shelter associates

CREATING SPATIAL DATA

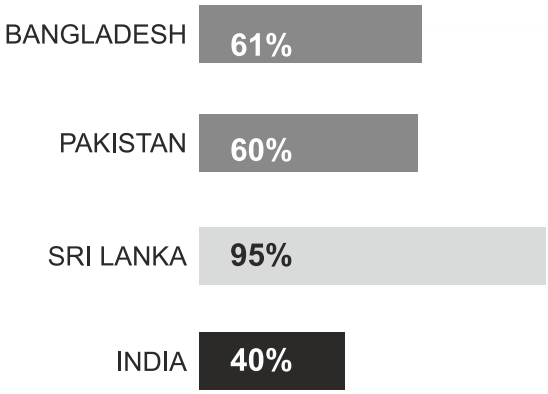
A Toolkit for delivering Sanitation in Slums

1/3

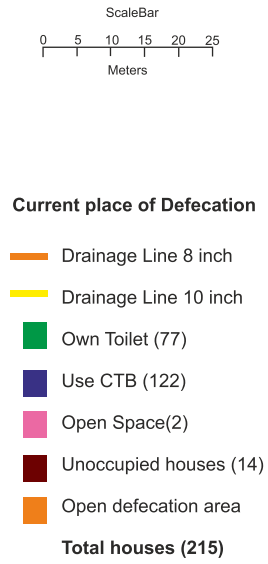
Contents

Foreword

According to the World Bank only 40% of Indians have access to improved sanitation and as a result India performs worse than Bangladesh (61%), Pakistan (60%), and Sri Lanka (95%). Lack of access to improved sanitation, meaning a facility that hygienically separates human excreta from human contact, has a detrimental impact on the health, education, financial security, and safety of 600 million Indian citizens, the majority of which reside in informal settlements.



Shelter Associates (SA) was established with the vision of an India where every citizen has access to the infrastructure essential for human survival and dignity and since it's founding SA has designed and implemented many slum rehabilitation projects and influenced national policy. Historically SA has been involved with Community Toilet Block (CTB) schemes but experiences with these projects led us to conclude that CTBs are ineffective endeavours which are high on capital expenditure and commit Urban Local Bodies (ULB) to expensive maintenance regimes. CTB's are usually a default option adopted by ULB's due to the lack of accurate data which would enable a targeted approach; a problem that our OHOT methodology addresses with the collection, verification, organisation, and interrogation of data. The data is presented as overlays on remote sensing images, such as Google Earth ® Maps, to enable a detailed understanding of the surveyed settlement and resident community.





As an organisation SA have moved away from CTB projects as it has been our observation that wherever families have been provided with their own household toilet, they have not only maintained them but also upgraded them over a period of time. This has led to the conviction that whenever possible individual sanitation is the most sustainable and scalable option to address the lack of access to improved sanitation that is experienced across the country. The OHOT model links well with the Government of India's Swachh Bharat Mission (SBM) and the National Urban Sanitation Policy (NUSP).

This document represents the culmination of years of practical experience in the slum rehabilitation sector and is intended to serve as a guide for facilitators, sponsors, and governments to steer the design and implementation of sanitation projects within informal settlements. This toolkit can be used in full or in part, facilitators can adopt the whole OHOT model or use parts of this document to strengthen their existing approach so that collectively we can elevate India to the status of 'Open Defecation Free' (ODF).

Last but not the least, I would like to thank DASRA Foundation for all their support and my colleagues Ross, Resham, Smita , Dhanashree and Shabana for painstakingly going through the innumerable drafts and refining the tool kit that I take great pleasure in presenting to all our readers.

Pratima Joshi
Founder & Executive Director
Shelter Associates

Introduction

This toolkit is compiled using SA's experiences of facilitating a range of sanitation solutions in informal settlements of urban Maharashtra since the year 2000. SA's 'One Home, One Toilet' (OHOT) model is a result of experimentation and continuous refinement over a period of time and developed from the observation that the provision of sanitation on a household basis is more impactful and sustainable as compared to the provision of Community Sanitation facilities.

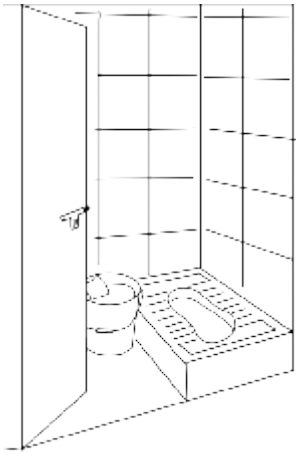
SA's OHOT model has also proven to be a holistic and a cost effective option for achieving 'Open Defecation Free' (ODF) status in informal settlements. Due to the universal nature of the objectives of each work stage, the OHOT model, in addition to being cost effective is replicable and scaleable, and therefore represents a solution to India's sanitation crisis that is both appropriate and feasible.

The intention of this document is to explain the OHOT model in detail so that it can guide any agent/agency involved in, or tasked with, the delivery of improved sanitation in informal communities. When emulated the toolkit will enable:

1. Implementers (NGOs, consultants, etc.) to design new projects which facilitate long lasting impactful change

2. Implementers/funders to develop existing projects into more robust propositions with regard to impact and sustainability

3. Policy makers/policy advisors to make sensitive and informed decisions when drafting slum sanitation policies, city sanitation plans (CSP), etc.



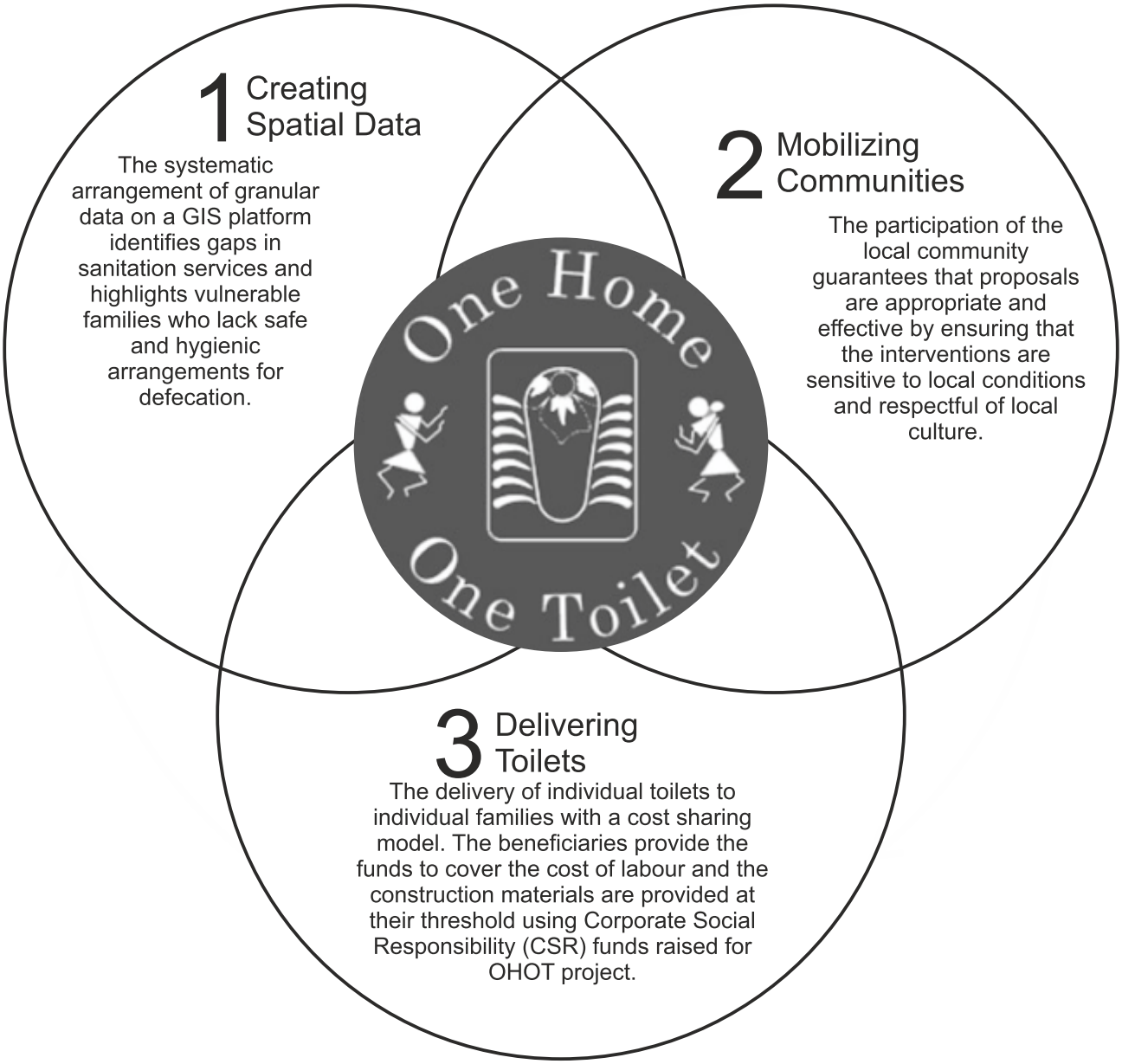
4. City administrators to make sensitive and informed decisions when executing slum sanitation policy

5. Potential beneficiaries (residents of informal settlements) to lobby their Urban Local Body (ULB) for access to improved sanitation

The toolkit can be used in full or in part; users can carry out any work stage as an individual exercise or repeat all work stages of the OHOT model. It is recommended that the user understands the full model, especially the objectives and prerequisites of all work stages prior to omitting a work stage. Each work stage is explained in detail and includes a description of the objectives and the prerequisites so that the user can be sure that a stage or stages can be omitted i.e. If an accurate understanding of the ground reality is already present then the users, if they trust the data available, could opt to omit stage 1 (data collection and GIS) and start their involvement from stage 2 (community mobilization). Users can also adopt the model to suit their local conditions and local project context, so long as the alterations do not negate the primary objectives of the work stages.

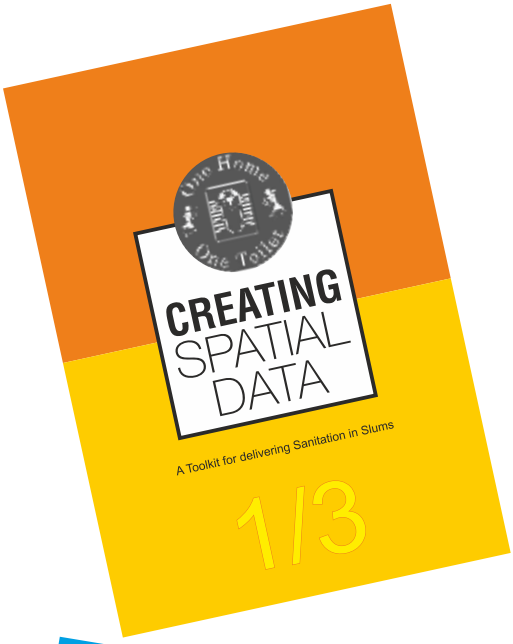
This toolkit is arranged sequentially to describe the progression of the model. The OHOT model has three distinct work stages which flow as a series; the results of a stage are the prerequisites for the next which is why care must be taken if the users of the toolkit decide to skip a stage. In this toolkit each stage is detailed in an individual booklet.

DATA DRIVEN, COMMUNITY CENTRIC SANITATION MODEL



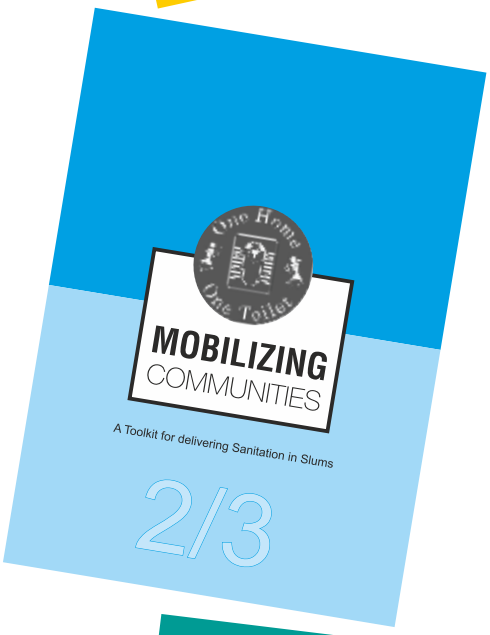
by **SHELTER ASSOCIATES**

TOOLKIT



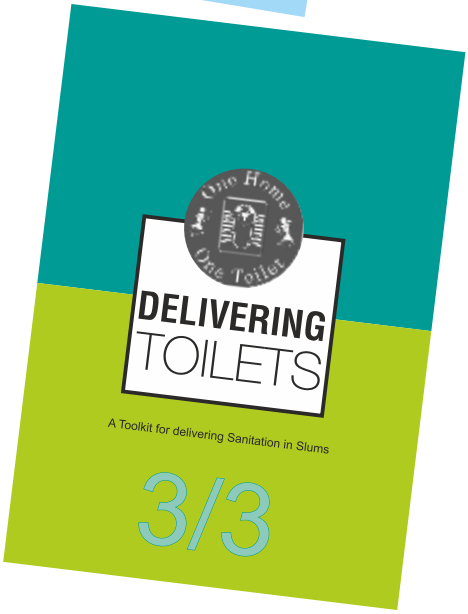
BOOKLET 1

CREATING SPATIAL DATA covers the primary stage of the OHOT model where the objective is to gain an understanding of the ground reality. Accurate data is required for sensitive and appropriate rehabilitation strategies and so should form the foundation of any intervention in an informal community. The meticulous collection of information is described in the booklet along with the spatial organisation of the data to create a data set that can be used to understand the sanitation situation of the community and plan interventions in the informal settlement. SA's use of data superimposed on Google Earth's remote sensing images to develop slum rehabilitation strategies earned SA the title of 'Google Earth Hero' in 2009 and has enabled SA to win competitions and pass due diligence tests for sanitation projects in Pune, Pimpri-Chinchwad, Sangli-Miraj, Navi Mumbai, Kolhapur, Khuladabad, Nashik, Thane, and Solapur.



