors limit the options available?

- Low income: Low per capita income ($414) clearly limits HH ability to invest capital in their own or shared facilities and individuals' willingness to pay (WTP) for public facilities
- Limited land ownership: In Monrovia's low income neighborhoods, there is relatively low land ownership. Landlord approval is therefore required to build HH or shared HH facilities, and landlords have little incentive to provide this approval
- Space constraints and high water table: Both limit the viability of large public block facilities, which require relatively large land parcels in crowded areas and lower water tables, to accommodate public block septic tanks
- Poor roads in low income communities: Public block facilities need to be desludged by large vacuum trucks, decreasing their viability to serve BoP communities as it is hard to access these communities with large transport vehicles

Q: Is there enough collection capacity today, to support expansion?

A: Sort of, vacuum truck capacity can serve up to ~30% of the target population but a new hub and spoke collection network is required to utilize this capacity

- Current vacuum truck capacity is likely enough to support a pilot (i.e., pilot up to 10% of target population)
- However, a new collection network will need to be created to serve BoP communities which are difficult to access with large vacuum trucks
- As facilities increase, to serve 30% of the target population or more, collection and transport infrastructure investment will be required

Recap: answers to key value chain questions, cont'd.

Q: Are treatment options sufficient?

A: Yes, if the AWF FISH treatment facility is built according to plan

- Limited treatment capacity exists today
- A treatment facility should be completed in ~12 months as part of MCC's AWF FISH project
- A market for reuse could make treatment facility economics more attractive, but will likely take significant investment and is not critical in the near-term

Q: Where are gaps in current regulations to meet BoP demand?

- Technical requirements are lacking: For chosen facility type(s), for ratio of facilities to households, for min/max distance between facilities, households, and water points, and for safe waste disposal
- Building codes are lacking: Building code is required, to mandate minimum ratio of toilet facilities to units in multi-family housing
- Existing regulations not enforced, for safe disposal of waste and open defecation
- Streamlined approval process is needed, for facility construction

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Value Chain Assessment Takeaways

Consumer Assessment Takeaways

Business Model Design Options

Next Steps

A small-scale consumer assessment was conducted to identify potential user preferences, willingness-to-pay and segments

PRIMARY RESEARCH

- 10 consumer interviews from across Monrovia with a variety of experiences
  - West Point
  - Clara Town
  - Central Monrovia
  - Lakpazee
  - New Kru Town / Duala
- Direct observation tours of target communities
  - West Point
  - Clara Town
  - Logan Town

SECONDARY RESEARCH

- Ansu Duala, Duala Group
- County Commissioner in Clara Town
- David Watako, WASH / Oxfam
- MCC FISH Facilitator
- Piet deVries, Global Communities

This limited scale assessment was only meant to test initial demand hypotheses and identify potential customer segments and preferences to test in the future

The limited primary research confirmed demand exists and WTP is ~ 5 LD….

DEMAND EXISTS BUT LACK OF ACCESS INFLUENCES CURRENT BEHAVIOR

- Users confirmed they want toilet facilities but most are not convenient or do not meet user needs
- During the day, target users indicated that they use public pay-per-use toilets, both formal and informal, to defecate. However, men would potentially urinate in public versus pay a fee
- Children go into small can or bags which is tossed in the river or ocean as many informal facilities aren't safe
- At night, users that don't have access to HH or shared HH toilets, use either 1) a can or bag as a toilet or 2) open defecate on the beach, river bank or in-between houses
- Solving nighttime demand will be difficult as no places exist to safely dispose of this waste. However, users noted they would be willing to dump their nighttime waste in a safe place if it existed vs. the river / ocean

WILLINGNESS TO PAY IS ~5 LD BUT COULD POTENTIALLY RISE TO 10-15 LD

- Most users noted their willingness to pay was 5 LD; however, some users were willing to pay roughly 10-15 LD for a clean, private toilet and proper supplies while defecating
  - 5 LD is the lowest currency in use and most items (i.e. rice, pepper, etc…) can be found in 5 LD quantities
- Users noted a higher willingness-to-pay for using toilets to defecate of 10 LD rather than to urinate for 5 LD
- Users were open to tiered pricing to differentiate between usage and other things like age
- Users were also open to bundled pricing packages (i.e. Pay 80 LD for 10 uses versus pay-per-use of 100 LD)