BOOKLET 2

MOBILIZING COMMUNITIES covers the second stage of the OHOT model. The objective is to gain the support of the community and the benefit of their input and specialist local knowledge. Community support and input are both essential to the success of interventions as it ensures that projects will be appropriate for the local (sub)culture and it ensures that the community will perform their associated duties. This booklet includes the various meetings and sessions which are conducted with the community to establish a dialogue where an insight into the sanitation issues can be gained and where an understanding of the benefits of household toilets can be promoted.



BOOKLET 3

DELIVERING TOILETS covers the third stage of the OHOT model where the toilet units and any associated sewage connections are installed. OHOT toilets are made available on a cost sharing basis to the beneficiary where the cost of labour is borne by the beneficiary family and the materials and components required for the construction of the OHOT toilets are provided by funds donated by OHOT partners through their Corporate Social Responsibility (CSR) contributions.

The methodology developed and refined by SA aligns with the Government of India's Swachh Bharat Mission (Clean India Program), One Step Closer to Cleanliness, an initiative launched in 2014 with the intention of reducing incidence of open defecation and associated violations of a person's health, safety, and dignity by 2019; and the Ministry of Urban Development' and National Urban Sanitation Policy (2010) which states that the "provision of individual toilets should be prioritised." SA has observed that even though the policy is in place ULB's tend to continue to provide CTB's despite their well known issues due to an absence of accurate data, and that ULB's tend to implement projects without the input or support of the beneficiary communities. This situation provides an opportunity for the application of the OHOT model and is the rationale for the production of this toolkit.

Lack of adequate sanitation has a detrimental impact on the health, education, financial security, and safety of people living in informal settlements and costs India 6.4% of its GDP ($53.8 billion) each year. Lack of sanitation is not an indicator of poverty, it is a major contributing factor.

In the following chapters we will explain our data driven, community centric, and inclusive methodology and demonstrate how to implement projects which will contribute to making India open defecation free and render the associated violations of our most vulnerable citizens a thing of the past. It is our hope that State Governments, ULB's, NGOs, foundations, social entrepreneurs, donors, international aid and development agencies, international financial institutions, and any other interested parties will use this toolkit to implement impactful improved sanitation projects across India.

List of Abbreviations

AWO	Administrative Ward Office
CSP	City Sanitation Plan
CSR	Corporate Social Responsibility
FGD	Focus Group Discussion
GIS	Geographic Information Systems
GOI	Government of India
LER	Local Elected Representative
NGO	Non Government Organisation
NUSP	National Urban Sanitation Policy
ODF	Open Defecation Free
OHOT	One Home, One Toilet
PCC	Precast Cement Concrete
PVC	Polyvinyl Chloride
RAY	Rajiv Awas Yojana
RCV	Resident Community Volunteers
RHS	Rapid Household Survey
RIM	Rapid Infrastructure Mapping
SA	Shelter Associates
SBM	Swachh Bharat Mission
SHG	Self Help Groups
ULB	Urban Local Body
UNICEF	United Nations International Children's Emergency Fund
URI	Unique Reference Identity
WC	Water Closet
WHO	World Health Organisation
CTB	Community Toilet Block
PTB	Public Toilet Block

CREATING SPATIAL DATA

Booklet 1/3

Background

Spatial information, where informal settlement level and household level data is integrated with a map of the associated informal settlement using a Geographic Information Systems (GIS) platform, is the foundation for all SA projects. As a part of the One Home, One Toilet (OHOT) initiative SA generates spatial information that is used to identify gaps in sanitation provision and families who do not have a safe defecation strategy. This booklet explains how to establish a data set that can be used to facilitate targeted sanitation interventions. At the end of this booklet the reader would understand the importance of, and method for:

1. Surveying physical structures and infrastructure in informal settlements
2. Assigning Unique Reference Identities (URIs) to dwellings within informal settlements
3. Verifying sewage infrastructure in informal settlements
4. Surveying families within the local community, including how to undertake the same with the use of KoBoToolbox and KoBoCollect.
5. Survey the informal settlement
6. Integrating data with GIS

This phase of the OHOT model is described by listing the prerequisites, objectives, equipment, method, duration, results, and risks of each work stage associated with creating spatial data. However, there are some questions which are generic and should be considered in relation to each work stage:

1. When will you conduct the task?
2. Are there any festivals or other large events planned at the same time?
3. How will the area of the informal settlement be divided amongst the OHOT team?
4. What route will you take during the task?
5. What route would ensure that the whole informal settlement is covered?
6. Are there any other logistical issues that need to be address prior to commencing the task?
7. Will the tasks be conducted concurrently?

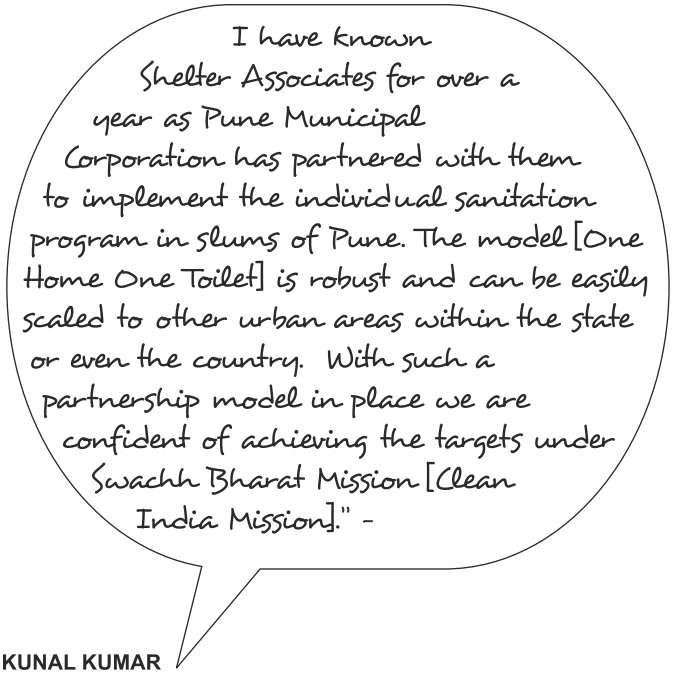
There are also some general risks that should be considered when surveying within informal settlements:

1. OHOT surveyors should all carry their identity cards.
2. OHOT surveyors should all carry a copy of the letter from the Administrative Ward Office (AWO).
3. OHOT surveyors should be aware of their conduct as representatives of the OHOT implementing agency.
4. OHOT surveyors should be conscious of their personal safety.
5. OHOT surveyors should never enter structures/dwellings on their own.
6. OHOT surveyors should not conduct surveys on their own. During each survey there should be at least two OHOT team members present to minimise any potential safety issues and make the task safer to perform.
7. OHOT surveyors should never enter broken structures.
8. The nature of the work stages means that OHOT team members will be working in close proximity to human waste. Precautions must be taken to ensure that the OHOT team members are separated from the waste at all times.

As part of the OHOT methodology, data is spatially organised to generate information that can be used to identify potential OHOT beneficiaries by highlighting gaps in sanitation services and the families who lack access to

improved sanitation. SA assert that the spatial organization of data is a prerequisite for planning sensitive and appropriate projects as it has been observed that a lack of accurate data has limited the efficacy, and frustrated the implementation stage, of many rehabilitation strategies across the Indian subcontinent. As the data on informal settlement held by AWOs is often outdated, inaccurate, and unreliable, the collection of accurate data is a critical component for both the planning and the implementation of slum rehabilitation projects.

SA use the remote sensing imagery available via Google Earth ® to coordinate all the GIS data that is collected in informal settlements across urban/peri-urban areas. This provides a city-wide perspective that informs the composition of rehabilitation interventions. Google Earth ® is used by SA as it is the most accessible remote sensing, with reasonable resolution imagery, which is available free of cost to any potential OHOT project partners, such as a beneficiary, a Local Elected Representative (LER) or an Administrative Ward Office (AWO) officer.



KUNAL KUMAR
Municipal Commissioner of Pune.
Pune.

Mapping and assigning Unique Reference Identities (URIs)

This work stage includes surveying all existing physical structures, features/amenities against the information held by the AWO, and assigning a URI to each dwelling within the informal settlement. As these two tasks of surveying and assigning URIs are interlinked they are presented here as one task.

Prerequisites

1. List of potential informal settlements. This list should be generated in collaboration with the AWO.

2. A map of each informal settlement. The map could be a soft or a hard copy provided by the AWO, or a Google Earth ® aerial photograph.

3. In instances where the informal settlement is too large fit on an A4 sheet at an appropriate scale (1:100 or 1:50) the full extent of the settlement should be divided into zones where each zone fits on a A4 sheet. In order to reduce the chance of confusion a key plan should also be prepared which clearly indicates each zone of the informal settlement.

Objectives

1. To generate an accurate plan layout of the informal settlement:
   a. Which can serve as an accurate analogue of the informal settlement.
   b. Where every structure, feature, amenity is labelled and all infrastructure indicated.
   c. Where every dwelling, both within the informal settlement and on the map, is identifiable with a URI.
   d. Which can be imported into GIS software.

2. To assign each dwelling a URI.

Attendees

1. Representatives of the OHOT implementing agency with surveying skills.

Equipment

1. Map of the informal settlement

2. Measuring tapes

3. Drawing materials - colour pencils/pens, highlighters, etc.

4. Paint of an inconspicuous colour

5. Paint brushes

6. Documentation equipment

Method - Surveying

1. Brief the members of the OHOT team of pertinent points regarding the survey:
   a. As the map will coordinate all of the RHS and RIM data, it is of critical importance that this step is carried

out methodically to ensure the production of a map which accurately represents the physical reality of the settlement.

b. The entire extent of the informal settlement is required to be included while surveying physical structures, features/amenities, and physical infrastructure
   i. Physical structures are dwellings, Community Toilets Blocks (CTB), schools, clinics, factories, shops, community halls, temples, mosques, etc.
   ii. Features/amenities are open spaces, areas of open defecation, areas of open garbage dumping, water bodies, cattle sheds, etc.
   iii. Physical infrastructure are roads and lanes, sewage lines and gutters, drainage inspection chambers/manholes, water wells, water supply pipes, water stand-posts/hand-pumps, water taps, electricity lines and posts/poles, garbage bins, etc.

c. Familiarize yourself with the layout of the settlement, the surroundings, and any indicated landmarks. This is of critical importance as it will enable you to orient yourself when within the informal settlement and help to spot differences with the AWO's map. Visiting a vantage point where you can see the whole of the informal settlement could assist your understanding of the layout and help to prepare for the task. Terraces of tall buildings and hills could be useful to gain this perspective.

d. The roads and lanes within the informal settlement should be recorded accurately on the map along with the type of road. For eg. kutcha, pucca, paving blocks, concrete, coba, etc.

e. The sewage lines and gutters within the informal settlement should be recorded accurately. The route, diameter, direction of flow, depth, and condition are all required to be recorded as this information will inform the drainage strategy for the OHOT toilets.

f. All structures within the informal settlement should be recorded accurately. The size and shape of the structures should conform to the reality of the informal settlement including if the structure has a verandah. The number of storeys should also be recorded.

g. Features/amenities within the informal settlement should be recorded accurately and labelled.

h. Areas where members of the local community dispose of their garbage should be indicated on the map.

i. The areas where members of the local community practice open defecation should be indicated on the map. The open defecation spots could be identified and verified through discussions with local community members.

j. When you are studying the map identify large structures which face onto two or more lanes and are likely to have two or more front doors. It is important to identify these potential arrangements so that when they are being surveyed the surveyors are reminded to confirm with the residents if they have another entry into the dwelling.

k. Each surveying team should have multiple hard copies of the map with them for the duration of the task.

2. The OHOT surveyors walk the pre-planned routes through their assigned sector surveying the settlement to ensure that the physical reality is represented on the map. Any deviations are record on a hard copy of the map.

3. Once the surveying exercise is complete the soft copy of the map is required to be updated. It is likely that it will be more efficient for the surveyors who undertook the survey in the field, and noted all the changes on a hard copy, to be involved in updating the soft copy.

Method - Assigning a URI

1. Brief the members of the OHOT team of pertinent points regarding the allocation of URIs:
   a. Dwellings should be assigned a URI,

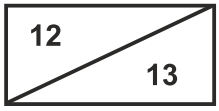
   b. Locked or Permanently locked dwellings should be assigned a URI, even if they are currently unoccupied.

   c. Broken dwellings should be assigned a URI, even if they are currently unoccupied.