COMMUNITY DYNAMICS AND SOCIAL STIGMA WILL BE IMPORTANT IN DRIVING CHANGE

- During the day in heavily trafficked areas, there is social pressure and social backlash for defecating in public; however, that social stigma goes away at night when people are less likely to be seen
- One community has put pressure to stop unacceptable behaviors, such as breaking hole in septic tank to let it drain, by increasing social pressure via fines from community commissioners
- In West Point, 500 LD fines have stopped daytime beach defecation but at night no one is there to monitor

…as well as established basic user requirements and potential target segments

CONSUMERS WANT A CLEAN, CONVENIENT, PRIVATE, AND SAFE FACILITY FOR USING THE TOILET

- Cleanliness appears to be the most important user desire
  - Most users noted that existing facilities are not clean with some indicating they would be willing to pay more for a clean and private space to use the toilet
  - Hand sanitization facilities as well as properly lit facilities would make them more attractive to users
  - Service is also lacking at many public toilets, as operators do not provide toilet paper but regular paper of some form, if any at all
- Convenience is also important as users indicated that many facilities are not located nearby and would prefer more convenient options, especially at night
- Privacy is an issue in public toilets as some lack stall doors / curtains so it still feels like you are going in public
- Safety of informal toilets is an issue, as they are not maintained and a risk to users especially children
- Other design preference that need to be further investigated include elements such as commode versus squat plate, inclusion of shower facilities, etc…

POTENTIAL TARGET SEGMENTS NEED FURTHER EVALUATION

- Income level: While the BoP cannot afford household or shared household options, these may be a opportunity for the working poor (>$5 a day) based on consumer desires
- Age: Increasing usage amongst children will be more difficult than adults as they lack income and may need to be charged less or incorporated into a subscription like model
- Sex: Depending on the purpose of the toilet visit, men and women desires for facilities may be different across usage, cleanliness, convenience and safety
- Usage: Users, especially men, will likely need to be offered different price points or services when urinating versus defecating
- Current Toilet Usage: Household, shared, community pay-per-use, open defecation / flying toilet

In addition to the primary customer research, secondary conversations confirmed insufficient capacity and WTP

SECONDARY CONVERSATIONS REINFORCED THAT DEMAND EXISTS, BUT THERE IS INSUFFICIENT CAPACITY

- In touring target communities with MCC, people have constructed shared household toilets to meet their needs in response to non-operational local community block toilets
- Multiple NGO and private sanitation providers also mentioned that local entrepreneurs have also created pay-per-use overhang toilets in these communities
- While these facilities meet users needs of a place to use the toilet, they do not provide safe disposal of the waste
- In two different pilots in the Camp Johnson and Red Light market areas, the Duala Group, which owns port-a-potties, saw between 300-600 people per day per toilet

NGOS AND PRIVATE SANITATION PROVIDERS SUGGESTED WILLINGNESS TO PAY IS ~5 LD

- While 5 LD seems to be a consensus price, 10 LD is charged in certain areas of the city and may be appropriate for enhanced services (i.e. toilet paper, cleanliness, etc…)
  - A Clara Town Commissioner said WTP was at 5 LD. However, right next door in Waterside informal toilets charge 10 LD
- Global Communities who tested a price point of 5 LD and 10 LD at its Logan Town facility saw a difference in usage at 5 LD but this price wasn't enough for the operator to break-even
- The Duala Group also noted that 5 LD in all of their pilots seems to be about the right price

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Next Steps

PSI and MCC should focus on single-unit public facilities while leveraging existing public blocks to increase access to BoP users

In order to sustainably and safely meet the demand and preferences of BoP users, PSI and MCC's facility model should focus on:

1. Implementing a new model that focuses on smaller single public unit facilities run by a franchisee, who is a local entrepreneur, and serviced by a franchisor with supply and waste removal services for an ongoing fixed franchise fee

2. Discontinuing building large public block facilities. However, the many existing assets should be leveraged and operated via a similar private franchisee operator model that requires an upfront investment by the franchisee in addition to an ongoing fixed franchise fee

A branded, P4P franchisee model is critical to overcoming the limitations of current community management models