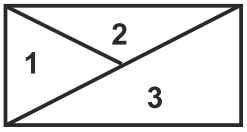
   d. Dwellings under construction should be assigned a URI.

   e. There is a difference between a structure and a dwelling. A dwelling is a volume of space that a family resides within, and a structure is a construction that accommodates dwellings. Multiple dwellings can be accommodated within one structure and a structure can be a dwelling for one family.

One Dwelling
in One Structure



Two Dwellings of a
two story Structure



Three Dwellings one
each of a
three story Structure

   f. The team assigning URIs should work in close collaboration with the surveying team. URIs should not be assigned to a dwelling until the area has been surveyed.

   g. Before assigning an identity to a dwelling, count the structures in the area/lane and check that the total conforms to what is indicated on the map.

h. Start the sequence from a prominent location, for example the principal entrance, an important structure, or well-known amenities such as a monument, a tree, etc. and follow a path around the settlement ensuring that all dwellings are assigned one URI which can be used for its identification.

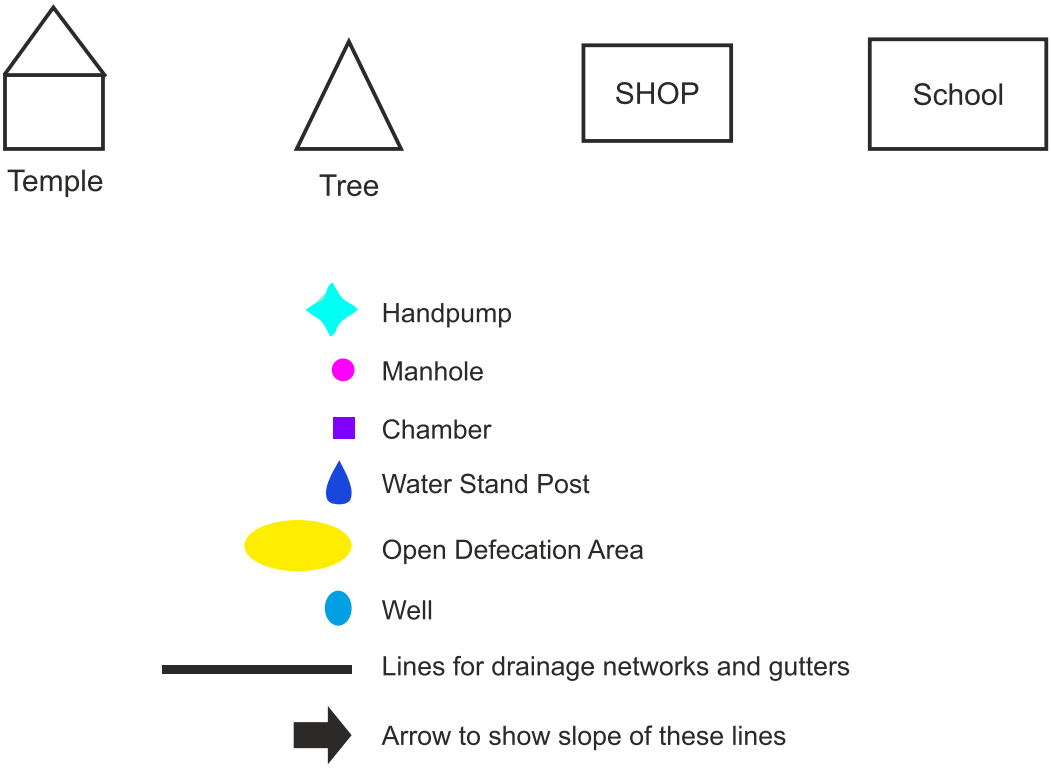
i. Each dwelling is only assigned one URI. If a dwelling has more than one door opening onto different lanes then all of the doors should display the same URI.

j. Residents may not want to reveal how many dwellings are contained within the structure. In these cases the team member should request to enter the structure, while inside the structure the number of kitchens should be counted; the quantity of kitchens indicates the number of dwellings. Each dwelling should be assigned its own URI even if it shares a structure with other dwellings.

k. Every structure in the settlement should be mapped, whether it is a house or a shop or a clinic or a small factory or a Samaj Mandir or Anganwadi etc, but only those structures where families or individuals stay should be assigned a URI.

m. All structures that are not residential, features/amenities, or physical infrastructure should be clearly labeled on the hard copy using a commonly understood name such as: CTBs, schools, clinics, factories, shops, community halls, temples, mosques, open space, open defecation area, open garbage dumping area, river, lake, well, nala, cattle sheds, etc.

n. Each surveying team should have a hard copy of the map with them for the duration of the task.



2. The OHOT surveyors walk the pre-planned routes through their allocated sector assigning URIs to the dwellings, locked dwellings, and broken dwellings.

Duration

The resources required to map the informal settlement and assign URIs to each dwelling will vary depending on its size and topography, the cooperation of the local community, and the weather on the day. SA have recorded that two OHOT team members can survey and assign URIs to approximately 400 dwellings in one working day.

Result

At the end of this work stage a map of the informal settlement should have been prepared which is an accurate representation of the existing layout, where all structures are shown, all dwellings are identifiable by a URI, and all features, amenities, and physical infrastructure are indicated.

Risks

1. As this task provides the foundation for all subsequent tasks of this work stage of the OHOT model, care must be taken to ensure it is carried out methodically so that opportunity of making mistakes is minimized.

2. If the informal settlement and the map do not coordinate, or if the URIs assigned to the dwellings in the settlement do not coordinate with the URIs of the dwellings on the map then there is a risk that the GIS outputs will be incorrect and risk the overall feasibility of an OHOT intervention.

3. The AWO and the Local Elected Representative (LER) whose constituents are potential OHOT beneficiaries must be informed prior to commencing surveys. This notice could be given during the introductory meeting with the LER.

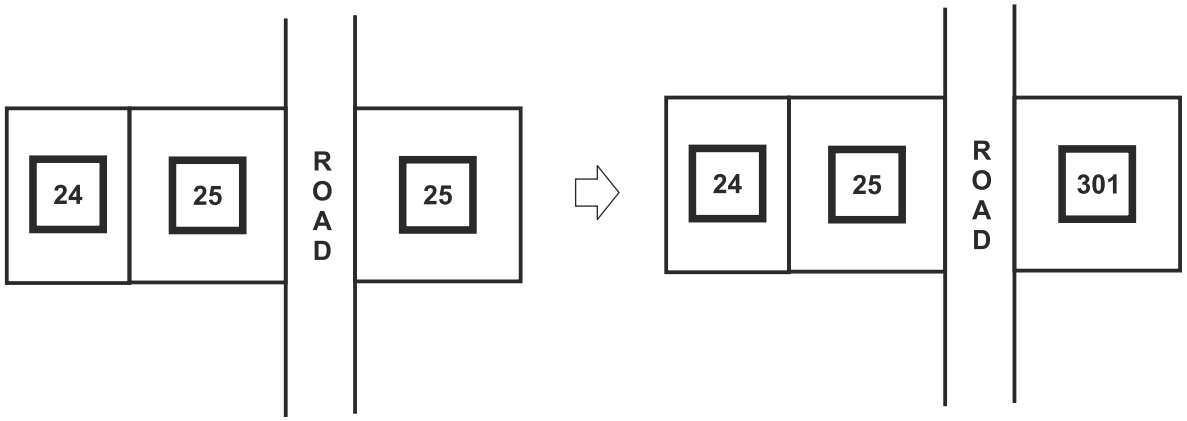
4. The teams responsible for mapping and numbering the dwellings should work together; the team that is assigning URIs to dwellings should follow the team which is surveying the settlement. This is to ensure that the URI allocated to the dwelling in the informal settlement coordinates with the same dwelling as represented on the map.

5. The URIs should only be assigned after the dwelling has been reviewed against the map.

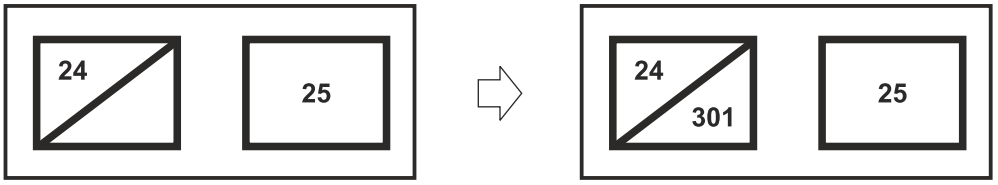
6. If the RIM is being conducted over more than one day there is the chance that the recorded information could get lost. To mitigate this risk maps should be photographed at the end of the working day.

7. It is possible that during subsequent stages it becomes apparent that:

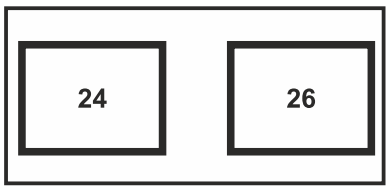
   a. Case 1: More than one dwelling has been allocated the same URI. In this instance, one of the dwellings should retain its URI and the other should be allocated a new URI. If the informal settlement has 300 dwellings then the URI 301 should be assigned.



   b. Case 2: More than one dwelling exists within one structure which has been allocated a single URI. In this instance the original URI can remain and a new URI should be allocated to the recently discovered dwelling. If the informal settlement has 300 dwellings then the URI of 301 should be used.



   c. Case 3: A URI has been skipped. In that case the other URIs should not be altered but the skipped number should be recorded so that it can be used for another dwelling.



Verification of Sewage Infrastructure

This work stage develops the map of the informal settlement that was generated during the mapping work stage to provide an understanding of the extent and condition of the existing sewage infrastructure within the informal settlement. This information is essential for planning upgrades to the sewage infrastructure to ensure that an increased number of toilet connections is practicable.

Prerequisites

An accurate layout of the existing layout, where all physical structures and features/amenities are shown and any known sewage infrastructure is indicated.

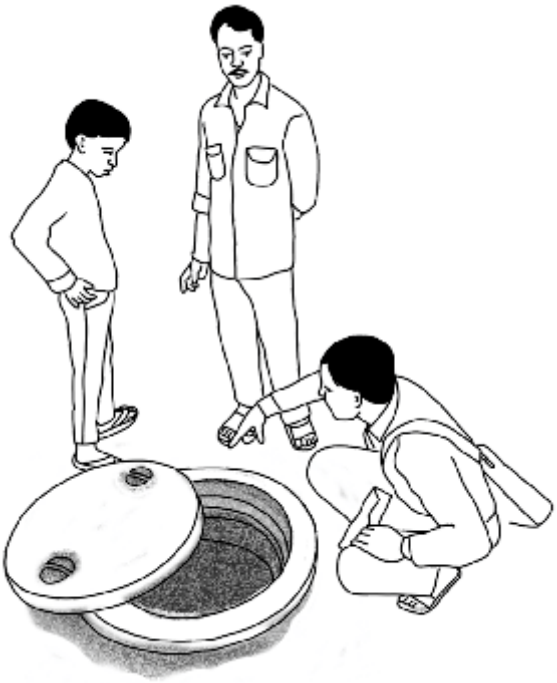
Objectives

1. To gain a deeper understanding of the coverage and capacity of the existing drainage network.

2. To identify areas where it would be feasible to revamp the existing drainage system and install new sewage lines.

3. To identify areas where it would be feasible to install new drainage infrastructure.

4. To produce a drainage infrastructure layout of the informal settlement which can be validated by the AWO.



Attendees

1. Representatives of the OHOT implementing agency with surveying skills.

2. Representatives from the AWO associated with the informal settlement such as junior engineers and/or sanitary inspectors.

Equipment

1. Map of the informal settlement

2. Measuring tapes, water tube for checking levels.

3. Drawing materials- colour pencils/pens, highlighters, etc.

4. Documentation equipment

METHOD

1. Brief the members of the OHOT team of pertinent points regarding the verification of sewage infrastructure:

    a. The entire extent of the informal settlement is required to be included while searching for evidence of the sewage infrastructure.
    b. There are different elements of the sewage infrastructure that the OHOT surveyors will need to be familiar with; manholes, chambers, etc.
    c. The existing main drainage line, which the sewage infrastructure within the informal settlement links to, is required to be identified.
    d. Some existing sewage infrastructure within the informal settlement might not actually be connected to anything. Unconnected drainage lines should be identified on the map.
    e. The routes of the existing drainage lines is required to be recorded.
    f. The diameter of the existing drainage lines is required to be recorded.
    g. The gradient/direction of flow of the existing drainage lines is required to be recorded.
    h. The depth of the existing drainage lines is required to be recorded.
    I. The condition of existing sewage infrastructure is required to be ascertained. Drainage lines requiring repair/replacement should be identified on the map.
    j. Surface water gutters can be upgraded to drainage lines in lanes which are already very narrow so as not to reduce them further.
2. The OHOT team leader divides the informal settlement into sectors so that the task can be divided amongst the OHOT team members. The sectors should be clear so that when a sector is assigned to a surveying team there is no chance of dwellings being surveyed more than once.

3. The OHOT surveyors walk the pre-planned routes through their assigned sector with the junior engineer and/or sanitary inspector from the AWO reviewing the condition of all inspection chambers and manholes marked on the map. If drainage infrastructure has been missed during the mapping work stage record it on the map for updating later.

4. Open the inspection chamber and manhole to review:
    a. The condition of the sewage lines. Record any observed damage and/or blockages.

    b. The diameter of the inlet and outlet sewage lines. Record the diameter of the sewage lines on the map of the informal settlement using a colour system to indicate the diameter.

    c. The slope of the sewage lines. Record the slope of the sewage lines on the map of the informal settlement using an arrow.

5. Discuss with the junior engineer and/or sanitary inspector from the AWO areas of the informal settlement which are not served by the existing drainage infrastructure and how the existing sewage infrastructure might be upgraded and/or extended to ensure that all areas are served.

6. Agree a process for validating the drainage layout with the junior engineer and/or sanitary inspector from the AWO so that the drainage infrastructure layout can be considered an official document.

Duration

The resources required to verify the drainage infrastructure will vary depending on the size and topography of the settlement, the cooperation of the local community, and the weather on the day. SA have recorded that the

drainage infrastructure for one informal settlement of 500 dwellings can be verified in approximately 4 hours.

Result

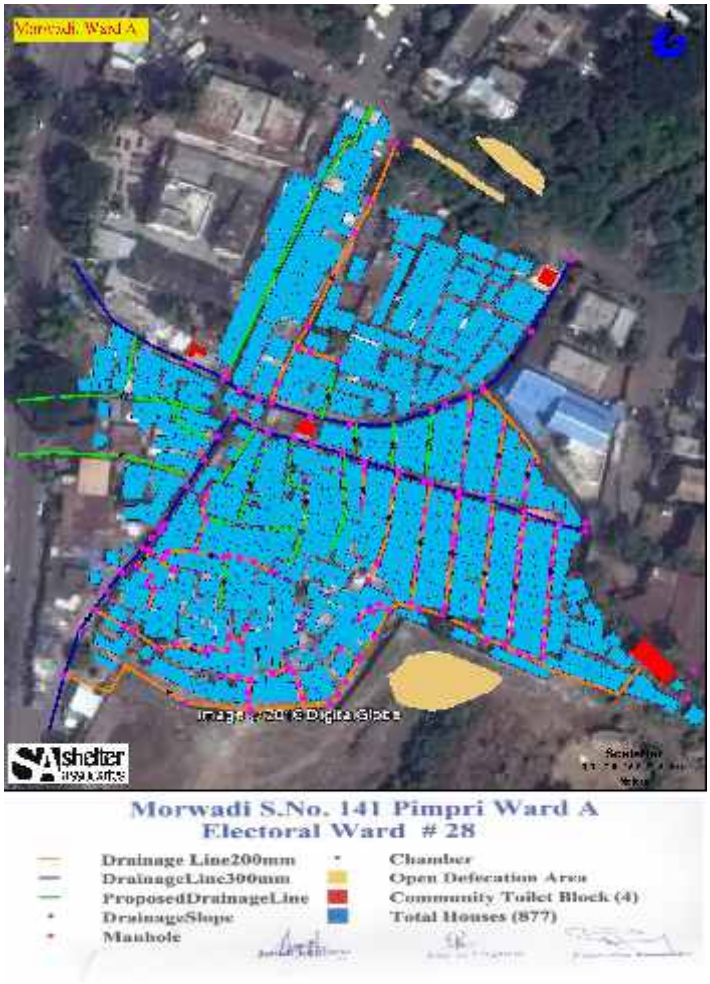
At the end of the work stage the sewage infrastructure should be accurately recorded on the map, where all sewage lines are indicated, all pipe diameters are confirmed, all slopes are shown, and all blocked pipes and broken manhole/inspection chamber covers are located. The sewage infrastructure layout of the informal settlement should have also been validated by the AWO.

Risks

1. As this task informs the subsequent tasks and work stages of the OHOT model, care must be taken to ensure it is carried out methodically so that opportunity for making mistakes is minimized.

2. Some sewage lines in the informal settlement might not be apparent as the inspection chambers/manholes are concealed under the paving. This could be addressed by talking with the members of the local community.

3. Some sewage lines in the informal settlement might not be functional. This can also be ascertained by talking with the members of the local community.



Drainage map validation by PMC

Rapid Household Survey (RHS)

This work stage is the next step to gain a greater understanding of the OHOT project context by gathering data which relates to the local community. To obtain this information a Rapid Household Survey (RHS) is conducted with each family within the settlement. The RHS contains 25 questions and is designed to gather information regarding each member of the family, including their place of defecation, and their interest in having an OHOT toilet.

Prerequisites
An accurate representation of the existing layout, where all structures are shown.

Objectives
To gather OHOT specific information from each family residing within the informal settlement.

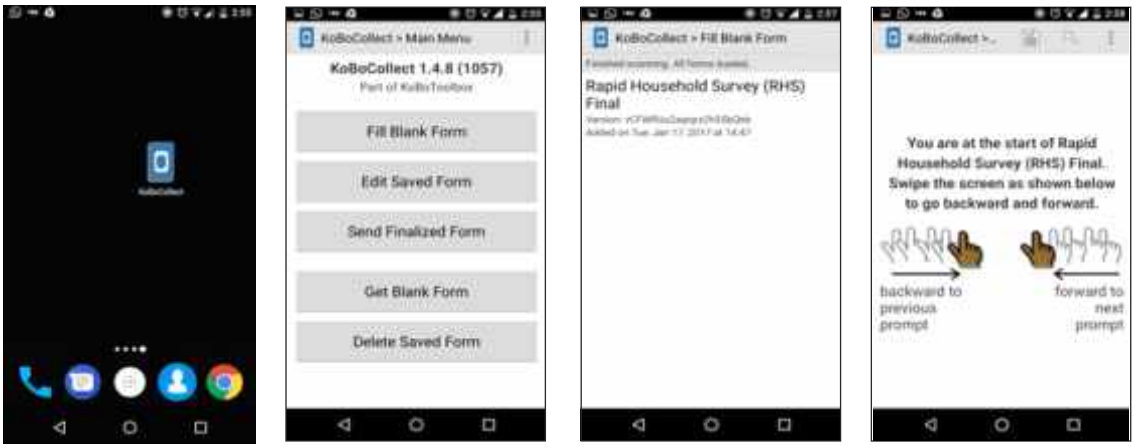
Attendees
1. Representatives of the OHOT implementing agency with surveying skills.

2. Where possible, the youth within the informal settlement should be trained to conduct RHS in their own informal settlement.

Equipment
1. Map of the informal settlement

2. Drawing materials - colour pencils/pens, highlighters, etc.

3. RHS form - The KoBoCollect app provides access to SA's RHS form



4. Writing materials

5. Letter of consent from AWO permitting the OHOT implementing agency to conduct a survey of the residents of the informal settlement.

6. Identification

7. Documentation equipment

8. Tablet/smartphone to access SA's RHS form via the KoBo Collect Application.

Method

1. Brief the members of the OHOT team of pertinent points regarding the survey:

   a. The entire extent of the informal settlement is required to be included while conducting the RHS.

   b. Participation in the RHS is voluntary; each participant should give their permission prior to the start of the survey.

   c. OHOT surveys should communicate the reason for the survey to the family being surveyed. Surveyors must never commence the survey without explaining the context to the owner, occupier or tenant.

   d. OHOT surveyors should be aware that some questions may be considered to be sensitive and the participant has the right to not answer. Surveyors should not force participants to answer questions as participation in the RHS is not compulsory.

   e. OHOT surveyors should be conscious of time. Surveyor should not needlessly delay the potential beneficiary from their duties.

   f. OHOT surveyors should not lead the participant with their answers.

2. The OHOT team leader divides the informal settlement into sectors so that the task can be divided amongst the OHOT team members. The sectors should be clear so that when a sector is assigned to a surveying team there is no chance of dwellings being surveyed more than once.

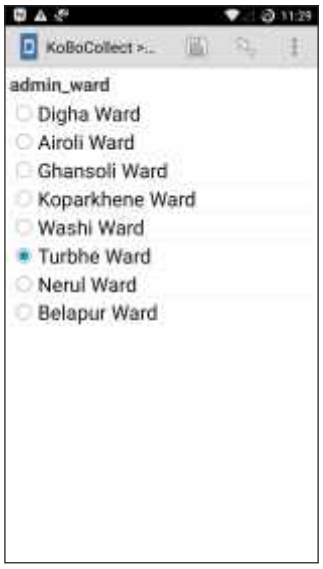
3. The OHOT surveyors walk the pre-planned routes through their assigned sector surveying a representative of each family. In the case of locked dwellings, surveyors should gather information from the neighbours with regard to whether the family has left temporarily or if they will be away for an extended period of time.

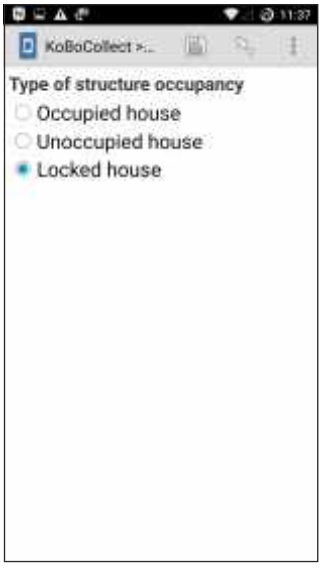
4. Once the data has been collected, this data helps to ensure that the figures are consistent in both sets of data.

THE RHS FORM: (Refer to Annexure 1)
This is an explanation of each question of the RHS form:

Section 1 General Information:

1.01 Select the relevant city.
1.02 Select the relevant administrative ward.
1.03 Select the relevant electoral ward.
1.04 Select the relevant settlement name.
1.05 Input the date that the survey was conducted on.
1.06 Input the OHOT surveyor(s) who collect the data.
1.07 Input the URI of the surveyed dwelling/family.
1.08 Select the dwelling classification, such as: occupied, unoccupied or locked.
1.09 Select the type of 'unoccupied' occupancy amongst the following: double house (meaning a dwelling owned by the same family as another dwelling within the same informal settlement), broken, house under construction, permanently locked or unwilling to participate in the RHS.
1.10 Input the 'Parent' household number for houses that are identified as a double house.

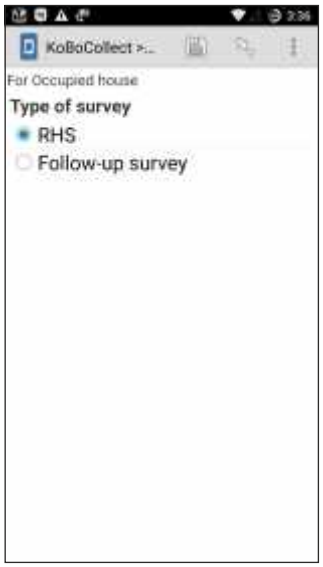




Section 2 For Occupied Houses:

2.01 Input the full name of the family head.

2.02 Select the type of survey, such as: RHS or only questions related to SBM.



Section 3 For RHS:

3.01 Input a contact number for the family head.

3.02 Input the Adhar card number for the family head.

3.03 Input the number of family members.

3.04 Select to indicate if the family has any female members below 18 years of age.

3.05 Specify the number of female members below the age of 18.

3.06 Select the type of structure, such as: pucca, semi-pucca or kutcha. A household built with bricks and mortar which has a concrete slab forming the roof it is classed as a 'pucca house', a household built with bricks and mortar which has tin sheets forming the roof is classed as a 'semi-pucca' and a household made of any impermanent material such as mud and tin sheets is classed as a 'kutcha house'.

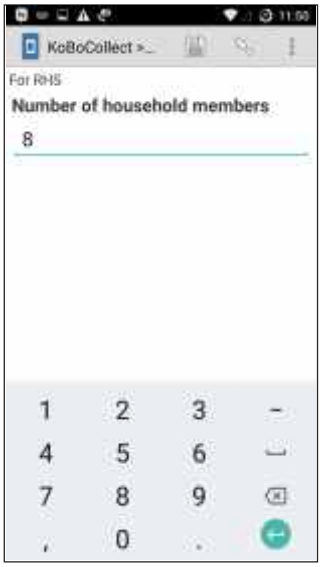
3.07 Select the type of lease, such as: owner or tenant.

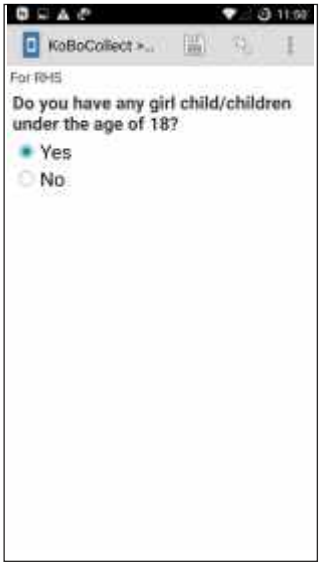
3.08 Input the area of the family's dwelling. The area can be measured with a tape measure or could be estimated by counting floor tiles of a known area.

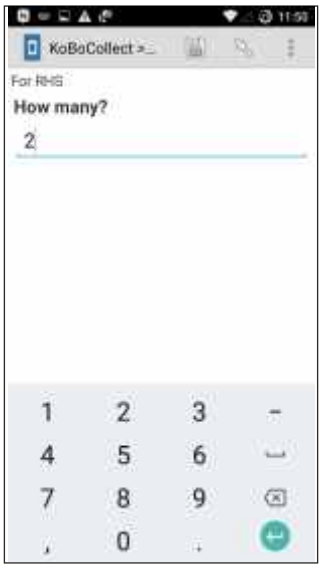
3.09 If the family has their own household toilet, select to indicate if what water supply the toilet currently has.