- A branded franchisee model can overcome the limitations of the current community based management models by creating:
  - A sense of ownership as entrepreneurs have to provide an up-front investment
  - Incentives and accountability by employing a fixed monthly franchise fee along with pay for performance concepts to keep the rights to a franchise
- Franchise contracts should be modeled on P4P concepts:
  - Clear operating guidelines, including quality/cleanliness audits
  - Franchisor has the ability to replace non-performing franchisees
  - Regulatory permits obtained by the franchisor rather than the individual entrepreneurs to reduce barriers and allow a level playing field

There are a number of ways these agreements between MCC, the franchisor, and the franchisee can be structured to leverage P4P concepts

Single public facilities are the most sustainable financial option, as proper shared HH facilities are out-of-reach of most BoP users

	Shared Household	Single Public	Public Blocks	Assumption
CAPITAL COSTS	**$500**	**$500**	**$10,000**	No loan amortization costs included
FACILITY	$500	$500	$10,000	
OTHER (LAND, PERMITS)	$0	$0	$0	None
DAILY REVENUE	**$3.60***	**$6.00**	**$14.40**	* Cost avoidance for shared HH
COST PER USE	$0.06	$0.06	$0.06	5 LD per use
# OF USES (USERS)	60 (20)	100 (50)	240 (15/ toilet)	1 user = 2 uses per day; Public = 8 toilets
OPERATING COSTS	**$1.38**	**$2.41**	**$9.43**	
OPERATOR	$0.00	$0.00	$0.00	Franchisee acts as operator
DESLUDGING	$0.84	$1.40	$7.35	$0.10/ gallon = 1.5K gal/$150 per load
FRANCHISE COLLECTION FEE	$0.06	$0.15	$0.00	$0.50/ trip = $8 fee/ 16 collector trips
SUPPLIES (I.E. TOILET PAPER)	$0.35	$0.73	$0.98	$0.60/ tp roll & $0.10 for other
MAINTENANCE	$0.14	$0.14	$1.10	$50 per toilet per year
DAILY PROFIT	**$2.22***	**$3.59**	**$4.97**	* Cost avoidance for shared HH
ANNUAL PROFIT	**$809**	**$1,311**	**$1,812**	Before repayment of capital costs
BREAK-EVEN DAYS (MONTHS)	**226 days 8 months**	**139 days 5 months**	**2,014 days 67 months**	Capital cost (not including amortization costs) / daily profit

To reach 10% of the target population with a franchisee pilot, an investment of ~$150K would be required to build the facilities

- In order to pilot the single public franchisee model in two communities, covering ~31K users or 10% of the 311K target population, it would require ~$150K to construct 292 toilets
  - Given the modest investment required to finance the pilot phase, NGO or public funding should be able to cover the cost of the investment needed to finance franchisees
- The table below highlights the facility capital costs (not including land or permits) to scale the single public model versus the public block model to serve the target population

Target Pop. Served	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
# of Single Use Toilets	292	583	875	1,166	1,458	1,749	2,041	2,333	2,624	2,916
Cost ($500 per)	$0.15M	$0.3M	$0.4M	$0.6M	$0.7M	$0.9M	$1.0M	$1.2M	$1.3M	$1.5M
# of Public 8-Block	36	73	109	146	182	219	255	292	328	364
Cost ($10K per)	$0.4M	$0.7M	$1.1M	$1.5M	$1.8M	$2.2M	$2.6M	$2.9M	$3.2M	$3.6M

Note: Assumes 107 users per toilet

- Additional funding of will be needed to increase public awareness as well as train the entrepreneurs running the franchises during the pilot phase
- While the pilot phase may only leverage one or two franchisors, in future we would anticipate more than one franchisor entering the market, MCC should encourage this to avoid the risk that a monopoly may provide poor customer service, by 1) letting market dynamics play out or 2) strictly enforcing P4P contracts with franchisors

In addition to business model considerations, other issues need to be addressed to create an enabling environment