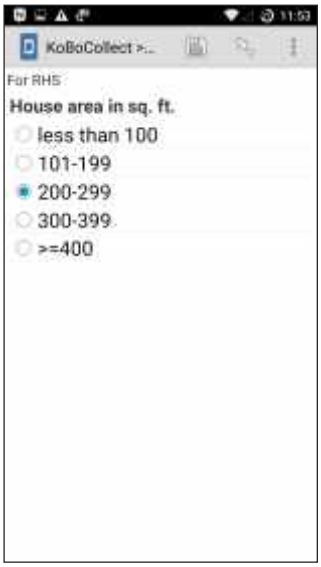
3.10 Select to indicate the family's current method for garbage collection.

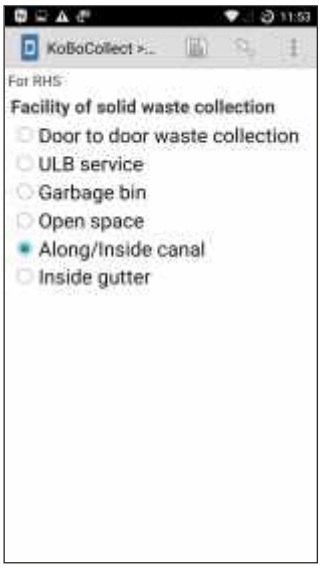
3.11 Select to indicate if any members of the family have construction skills. The aim of this question is to identify members of the local community who have skills in the construction sector such as masons, plumbers or construction labour which could be useful during the construction phase of the OHOT project.











Section 4 For Follow-up and RHS:

4.01 Select to indicate if the family has applied for an individual toilet under the Government of India's Swachh Bharat Mission (Clean India Mission).

4.02 Select the type of Swachh Bharat Mission toilets applied for, such as: whether the funds are released in installments or the toilets are provided by the contractor.

4.03 If the family has applied for an individual toilet under SBM, select to indicate the number of installments currently received.

4.04 If the family has received installments under SBM, input the date of the first installment.

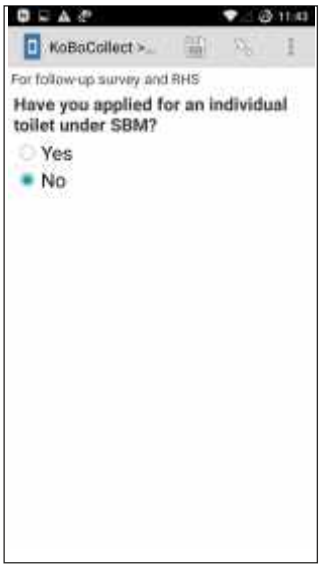
4.05 If the family has received installments under SBM, input the date of the second installment.

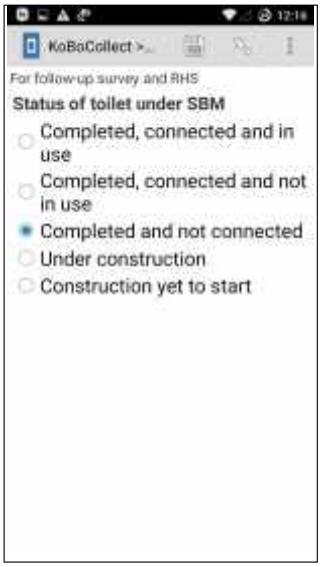
4.06 If the family has received installments under SBM, input the date of the third installment.

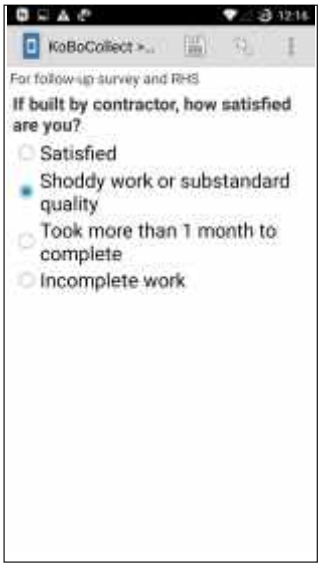
4.07 If the family has received all the installments under SBM, select to indicate the status of the individual toilet, such as 'completed and in use', 'completed and not connected to a sewage system', 'under construction' or 'construction not yet commenced'.

4.08 Assess the work of the contractor who built toilets under SBM.

4.09 Input the cost incurred to build the toilet.
4.10 Select to indicate the family's current place of defecation.
4.11 Indicate what the proximity of availability of drainage is to connect to a proposed or disconnected toilet.
4.12 Select to indicate if the family is interested in owning their own individual toilet.
4.13 Input the preference of the kind of toilet such as: prefab or customised.
4.14 if interested in an individual toilet, indicate the scheme under which the toilet is to be built under the SBM or OHOT model.
4.15 If the family is interested in owning their own individual toilet select to indicate the reason.
4.16 If the family is not interested in owning their own individual toilet select to indicate the reason.
4.17 If the family has their own toilet, select to indicate what waste disposal system the toilet is connected to.
4.18 Input the users of toilet in the household.
4.19 Input the reason for not using toilet.
4.20 Select to indicate if any member of the family practices open defecation. Families with members who practice open defecation are targeted as a priority for a OHOT toilet.
4.21 The household number is entered again to validate the entry.

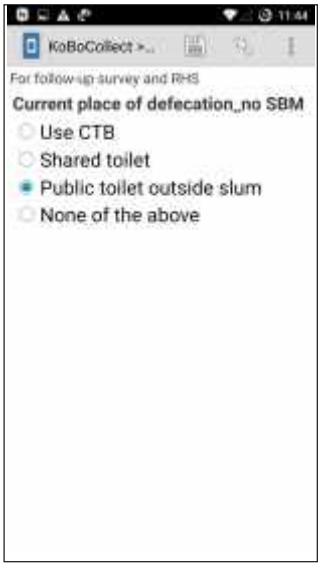



KoBoCollect >...
For follow-up survey and RHS
Status of toilet under SBM
Completed, connected and in use
Completed, connected and not in use
Completed and not connected
Under construction
Construction yet to start

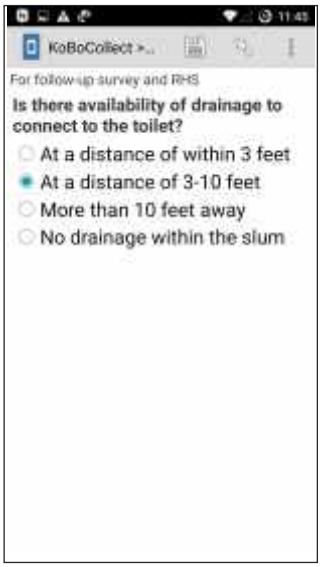

KoBoCollect >...
For follow-up survey and RHS
If built by contractor, how satisfied are you?
Satisfied
Shoddy work or substandard quality
Took more than 1 month to complete
Incomplete work

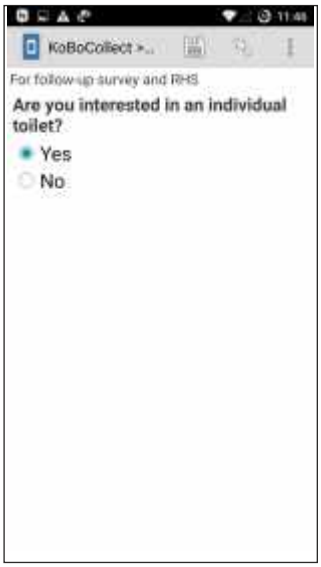

KoBoCollect >...
For follow-up survey and RHS
What was the cost incurred to build the toilet?
52000
1 2 3
4 5 6
7 8 9
, 0 .

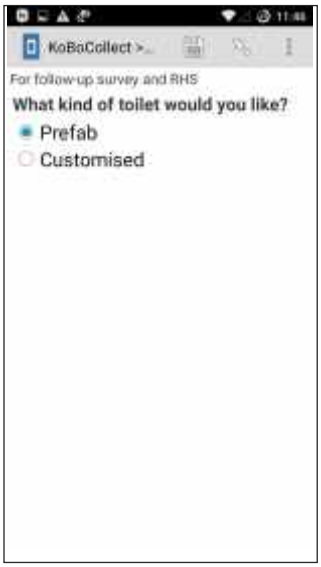

KoBoCollect >...
For follow-up survey and RHS
Current place of defecation2
Own toilet
Toilet by other NGO
Toilet by SA
None of the above


KoBoCollect >...
For follow-up survey and RHS
Current place of defecation_no SBM
Use CTB
Shared toilet
Public toilet outside slum
None of the above

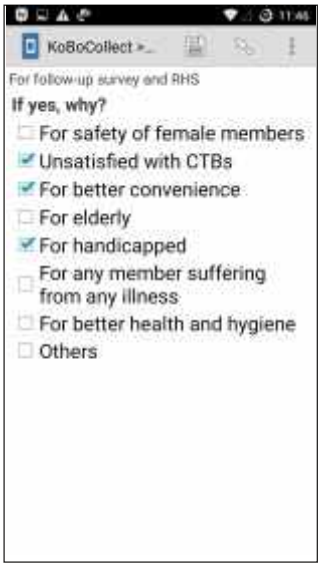

KoBoCollect >...
For follow-up survey and RHS
Current place of defecation1
SBM (Installment)
SBM (Contractor)
Toilet by SA (SBM)
Toilet by other NGO (SBM)

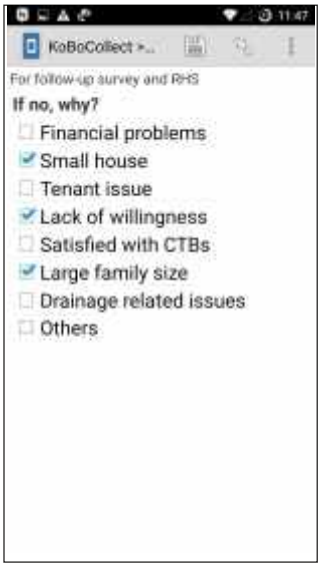

KoBoCollect >...
For follow-up survey and RHS
Is there availability of drainage to connect to the toilet?
At a distance of within 3 feet
At a distance of 3-10 feet
More than 10 feet away
No drainage within the slum

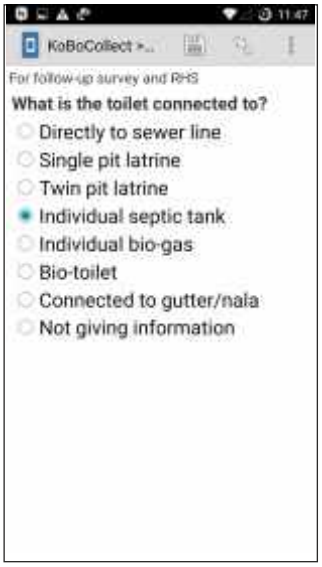

KoBoCollect >...
For follow-up survey and RHS
Are you interested in an individual toilet?
Yes
No


KoBoCollect >...
For follow-up survey and RHS
What kind of toilet would you like?
Prefab
Customised

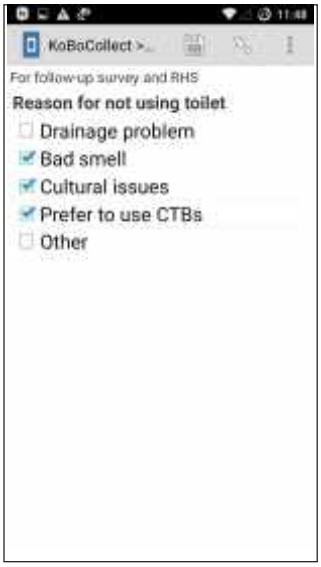

KoBoCollect >...
For follow-up survey and RHS
Under what scheme would you like your toilet to be built?
SBM (Installment)
SBM (Contractor)
OHOT model

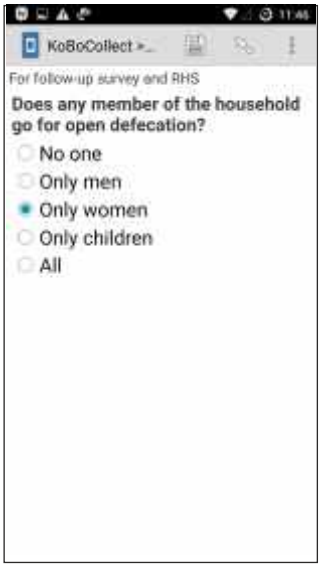

KoBoCollect >...
For follow-up survey and RHS
If yes, why?
For safety of female members
Unsatisfied with CTBs
For better convenience
For elderly
For handicapped
For any member suffering from any illness
For better health and hygiene
Others


KoBoCollect >...
For follow-up survey and RHS
If no, why?
Financial problems
Small house
Tenant issue
Lack of willingness
Satisfied with CTBs
Large family size
Drainage related issues
Others


KoBoCollect >...
For follow-up survey and RHS
What is the toilet connected to?
Directly to sewer line
Single pit latrine
Twin pit latrine
Individual septic tank
Individual bio-gas
Bio-toilet
Connected to gutter/nala
Not giving information


KoBoCollect >...
For follow-up survey and RHS
Who all use toilets in the household?
All members
Partial use- children, women, elderly


KoBoCollect >...
For follow-up survey and RHS
Reason for not using toilet
Drainage problem
Bad smell
Cultural issues
Prefer to use CTBs
Other


KoBoCollect >...
For follow-up survey and RHS
Does any member of the household go for open defecation?
No one
Only men
Only women
Only children
All


KoBoCollect >...
Enter household number again
25
1 2 3
4 5 6
7 8 9
0

Duration

The resources required to conduct the RHS will vary depending on the size and topography of the settlement, the cooperation of the local community, and the weather on the day. SA have recorded that one OHOT team member can gather data from approximately 100 families in one working day.