IMPROVED COORDINATION	▪ Establishment of a sanitation alliance as proposed in the FISH project to improve communication and coordination across the government, NGOs and private players ▪ At a minimum, WASH consortium members should coordinate and share knowledge about proposed business/ mgmt. models, existing and planned facility locations, costs, etc… to increase the overall ROI for members
STREAMLINED APPROVAL PROCESS	▪ Leverage the creation of a sanitation alliance led by MCC to reduce the barriers and handoffs to receiving approval to construct toilet facilities by providing one point of approval to satisfy the requirements of MCC, Ministry of Public Works, Liberian Water and Sanitation Corp, Ministry of Health and the Liberian EPA
ENFORCEMENT OF REGULATIONS	▪ MCC should consider creating a network of sanitation enforcement monitors similar to its parking enforcement monitors to prevent open defecation & urination. MCC could leverage this existing network to quickly scale enforcement ▪ Educate community commissioners and other leaders, both formal and informal, on why they should enforce sanitation regulations like the safe disposal of waste
MINIMUM TECHNICAL REQUIREMENTS	▪ Minimum technical standards to ensure the safe disposal of waste should be enforced by the government, but they should not a impose a standard design as it will hamper innovation ▪ The technical facility requirements should ensure the waste collection process is also safe, for example, if small collection containers are utilized they should be able to be sealed easily with out collectors being exposed to the waste

A new hub and spoke collection model needs to be created to increase the BoP's access to safe waste disposal

Assuming a network of single public facilities is created, a new hub and spoke model of collection will need to be established leveraging the existing capacity of larger transportation providers to service facilities targeting the BoP:

- **Single public toilet collection model:** Model should utilize regular waste collection (1-3 days) via a hub and spoke collection model where smaller volumes are transported to a central location. Vacuum trucks will then take the sludge to treatment facility
  - During the pilot phase, franchisor can either 1) run collection business and contract out transport or 2) outsource both collection and transport with these fees passed through to the individual toilet operators as part of the fixed franchise fee
  - Long-term, franchisor needs to make a own/ operate versus outsource decision
- **Public block collection model:** Model should leverage vacuum trucks on an as need basis to empty public block facilities
  - Public blocks could act as a central collection point in the hub and spoke model
  - To overcome the large one-time payments for desludging services, alternative payment models such as weekly or monthly fee for a number of guaranteed services a year should be considered
- **P4P contracts:** Ensure the waste reaches the proper treatment facilities
  - Outsourcing contract between the franchisor and disposal operator should be based on P4P concepts allowing the franchisor to conduct periodic audits to ensure that fecal sludge was delivered to the treatment facility (and the dumping charge paid) and that adequate service was provided to the collection people bringing the sludge (wait times, service, prompt and accurate payment, etc.)
  - MCC could incentivize performance against these contracts by providing payments based on amount of waste delivered, % of target population serviced, etc…

Both the collection network and transport components of the value chain are profitable on a standalone basis at scale…

The following collection and transport calculations are based upon a hub and spoke collection network that would be utilized to collect from single public facilities while vacuum trucks would be used to service existing block facilities and central collection points

Franchisor Revenue from One Collector		
Capital Costs	**$450**	No loan amortization costs included
Handcart	$200	1 handcart at $200
Central Collection Tank	$250	$1K for a 1.5K gal tank split by 4 collectors
Daily Revenue	**$8**	
Number of Trips	16	
Per Trip Collection Price	$0.50	$8.00 per 1 collector for 16 trips a day
Operating Costs	**$6.08**	
Collectors	$6.00	$6 per collector
Maintenance	$0.08	10% of Capital Costs
Daily Profit	**$1.92**	
Annual Profit	**$510**	Before repayment of capital costs
Break-even Days (Months)	**246 days (8.2 months)**	Capital cost (not including amortization costs) / daily profit

…despite large capital costs for transport infrastructure, which should be able to be recovered in 1.5 to 2 years

	500 Gallon Tug	1,500 Gal Truck	2,500 Gal Truck	Assumption
CAPITAL COSTS	**$85,000**	**$138,750**	**$185,000**	No loan amortization costs included
TRUCK & TUGS	$52,000	$138,750	$185,000	2 tugs and 1 truck
OTHER COLLECTION VEHICLES	$33,000	$0	$0	1 pickup truck for tugs
DAILY REVENUE	**$400**	**$300**	**$500**	
TRUCKLOAD PRICE	$50	$150	$250	$150 per truckload
# OF TRUCKLOADS	4	2	2	2 trips per lg. truck &4 per tug
OPERATING COSTS	**$245.58**	**$182.87**	**$200.32**	
OPERATORS	$6.00	$6.00	$6.00	$6 per operator
FUEL	$86.00	$43.00	$43.00	$4.30 per gallon, 4 MPG, 20 mi trip
DUMPING FEE	$80.00	$40.00	$40.00	$20 per load
MAINTENANCE	$32.08	$52.36	$69.81	10% of capital cost
S,G&A	$41.51	$41.51	$41.51	Sales staff salary, rent, misc.
DAILY PROFIT	**$154.42**	**$117.13**	**$299.68**	
ANNUAL PROFIT	**$40,920**	**$31,040**	**$79,415**	Before repayment of capital costs
BREAK-EVEN DAYS (MONTHS)	**550 days 19 months**	**1,185 days 40 months**	**617 days 21 months**	Capital cost (not including amortization costs) / daily profit