Result

At the end of the work stage information should have been gathered from all families residing within the informal settlement.

Risks

1. As this task informs the subsequent tasks of the OHOT model, care must be taken to ensure it is carried out methodically so that opportunity for making mistakes is minimized.

2. OHOT surveyors should prepare for the survey, extra copies of the forms should be carried and if tablets/smartphones with the KoBoCollect app are being used then all mobile technology should be fully charged and all forms downloaded. OHOT surveyors may not be able to connect to a power supply or an internet connection for the duration of the survey.

3. When conducting the survey it is likely that many structures will be locked; if more than 15% of the dwellings are locked then a return visit will be required.

Rapid Infrastructure Mapping (RIM)

This work stage is necessary to gain a complete understanding of the OHOT project context by gathering data which relates to the informal settlement. The RIM survey contains 7 sections including toilet information and sewage infrastructure information.

Prerequisites
An accurate representation of the existing layout, where all structures are shown and known sewage lines are indicated along with inspection chambers/manholes.

Objectives
To gather OHOT specific information regarding the informal settlement, such as information relating to toilets, water supply, solid waste management systems, sewage management infrastructure, and road and access information.

Attendees
1. Representative of the OHOT implementing agency with surveying skills

Equipment
1. Map of the informal settlement
2. Drawing materials - colour pencils/pens, highlighters, etc.
3. RIM form - The KoBoCollect app provides access to SA's RIM form
4. Writing materials
5. Letter of consent from AWO permitting the OHOT implementing agency to conduct a survey of the informal settlement.
6. Identification
7. Documentation equipment
8. Tablet/smartphone to access SA's RIM form via the KoBoCollect application.

Method
1. Brief the members of the OHOT team of pertinent points regarding the survey:
    a. The entire extent of the informal settlement is required to be included while conducting the RIM.
    b. The information that relate to CTBs is required to be input for each CTB within the informal settlement.
    c. The information that relate to CTBs is to be gathered by inspecting the whole of the CTB, its exterior and its interior, included each toilet cubicle.
    d. During the RIM survey there are many photographs that should be taken as they will be required for the

factsheets which serve as a summary sheet for the informal settlement:

i. General photographs of the informal settlement.
ii. CTBs within the informal settlement showing the condition, the level of cleanliness and the facilities available for children under 5 years of age.
iii. Open defecation spots used by the local community.
iv. Water stand posts within the informal settlement.
v. Garbage containers within the informal settlement.
vi. Household waste collection available to the local community.
vii. Open dumping sites used by the local community.
viii. Type of roads within the informal settlement.
ix. Manholes/chambers within the informal settlement.
x. Open gutters within the informal settlement.

2. The OHOT team leader divides the informal settlement into sectors so that the task can be divided amongst the OHOT team members. The sectors should be clear so that when a sector is assigned to a surveying team there is no chance of dwellings being surveyed more than once.

3. The OHOT surveyors walk the pre-planned routes through their assigned sector surveying the informal settlement and input data into the RIM form.

4. Once the data has been collected in needs go through a process of verification with the local community, the AWO, and for some data, the town planning department.

5. Once the data has been collected, this data helps to ensure that the figures are consistent in both sets of data.

6. A fact sheet of the informal settlement is produced once the data has been collected by the OHOT surveyor, checked by the OHOT surveyor, verified with the local community, the AWO, and the town planning department, and cross checked with other data collected.

THE RIM FORM: (Refer to Annexure 2)
This is an explanation of each question of the RIM form:

Section 1
Administrative Information:

1.01 Input the date that the survey was conducted
1.02 Input the name of the OHOT surveyor who collected the data
1.03 Input the name of the OHOT surveyor who checked the map
1.04 Input the name of the OHOT surveyor who took the photographs

Section 2
General Information:

2.01 Input the Government of India's (GOI) census code numerical code for the state
2.02 Input the GOI's census code numerical code for the district
2.03 Input the GOI's census code numerical code for the city
2.04 Input the GOI's census code numerical code for the electoral ward
2.05 Input a numerical code for the informal settlement
2.06 Input the survey number
2.07 Input the name of the informal settlement
2.08 Input the name and number of the relevant administrative ward
2.09 Input the name and number of the electoral ward
2.10 Input the landmark near the settlement, such as a known part of a main road, or nearby school/hospital/river/lake etc.
2.11 Input the year in which the informal settlement was established.
2.12 Select the legal status of the informal settlement.
2.13 Input the year that the informal settlement was declared. If the informal settlement is undeclared write 'NA' to indicate 'Not Applicable'.
2.14 Select the owner of the land associated with the informal settlement.
2.15 Select the development plan reservation type of the informal settlement.
2.16 Input the development plan reservation.
2.17 Input the approximate area of the informal settlement. This information could be obtained by Google Earth ®.
2.18 Input the number of dwellings in the informal settlement.
2.19 Select the location that describes the informal settlements situation.
2.20 Select the topography that describes the informal settlements situation.
2.21 Input a description of the informal settlement, for example 82% dwellings in the informal settlement are semi-pucca, with the remaining 18% made of kutcha materials. The toilet seat to person ratio is 1:24, drainage coverage is 33%, open gutter coverage is 20% and 67% of families have access to an individual water supply.

Section 3:
Toilet information

3.01 Input the total number of Community Toilet Blocks (CTB) within the informal settlement.
3.02 Input the total number of CTBs in the informal settlement that are 'pay and use'.
3.03 Select all of the defecation options that are appropriate to describe the behaviors of the local community. Mark on the map the sites of open defecation associated with the local community.
3.04 Select to indicate the current status of the CTB.
3.05 Input the fee paid by each family to use the CTB.

3.06 Input the fee paid per individual to use the CTB.
3.07 Select to indicate the gender usage of the CTB.
3.08 Input the total number of seats allocated for both genders.
3.09 Input the total number of seats allocated for both genders which are currently not in use.
3.10 Select to indicate the reason why the seats allocated for both genders are not in use.
3.11 Input the total number of seats allocated for males.
3.12 Input the total number of seats allocated for males which are currently not in use.
3.13 Select to indicate the reason why the seats allocated for males are not in use.
3.14 Input the total number of seats allocated for females.
3.15 Input the total number of seats allocated for females which are currently not in use.
3.16 Select to indicate the reason why the seats allocated for females are not in use
3.17 Select to indicate if the CTB is available at night (from 11pm to 5am.)
3.18 Select to indicate the agent currently responsible for cleaning and maintaining the CTB.
3.19 Select to indicate the current condition of the CTB structure, including the apparent structural stability of the CTB
3.20 Input the total number of seats which are in a good condition.
3.21 Input the total number of seats where their doors are in a good condition.
3.22 Input the total number of seats which are served by an electricity supply.
3.23 Input the total number of seats where the wall tiles are in a good condition.
3.24 Input the total number of seats where the floor tiles are in a good condition.
3.25 Select to indicate the frequency that the CTB is cleaned.
3.26 Indicate whether the agent responsible for cleaning the CTB uses cleaning agents.
3.27 Select to indicate the cleanliness of CTB.
3.28 Select to indicate if there is currently a caretaker for the CTB.
3.29 Select to indicate the current type of water supply for the CTB.
3.30 Select to indicate the capacity of the water tank for the CTB.
3.31 Select to indicate the average quantity of water that a member of the local community uses per flush.
3.32 Select to indicate the availability of water in the CTB.
3.33 Select to indicate the availability of electricity in the CTB for pumping water into the tank.
3.34 Select to indicate the availability of electricity in the CTB after dusk.
3.35 Select to indicate if the CTB has facilities for children under 5 years of age.
3.36 Select to indicate the condition of the facilities for children under 5 years of age.
3.37 Select to indicate the sewage disposal system associated with the CTB.
3.38 Select to indicate the distance from the CTB to the closest municipal sewer line
3.39 Input pertinent comments in relation to informal settlement level toilet information.

Section 4:
Water Information

4.01 Input the total number of water stand posts within the informal settlement.
4.02 Input the total number of water taps within the informal settlement.
4.03 Input the total number of water hand pumps within the informal settlement.
4.04 Select to indicate any alternative sources of water available to the residents of the informal settlement.
4.05 Select to indicate the availability of water within the informal settlement.
4.06 Select to indicate the pressure of water within the informal settlement.
4.07 Select to indicate the coverage of water services across the informal settlement.
4.08 Select to indicate the quality of the water available within the informal settlement.
4.09 Type pertinent comments in relation to informal settlement level water information.

Section 5:

Waste Collection Information

5.01 Input the total number of household waste collection containers within the informal settlement.
5.02 Select to indicate the household waste collection facilities available within the informal settlement.
5.03 Select to indicate the frequency of household waste collection within the informal settlement.
5.04 Select to indicate the coverage of household waste collection across the informal settlement.
5.05 Select to indicate the location of the communities open dumping sites within the informal settlement. Mark on the map the sites of open dumping within the informal settlement.
5.06 Select to indicate to indicate if waste is deposited in the gutters of the informal settlement by the local community.
5.07 Input pertinent comments in relation to informal settlement level water information.

Section 6:

Sewage Lines and Gutter

6.01 Select to indicate the presence of sewage lines within the informal settlement.
6.02 Select to indicate the coverage of sewage lines across the informal settlement.
6.03 Select to indicate if the sewage lines within the informal settlement get blocked.
6.04 Select to indicate if the gradient of the sewage lines within the informal settlement is adequate.
6.05 Select to indicate the diameters of the sewage lines within the informal settlement.
6.06 Input pertinent comments in relation to sewage lines within the informal settlement.
6.07 Select to indicate the presence of gutters within the informal settlement.
6.08 Select to indicate the type of gutters within the informal settlement.
6.09 Select to indicate the coverage of gutters across the informal settlement.
6.10 Select to indicate if the gutters are covered, uncovered or partially covered.
6.11 Select to indicate if the gutters within the informal settlement flood.
6.12 Select to indicate if the gutters within the informal settlement get blocked.
6.13 Select to indicate if the gradient of the gutters within the informal settlement is adequate.
6.14 Input pertinent comments in relation to informal settlement level sewer line and gutter information.

Section 7:

Road and Access Information

7.01 Select to indicate the presence of roads within the informal settlement.
7.02 Select to indicate the type of roads within the informal settlement.
7.03 Select to indicate the coverage of pucca roads (durable materials such as cement concrete road or tar) across the informal settlement.
7.04 Select to indicate the finish of the roads within the informal settlement.
7.05 Select to indicate the width of the internal roads within the informal settlement.
7.06 Select to indicate the widths of the arterial roads within the informal settlement.
7.07 Select to indicate the vehicular entry points into the informal settlement.
7.08 Select to indicate if the informal settlement are below the level of roads.
7.09 Select to indicate if the dwellings of the informal settlement are below the level of roads.
7.10 Input pertinent comments in relation to informal settlement level road and access information.

Duration

The resources required to conduct the RIM will vary depending on the size and topography of the settlement, the cooperation of the local community, and the weather on the day. SA have recorded that one OHOT team member can complete the RIM survey for an informal settlement of 1500 dwellings and 8-10 CTBs in one working day.

Result

A complete picture of the informal settlement in relation to OHOT specific information which is presented concisely as a factsheet (Refer to Annexure 3).

Risks

1. As this task informs the subsequent tasks of the OHOT model, care must be taken to ensure it is carried out methodically so that opportunity for making mistakes is minimized.

2. OHOT surveyors should prepare for the survey, extra copies of the forms should be carried and if tablets/smartphones with the KoBoCollect app are being used then all mobile technology should be fully charged and all forms downloaded. You may not be able to connect to a power supply or an internet connection for the duration of the survey.

KoBoCollect Data Entry

To increase the efficiency of conducting the RHS and RIM, SA has developed a version of the survey forms which enables data to be input using an application that can be run from a tablet/ smartphone. This allows data to be processed quicker as it removes the need for entering the data recorded on paper copies of the RIM and RHS forms into a database. The digitisation of the process also has the potential to engage the local community, who are likely to own mobile technology. SA provide these members with access to the SA's RHS form so that members of the local community can collect RHS data alongside the OHOT surveyors; the RIM data is not collected by members of the local community. The method for setting up this system up is described below:

1. An account needs to be created on the KoBoToolbox website. To set up an account navigate to the KoBoToolbox website and click the button for signing up. A user name must be chosen along with a password. User details are required to be input along with a verification email. Once all of the required information has been input, click the button for creating your account. An email will be sent containing a link to activate the KoBoToolbox account. Support is available on the homepage of the KoBoToolbox website.