Improved utilization and enhanced collection capacity will be needed to allow for safe disposal of waste beyond a pilot phase

- The existing and planned transport capacity of ~39K gallons is sufficient to conduct pilots that would reach up to ~30% of the target population (93K users) in the near-term but additional capacity investment is needed in the long-term as facilities scale to a larger portion of the population
- The table below highlights the additional investment in transport and additional collectors that will be required as facilities scale to provide safe disposal services

Target Pop. Served	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**
Daily Waste Generated	13K Gal	26K	39K	52K	65K	78K	91K	104K	117K	130K
# of 2.5K Gal Trucks	-	-	1	3	6	8	11	14	16	19
Add. Investment Required ($185K)	$0.0M	$0.0M	$0.2M	$0.6M	$1.1M	$1.5M	$2.0M	$2.6M	$3.0M	$3.5M
Current Capacity	39K									
# of Collectors	18	36	55	73	91	109	128	146	164	182

Note: Assumes collectors handle 16 toilets

- As additional funding is needed to scale, MCC can employ a buy and contract out operation model or provide access to either public or private funding mechanisms that provide favorable lending terms
- Additional funding will be needed to increase public awareness on the importance or proper disposal and to increase awareness of existing options

The financial stability of waste treatment will depend on either 1) development of a reuse market or 2) government subsidy

Our analysis of the sanitation value chain, led us to the following conclusions regarding the long-term sustainability of treatment and reuse business model:

- While the facility and collection / transport components of the value chain can operate on as standalone basis, they will not generate enough revenue to subsidize the operating costs of a safe treatment facility
- Given this, the long-term waste treatment business model will rely on one of two sources of funding which can be tested upon the completion of the AWF FISH treatment plant:

Development of a Reuse Market

- Economic viability of the plant depends in large part on the development of a fertilizer market, which is yet unproven
- When contracting a facility operator, MCC should include P4P incentives focused on the operators ability to develop the reuse market (i.e. amount converted and sold)
- Potential markets for non-food grade fertilizer do exist but development of these markets will likely require investment to work with large buyers to understand their requirements and barriers
- Our high level analysis, indicates if these markets can be developed, long-term financial stability would exist for both private and public providers

Government Subsidization

- If reuse markets can not be developed, MCC will have to find other ways (i.e. taxes, higher fees, loans, grants, etc…) to subsidize the operation of treatment facilities to cover operating costs and any capital scale-up costs

The discussion to this point has provided the insights needed to start to answer our original questions

Can a **commercially viable business model(s)** be developed?

- Facility, collection and transport are each economically viable
- However, they cannot support the cost of building or operating a treatment facility
- The treatment facility can be commercially viable only if a reuse market is developed; otherwise, government subsidy will be required
- The following slides recap the business model design recommendations and provide options for piloting various P4P economic models

Can a business model(s) be developed…that **incentivizes private providers to enter**?

- Yes, a business model can be developed based on a franchise model that creates:
  - Profit incentives for all players – franchisor, franchisee and transport owner/ operators
  - A sense of ownership for franchisees, created by requiring investment of franchisees' own capital
  - Measureable P4P clauses (i.e. pay for sludge versus pay per user) that can most easily be monitored and not embellished

What **public policy, regulations, and/or finance mechanisms** are needed to support entry?

- Technical requirements for chosen facility type(s), for ratio of facilities to households, for min/max distance between facilities, households, and water points, and for safe waste disposal. SPHERE humanitarian standards are a possible point of departure
- Building codes to mandate minimum ratio of toilet facilities to units in multi-family housing
- Enforcement of existing regulations for safe disposal of waste and open defecation
- Streamlined approval process for facility construction
- Favorable terms of financing or other financial incentives, to attract quality franchisors

Recap of the business model design recommendations

Sanitation Facilities

- Franchise based single pay-per-use toilets are the primary model
- Covert management of existing public blocks to a franchisee agreements
- P4P based on either number of users or amount of sludge collected as well as customer satisfaction

Collection & Transport

- Hub and spoke model to collect waste from single public facilities
- Large vacuum trucks used to collect from public blocks and central hubs
- Franchisor either owns collection and transport or outsources it long-term
- P4P based on amount collected and service levels provided

Treatment (Including disposal / reuse)

- Long-term viability depends on development of reuse market
- In the absence of a reuse market, government subsidization will be required as revenue from the other two parts of the value chain will not likely be able to cover operating costs

The facilities and collection & transport components of the value chain:

- Appear economically viable
- Depend on network density to meet assumptions (i.e 2 truck trips, 16 collection trips, etc..)
- Do not take into account system wide branding for franchisor or business scaling time/costs

Three primary options exist for structuring P4P agreements between MCC, the franchisor, and the franchisee to pilot

	Option 1	Option 2	Option 3
CUSTOMER	Pay-per-use	No Charge	Pay-per-use
FRANCHISEE	▪ Cash from customer ▪ Pays franchise fee both upfront and ongoing	▪ Paid by franchisor per kg of sludge ▪ Pays franchise fee – upfront and ongoing	▪ Cash from customer ▪ Pays franchise fee that is lower than option 1 both upfront and ongoing
FRANCHISOR (LARGE NGO OR PRIVATE COMPANY)	▪ Finances and owns toilets ▪ Manage or owns collection and transport ▪ Paid franchise fee ▪ Ability to transfer ownership for non-performance ▪ Additional financial incentives likely required to attract competent franchisors	▪ Finances and owns toilets ▪ Manage or owns collection and transport ▪ Paid franchise fee ▪ Collects fee from MCC per kg of sludge and passes it to franchises ▪ Ability to transfer ownership for non-performance ▪ Additional financial incentives likely required to attract competent franchisors	▪ No financing / investment ▪ Does not own toilets ▪ Manage or owns collection and transport ▪ Paid lower franchise fee than option 1 ▪ Ability to transfer ownership for non-performance ▪ Additional financial incentives may be required to attract competent franchisors
MCC	▪ Market structure and regulatory oversight – selects franchisor, issues permits, monitors compliance, etc…	▪ Market structure and regulatory oversight ▪ Pays franchisor per kg of sludge	▪ Market structure and regulatory oversight ▪ Finances toilets

Three primary options exist for structuring P4P agreements between MCC, the franchisor, and the franchisee to pilot (cont.)

	Option 1	Option 2	Option 3
PROS	▪ Simplest economic model ▪ If successful, economically self sustaining	▪ Larger role and more control for MCC ▪ Service provided at no cost to BoP customer while retaining market-based structure and incentives	▪ Larger role and most control for MCC, allowing more quality control of facility construction ▪ Simple economic model ▪ If successful, economically self sustaining ▪ Additional financial incentives to attract competent franchisors may be less
CONS	▪ Limited role for MCC, but do not underestimate the importance of its regulatory and oversight role ▪ Cost per use may reduce demand ▪ Additional financial incentives to attract competent franchisors may be significant	▪ Highest reporting complexity ▪ Subsidy required for MCC to pay for kg of sludge removed ▪ Additional financial incentives to attract competent franchisors may be significant	▪ Cost per use may reduce demand ▪ Subsidy required for MCC to finance toilet construction ▪ Franchisors have little incentive to make investments to continue to upgrade facilities

Each option should be piloted in a different area of Monrovia to compare results side-by-side to understand which model is likely to be most successful in the long-term

Prior to submitting the proposal, PSI and MCC need to think through the outstanding value chain questions…

SANITATION FACILITIES

- What role does PSI want to play?
  - Does PSI want to be the franchisor or is it someone else?
  - Does PSI want to own the brand and outsource construction to communities or other NGOs?
- Is MCC on board with potential economic models to pilot?
  - Which models should MCC and PSI pilot?
- Can the franchise fee be enough to cover marketing and other franchisor administrative costs?
- What does the final technical design look like?