2. Once an account has been created projects can be created (KoBoToolbox uses the term 'project' for survey forms.) There are a few methods for creating SA's RHS and RIM forms:
   a. You can create new projects. From the KoBoToolbox dashboard click the 'new' button, and click 'new form' from the drop down menu. A project name must be input, and a project description, sector, and country can be input here if desirable for the OHOT implementing agent/agency. Once a new project is set up individual questions have to be created and added to the project. SAs RHS or RIM survey form could be recreated in this way using the copies of the survey forms in the appendices of this toolkit.

   b. You can upload a survey form. From the KoBoToolbox dashboard click the 'new' button, and click 'upload' from the drop down menu. Once upload is selected a file a dialogue box through which the excel file of the survey form can be selected. SA's RHS or RIM forms could be recreated in this way by contacting the organisation and requesting access to the XLS/XML versions of the forms.

   The creator of the survey forms will be the admin user with permissions over and above those of an end user.

3. Once the survey form has been created there are a few functions that can be performed:
   a. The form can be edited. To edit a survey form click the 'Edit in Form Builder' button.

   b. The form can be previewed. To preview a survey form click the 'Preview' button.

   c. The form can be deployed. This means that the survey form becomes accessible to end users. Once deployed a form can be edited and redeployed. To deploy/redeploy a survey click the 'deploy/redeploy' button.

   d. The form can be downloaded. To download a survey form click the three dots icon and select the 'Download form as XLS/XML' from the drop down menu.

   e. The form can be shared. This facility enables end users to be invited to use the survey form. To share a survey form click the three dots icon and select the 'Share this project' from the drop down menu.

f. The form can be cloned. This facility enables the admin user to create a duplicate of an existing survey form. This is especially useful when survey questions or potential answer values need to be altered on due to a different OHOT project context, such as a different urban/peri-urban area or a different state, etc. To clone a survey form click the three dots icon and select the 'Clone this project' from the drop down menu.

4. Once a final survey form has been created and deployed it should be shared to enable end users to access the form and input data. To provide access to a OHOT surveying team the following steps should be followed.
   a. Each OHOT team member is required to have a KoBoToolbox account. The account can be created by the end user or the admin user.

   b. Once the end users are created they can be invited by the admin user to have access the survey forms. The admin user who is the owner of the forms can also determine the access rights for each end user individually. The invitations are sent to the OHOT team members using their usernames.

5. Once the survey forms have been shared with the OHOT surveyors they can start inputting data in one of two ways:
   a. The end users can input data by logging into their account on the KoBoToolbox website.

   b. The end users can input data using a tablet/ smartphone by logging into their KoboToolbox account via the KoBoCollect app which can be downloaded from the play store.

6. Once the OHOT surveyors have access to the survey forms they can start inputting data:
   a. Launch the KoBoCollect app.

   b. To input RHS or RIM data for a household select “Fill Blank Form” and then select the survey project which contains the RHS or RIM questions.

   c. Select the informal settlement from the drop down menu options.

   d. Click in the window to input the data or to access the drop down menu options.

   e. Swipe left to advance to the next question and swipe right to return to a previous question.

   f. After all data has been input and checked the survey can be recorded as complete.

   g. The final step to record the survey form as complete by clicking on the 'Save and Exit' button. This uploads the survey form to the admin users account. Any rectification required once the survey forms have been uploaded must be carried out by the admin users. It is important that OHOT surveyors check their work prior to uploading to minimise the remedial work later.

Geographic Information Systems (GIS)
Part 1 - Organising Data

This work stage transforms the household level data into information than can be used to generate OHOT projects. The RHS data is imported into GIS software and the data for each family is associated with their dwelling on the map of the informal settlement.

Prerequisites
An accurate representation of the existing layout, where all structures are shown known, sewage lines are indicated along with inspection chambers/manholes, and OHOT specific information from each household residing within the informal settlement has been gathered.

Objectives
To organise the RHS data spatially using the map of the informal settlement and to generate outputs which allow for sanitation services to be focused on the most vulnerable.

Attendees
Representative of the OHOT implementing agency with GIS skills

Equipment
1. Computer/laptop

2. AutoCAD software

3. GIS software such as Geomedia, ArcGIS, QGIS, etc.

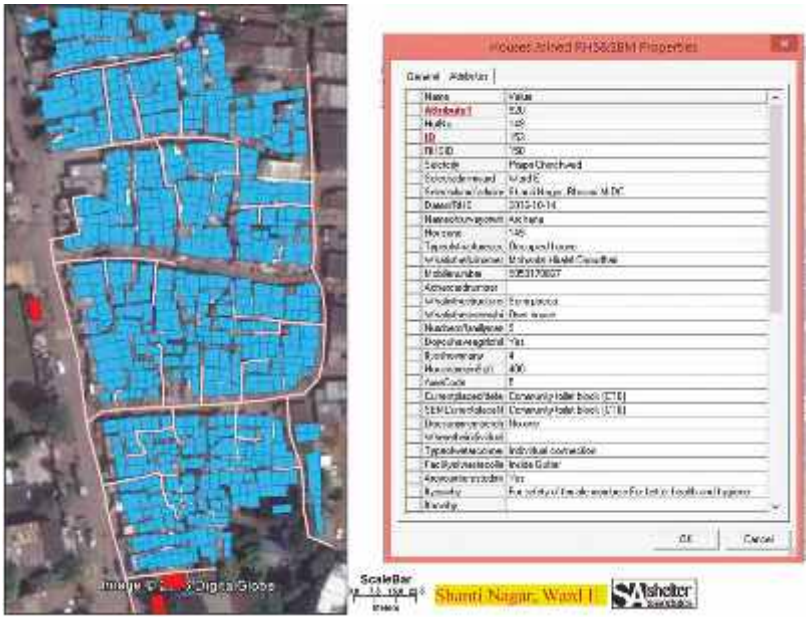
4. Google Earth

Method
1. A base remote sensing aerial image of the informal settlement is imported into the GIS software. The aerial image is traced to create a digitized layout.

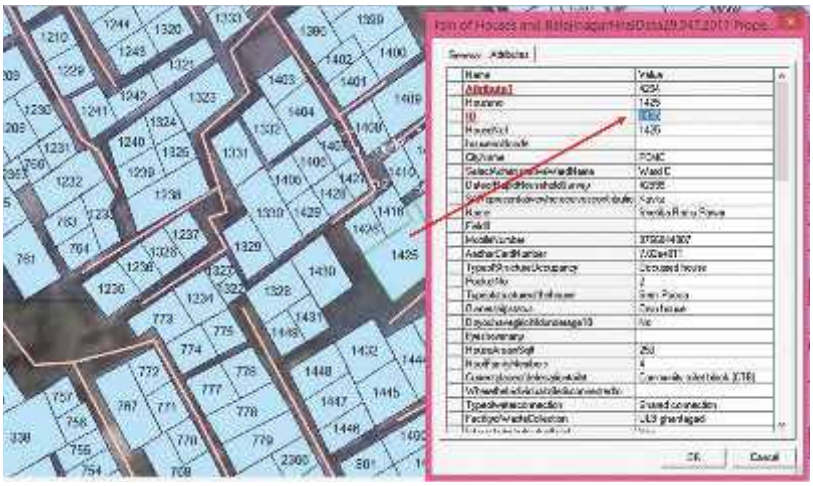
2. The layout should be prepared using layers such as dwellings, drainage lines, manholes, chambers, gutter lines, garbage bins, CTBs, etc.

3. The data collected during the RHS survey workstage is attached to the digitized layout.

4. Latitude and longitude values of each dwelling are generated by the GIS software. These values give an accurate location of the dwelling and are referenced when uploading completed OHOT toilet photographs onto the SBM portal.



RHS data attached to each household across entire settlement



RHS data attached for specific household

Duration

SA have recorded that the data for 500 dwellings can be linked in one working day by 1 person.

Result

A dataset which is organised spatially and can be used to generate outputs regarding the informal settlement and the local community.

Risks

1. As this task informs the subsequent task of the OHOT model, care must be taken to ensure it is carried out methodically so that opportunity for making mistakes is minimized.

2. For clarity the line weight and colour for layers should be consistent across all informal settlements. A graphic presentation style should be standardized to minimize confusion and miscommunication. Symbols used should also be standardized.

GIS Part 2 - Running Spatial Queries

This work stage generates the information required to design feasible OHOT projects.

Prerequisites

A RHS dataset which is organised spatially on the map of the informal settlement.

Objectives

To generate a series of outputs which can be used to understand the local community and locate potential OHOT beneficiaries within the informal settlements.

Attendees

1. Representative of the OHOT implementing agency with GIS skills

Equipment

1. Computer/laptop

2. GIS software such as Geomedia, ArcGIS, QGIS, etc.

Method

1. Once the RHS data has been attached to the map, several queries can be generated to enable analysis of data, thereby turning the data into information. SA's standard informal settlement level queries are listed below: (Refer to Annexure 4)
   a. Map showing house numbers of each household
   b. RIM:
      i. Presence of drainage
      ii. Presence of gutters
      iii. Presence and type of roads
   c. RHS
      iv. Type of structure occupancy
      v. Does the household have girl children under age 18?
      vi. Type of structure of the house
      vii. Ownership status of the house
      viii. House area
      ix. Type of water connection
      x. Facility of solid waste collection
      xi. Does any family member have any of the construction skills given below?
      xii. Have you applied for individual toilet under SBM?
      xiii. How many instalments have you received?
      xiv. Status of toilet under SBM
      xv. Current place of defecation
      xvi. Are you interested in an individual toilet?

xvi. What is the individual toilet connected to?
xvii. Who all use toilets in the household?
xviii. Reasons for not using toilet
xix. Does any member of the household go for open defecation?

Note- Using RIM & RHS data, multiple cross queries can be generated.

Duration

SA have recorded that the standard queries for one informal settlement can be generated in one hour.

Result

A set of standard query outputs regarding the informal settlement and the local community which can be used to plan OHOT related interventions such as workshops, Focus Group Discussions (FGD), door-to-door waste collection and the construction of OHOT toilets.

Risks

1. As this task informs all subsequent work stages of the OHOT model, care must be taken to ensure it is carried out methodically so that opportunity for making mistakes is minimized.

2. For clarity the line weight and colour for layers should be consistent across all informal settlements. A graphic presentation style should be standardized to minimize confusion and miscommunication. Symbols used should also be standardized.

ANNEXURE 1- Rapid Household Survey

Date **Rapid Household Survey (RHS) (Household level Data)**

Survey Notes:

(×) All Questions are mandatory unless indicated with x

Bold – Indicates that it's a multiple selection

1. Administration Information

1.01 Select City: *Drop down selection*
1.02 Select Admin Ward: *Drop down selection*
1.03 Select Electoral Ward: *Drop down selection*
1.04 Select Settlement name: *Drop down selection*
1.05 Date of RHS survey: *Drop down selection*
1.06 Name of surveyor(s) who collects RHS data: *Free text*
1.07 Household number: *Numeric field*
1.08 Type of structure occupancy:
- 01- Occupied house
- 02- Unoccupied house
- 03- Locked house

1.09 Type of unoccupied house:
- 01- Double house
- 02- Broken house
- 03- House under construction
- 04- Permanently locked house
- 05- Not giving information

1.10 Parent household number: *Numeric field*

2. For Occupied house

2.01 Full name of the head of the household: *Free text*
2.02 Type of survey:
- 01- RHS
- 02- Follow-up survey

3. For RHS

3.01 Enter the 10 digit mobile number: *Numeric field*
3.02 Adhar number: *Numeric field*
3.03 Number of household members: *Numeric field*
3.04 Do you have any girl child/children under the age of 18?
- 01 – Yes
- 02 - No

3.05 How many?: *Numeric field*
3.06 Type of structure of the house:

01 - Pucca 02 - Semi-Pucca 03 – Kucha

3.07 What is the ownership status of the hut:

01- Own house 02- Tenant

3.08 House Area in Sq.ft:
- 01- Less than 100
- 02- 101-199
- 03- 200-299
- 04- 300-399
- 05- >=400

3.09 Type of water connection:

01 - Individual	02 – Shared connection	03 - Water stand posts
04 - Hand pump	05 – Water tanker	06 – Well
07- From other settlements		

3.10 Facility of solid Waste Collection:

01- Door to door waste collection	02- ULB service	03- Garbage bin
04- open space	05- Along/inside canal	06- Inside gutter

3.11 Does any household member have any of the construction skills given below?:

01-Mason
02-Construction labour
03- Plumber
04-Carpenter
05- None

4. For Follow-up and RHS

4.01 Have you applied for individual toilet under SBM?

01 – Yes
02 – No

4.02 Type of SBM toilets:

01- SBM (Installment)
02- SBM (Contractor)
03- Toilet by SA
04- Toilet by other NGO

4.03 How many instalments have you received?

01- 0
02- 1
03- 2
04- 3

4.04 When did you receive your first installment?: *Date*
4.05 When did you receive your second installment?: *Date*
4.06 When did you receive your third installment?: *Date*
4.07 Status of toilet under SBM:

01- Completed, connected and in use
02- Completed, connected and not in use
03- Completed and not connected
04- Under construction
04- Construction yet to start

4.08 If built by contractor, how satisfied are you?:

01- Satisfied
02- Shoddy work or substandard quality
03- Took more than 1 month to complete
04- Incomplete work