COLLECTION & TRANSPORT

- Are collection and transport required to be integrated?
- For the pilot, will the franchisor own or outsource the collection and transport of waste? Long-term?
- Would any of the three existing private companies be willing to create a collection network? What incentives do they need?

TREATMENT

- Are potential reuse consumers open to using human waste-based fertilizer?
  - Can PSI get a commitment from any group that is willing to pilot the fertilizer when it is available as a proof of concept ahead of the Gate proposal?
  - If a reuse market does exist, how can MCC structure the contract so that the operator is paying for its inputs (aka fecal sludge) rather than charging a dumping fee?
  - If a reuse market can't be developed, how will MCC fund treatment at scale?

…and outstanding consumer questions

These questions can be further grounded out in interview, observations, or piloting:

- Which facility design features (clean, convenient, private, safe) identified in the initial consumer assessment are the most important in practice?
  - Most importantly, are people willing to trade off convenient (shared HH) for clean (single public facility)?
- Are people willing to stand in line to use a facility? If so, behind how many people? How long are they willing to wait in a line?
- Can the initial revenue assumptions on willingness to pay and volume of users per facility be validated?
- Which segments of low-income users should be targeted, if any?
- What marketing message is likely to mobilize the greatest # of users?

Would you like us to provide guidance on how to ground these questions out further?

Agenda

Value Chain Assessment Takeaways

Consumer Assessment Takeaways

Business Model Design Options

Next Steps

Next Steps

HOPE CONSULTING TEAM

- Finalize business model design document including value chain player profiles
- Answer any remaining questions
- Other?

PSI

- Vet with MCC
- Conduct follow-up to answer any outstanding questions as necessary
- Share learnings with other PSI country teams and WASH consortium members
- Incorporate design recommendations into Gates proposal
- Other?

Appendix

Treatment: High-level financial model

Project Team & Contact Information

Treatment: High-level financial model overview

Capacity	100%	75%	50%	25%	10%	Assumption
CAPITAL COSTS	**$449,000**	**$144,150**	**$192,600**	**$449,000**	**$449,000**	No loan amortization costs
FACILITY	$340,000	$138,750	$185,000	$340,000	$340,000	FISH Project
LAND & OTHER	$109,000	$400	$600	$109,000	$109,000	FISH Project: land $50K, other $59K
ANNUAL REVENUE	**$1,150,636**	**$862,977**	**$575,318**	**$287,659**	**$115,064**	
PRICE PER BAG	$25	$25	$250	$25	$25	Max capacity of 300K gal., 4 cycles a year, 50% yield
# OF 50 KG BAGS	45,545	34,159	22,773	11,386	4,555	
PRICE PER LOAD	$20	$20	$20	$20	$20	$20 per load
# OF 2,000 GAL LOADS	600	450	300	150	60	
OPERATING COSTS	**$187,480**	**$156,303**	**$123,535**	**$86,768**	**$63,261**	
MANAGEMENT	$12,000	$12,000	$12,000	$8,000	$4,000	$4K per mgmt. staff
LINE STAFF	$4,470	$4,470	$3,180	$1,590	$1,590	$6 per day, 60 bag a day
DISTRIBUTION	$71,165	$53,374	$35,582	$17,791	$7,116	$1K per semi w/ 16 pallet x 40 bags
BAG COST	$45,545	$34,159	$22,773	$11,386	$4,555	$1 per bag
MAINTENANCE	$34,000	$34,000	$34,000	$34,000	$34,000	10% of facility
S,G&A	$20,000	$18,000	$16,000	$14,000	$12,000	Sales staff, fertilizer testing
ANNUAL PROFIT	**$963,156**	**$706,675**	**$451,783**	**$200,892**	**$51,803**	Before repayment of capital costs
BREAK-EVEN DAYS (MONTHS)	**170 days 6 months**	**232 days 8 months**	**363 days 12 months**	**816 days 28 months**	**3,164 days 106 months**	Capital cost (not including amortization costs) / daily profit

Project Team

Hope Neighbor

Project Partner

- Led projects of Hewlett & Gates
- Former strategy consultant @ Marakon
- Previous experience in international dev. @ World Bank & Peace Corps

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- Former Sr. VP of Strategy @ MacDermid
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