4.09 What was the cost incurred to build the toilet?: *Numeric field*
4.10 Current place of defecation:

01- SBM (Installment)
02- SBM (Contractor)
03- Toilet by SA (SBM)
04- Toilet by other NGO (SBM)
05- Own toilet
06- Toilet by other NGO
07- Toilet by SA
08- Use CTB

09- Shared toilet
10- Public toilet outside slum
11- Open defecation

4.11 Is there availability of drainage to connect to the toilet?:
01- At a distance of within 3 feet
02- At a distance of 3-10 feet
03- More than 10 feet away
04- No drainage within the slum

4.12 Are you interested in an Individual toilet?:
01 – Yes
02 – No

4.13 What kind of toilet would you like?:
01- Prefab
02- Customised

4.14 Under what scheme would you like your toilet to be built?:
01- SBM (Installment)
02- SBM (Contractor)
03- OHOT model

4.15 If yes, why?:
01- For safety of female members
02- Dissatisfied with CTBs
03- For better convenience
04- For elderly
05- For handicapped
06- For any member suffering from any illness
07- For better health and hygiene
08- Others

4.16 If no, why?:
01- Financial problems
02- Small house
03- Tenant house
04- Lack of willingness
05- Satisfied with CTBs
06- Large family size
07- Drainage related issues
08- Others

4.17 What is the toilet connected to?

01 – Directly to sewer line	02 – Single pit latrine	03 – Twin pit latrine
04 – Individual septic tank	05 – Individual bio-gas	06 – Bio toilet
07- Connected to gutter/nala	08 – Not giving information	

4.18 Who all use toilets in the household?:
01- All members
02- Partial use- children, women, elderly

4.19 Reason for not using toilet:
01- Drainage problem
02- Bad smell
03- Cultural issues
04- Prefer to use CTBs
05- Other

4.20 Does any member of the household go for open defecation?:
- 01- No one
- 02- Only men
- 03- Only women
- 04- Only children
- 05- All

4.21 Enter household number again: *Numeric field*

ANNEXURE 2- Rapid Infrastructure Mapping

Date **Rapid Infrastructure Mapping (RIM) (Slum level Data)**

Survey Notes:

(×) All Questions are mandatory unless indicated with x

(●) indicates that a picture is required in association with the desired fact

Bold – Indicates that it's a multiple selection

1. Administration Information

1.1 Date of survey
1.2 Name of surveyor(s) who collected the data
1.3 Name of surveyor(s) who checked the map
1.4 Name of surveyor(s) who took the photographs

2. General Information

2.1 State code
2.2 District code
2.3 City code
2.4 Electoral code
2.5 Slum code
2.6 Survey number
2.7 Slum name (●)
2.8 Administrative ward number & name
2.9 Electoral ward number & name
2.10 Landmark
2.11 Year established according to the community
2.12 Legal status
- 01 Undeclared
- 02 Partly declared
- 03 Declared

2.13 Date of declaration (day/month/year)
2.14 Land owner
- 01 Private
- 02 Central Government
- 03 State Government
- 04 Local Government (ULB)
- 05 Not known

2.15 Development Plan Reservation type
- 01 - Residential
- 02 - Industrial
- 03 – Public Purpose
- 04 – Open space, Garden, Play ground
- 05 – River, Nala, Lakes, etc
- 06 – Road widening, Proposed road
- 07 – Commerce
- 08 – Public Semi-public
- 09 – Transportation
- 10 – No development zone (Agriculture)
- 11 – Reservation
- 12 – High density population area
- 13 – Not available

2.16 Development Plan Reservation
2.17 Approximate area of the settlement in square meters
2.18 Number of huts in the settlement (Number should be taken from RHS)
2.19 Location
- 01 - Water body/river bed/canal
- 02 - Hill slope
- 03 - Railway line

04 - Main road
05 - Within 1 km of an airport
06 - Isolated

2.20 Topography
01 – Acute
02 – Depression
03 – Reasonable
04 – Slight
05 - Flat

2.21 Describe the slum (type of structures, landmarks, amenities if any, general facilities provided by ULB)

3. Toilet Information

3.1 Number of Community Toilet Blocks (CTB)
3.2 Number of 'Pay & Use' CTBs
3.3 Status of defecation (●)
01 - Open defecation
02 - CTB
03 - Public Toilet Block outside of the settlement
04 - Group Toilet
05 - Individual toilet
06 – CTB of neighbouring slum
3.4 Is the CTB in use?

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 – No CTB 02 – Closed 03 – Under Construction 04 – Yes	01 – No CTB 02 – Closed 03 – Under Construction 04 – Yes	01 – No CTB 02 – Closed 03 – Under Construction 04 – Yes	01 – No CTB 02 – Closed 03 – Under Construction 04 – Yes	01 – No CTB 02 – Closed 03 – Under Construction 04 – Yes

3.5 Fee for use of CTB (per family per month)

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.6 Cost of 'Pay & Use' toilets (per individual per use)

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.7 CTB gender usage:

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 – Male 02 – Female 03 – Mixed 04 – Dedicated seats for men & women	01 – Male 02 – Female 03 – Mixed 04 – Dedicated seats for men & women	01 – Male 02 – Female 03 – Mixed 04 – Dedicated seats for men & women	01 – Male 02 – Female 03 – Mixed 04 – Dedicated seats for men & women	01 – Male 02 – Female 03 – Mixed 04 – Dedicated seats for men & women

3.8 Total Number of MIXED Seats allotted

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.9 Number of MIXED seats allotted but NOT in use

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.10 The reason for the MIXED seats not in use

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - Choked	01 - Choked	01 - Choked	01 - Choked	01 - Choked
02 - Broken pan	02 - Broken pan	02 - Broken pan	02 - Broken pan	02 - Broken pan
03 - Broken door	03 - Broken door	03 - Broken door	03 - Broken door	03 - Broken door
04 - No water	04 - No water	04 - No water	04 - No water	04 - No water
05 - No electricity	05 - No electricity	05 - No electricity	05 - No electricity	05 - No electricity
06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep
07 – Poor Construction	07 – Poor Construction	07 – Poor Construction	07 – Poor Construction	07 – Poor Construction
08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked
09 – No seats for men	09 – No seats for men	09 – No seats for men	09 – No seats for men	09 – No seats for men
10 - All seats in use	10 - All seats in use	10 - All seats in use	10 - All seats in use	10 - All seats in use

3.11 Number of seats allotted to men

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.12 Number of seats allotted to men but NOT in use

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.13 The reason for the men not using the seats

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - Choked	01 - Choked	01 - Choked	01 - Choked	01 - Choked
02 - Broken pan	02 - Broken pan	02 - Broken pan	02 - Broken pan	02 - Broken pan
03 - Broken door	03 - Broken door	03 - Broken door	03 - Broken door	03 - Broken door
04 - No water	04 - No water	04 - No water	04 - No water	04 - No water
05 - No electricity	05 - No electricity	05 - No electricity	05 - No electricity	05 - No electricity
06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep
07 – Poor Construction	07 – Poor Construction	07 – Poor Construction	07 – Poor Construction	07 – Poor Construction
08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked
09 – No seats for men	09 – No seats for men	09 – No seats for men	09 – No seats for men	09 – No seats for men

3.14 Number of seats allotted to women

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.15 Number of seats allotted to women but NOT in use

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.16 The reason for the women not using the seats

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - Choked	01 - Choked	01 - Choked	01 - Choked	01 - Choked
02 - Broken pan	02 - Broken pan	02 - Broken pan	02 - Broken pan	02 - Broken pan
03 - Broken door	03 - Broken door	03 - Broken door	03 - Broken door	03 - Broken door
04 - No water	04 - No water	04 - No water	04 - No water	04 - No water
05 - No electricity	05 - No electricity	05 - No electricity	05 - No electricity	05 - No electricity
06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep	06 - Poor up-keep
07 – Poor Construction	07 – Poor Construction	07 – Poor Construction	07 – Poor Construction	07 – Poor Construction
08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked	08 – Seats(s) locked
09 – No seats for women	09 – No seats for women	09 – No seats for women	09 – No seats for women	09 – No seats for men

3.17 Is the CTB available at night?

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 – No	01 – No	01 – No	01 – No	01 – No
02 – Yes, but NOT all night	02 – Yes, but NOT all night	02 – Yes, but NOT all night	02 – Yes, but NOT all night	02 – Yes, but NOT all night
03 - Yes – all night	03 - Yes – all night	03 - Yes – all night	03 - Yes – all night	03 - Yes – all night

3.18 CTB maintenance provided by

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - ULB 02 - NGO 03 - Community	01 - ULB 02 - NGO 03 - Community	01 - ULB 02 - NGO 03 - Community	01 - ULB 02 - NGO 03 - Community	01 - ULB 02 - NGO 03 - Community

3.19 Condition of CTB structure (●)

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - Poor	01 - Poor	01 - Poor	01 - Poor	01 - Poor
02 - Average	02 - Average	02 - Average	02 - Average	02 - Average
03 - Good	03 - Good	03 - Good	03 - Good	03 - Good

3.20 Out of total seats, no of pans in good condition

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.21 Out of total seats, number of doors in good condition

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.22 Out of total seats, number of seats where electricity is available

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.23 Out of total seats, number of seats where tiles on wall are in good condition

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.24 Out of total seats, number of seats where tiles on floor are in good condition

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum

3.25 Frequency of CTB cleaning by the ULB/ NGO/ Community

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 –Rarely Cleaned	01 –Rarely Cleaned	01 –Rarely Cleaned	01 –Rarely Cleaned	01 –Rarely Cleaned
02 – Twice a month	02 – Twice a month	02 – Twice a month	02 – Twice a month	02 – Twice a month
03 – Once a week	03 – Once a week	03 – Once a week	03 – Once a week	03 – Once a week
04 – Twice a week	04 – Twice a week	04 – Twice a week	04 – Twice a week	04 – Twice a week
05 – Alternative days	05 – Alternative days	05 – Alternative days	05 – Alternative days	05 – Alternative days
06 - Daily	06 - Daily	06 - Daily	06 - Daily	06 - Daily

3.26 Does the ULB/NGO/ Community use cleaning agents to clean the CTB?

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - No	01 - No	01 - No	01 - No	01 - No
02 - Yes	02 - Yes	02 - Yes	02 - Yes	02 - Yes

3.27 Cleanliness of CTB (●)

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - Poor	01 - Poor	01 - Poor	01 - Poor	01 - Poor
02 - Average	02 - Average	02 - Average	02 - Average	02 - Average
03 - Good	03 - Good	03 - Good	03 - Good	03 - Good

3.28 Is there a caretaker for the CTB?

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - No	01 - No	01 - No	01 - No	01 - No
02 - Yes, but NOT there full time	02 - Yes, but NOT there full time	02 - Yes, but NOT there full time	02 - Yes, but NOT there full time	02 - Yes, but NOT there full time
03 - Yes, and there full time	03 - Yes, and there full time	03 - Yes, and there full time	03 - Yes, and there full time	03 - Yes, and there full time

3.29 Type of water supply in the CTB

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 – Carry from home	01 – Carry from home	01 – Carry from home	01 – Carry from home	01 – Carry from home
02 - Water tank	02 - Water tank	02 - Water tank	02 - Water tank	02 - Water tank
03 - Piped supply	03 - Piped supply	03 - Piped supply	03 - Piped supply	03 - Piped supply

3.30 Capacity of the CTB water tank (in litres)

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 – No Water tank	01 – No Water tank	01 – No Water tank	01 – No Water tank	01 – No Water tank
02 – Less than 1000	02 – Less than 1000	02 – Less than 1000	02 – Less than 1000	02 – Less than 1000
03 - 1,000 – 5,000	03 - 1,000 – 5,000	03 - 1,000 – 5,000	03 - 1,000 – 5,000	03 - 1,000 – 5,000
04 - 5,000 – 10,000	04 - 5,000 – 10,000	04 - 5,000 – 10,000	04 - 5,000 – 10,000	04 - 5,000 – 10,000
05 - 10,000 – 20,000	05 - 10,000 – 20,000	05 - 10,000 – 20,000	05 - 10,000 – 20,000	05 - 10,000 – 20,000
06 - More than 20,000	06 - More than 20,000	06 - More than 20,000	06 - More than 20,000	06 - More than 20,000

3.31 Litres of water used by a community member (per one flush)

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - Less than 2 litres	01 - Less than 2 litres	01 - Less than 2 litres	01 - Less than 2 litres	01 - Less than 2 litres
02 - 2 – 3 litres	02 - 2 – 3 litres	02 - 2 – 3 litres	02 - 2 – 3 litres	02 - 2 – 3 litres
03 - More than 3 litres	03 - More than 3 litres	03 - More than 3 litres	03 - More than 3 litres	03 - More than 3 litres

3.32 Availability of water in the toilet block

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - Not available	01 - Not available	01 - Not available	01 - Not available	01 - Not available
02 - Less than 2 hours	02 - Less than 2 hours	02 - Less than 2 hours	02 - Less than 2 hours	02 - Less than 2 hours
03 - 2 - 6 hours	03 - 2 - 6 hours	03 - 2 - 6 hours	03 - 2 - 6 hours	03 - 2 - 6 hours
04 - 6 - 12 hours	04 - 6 - 12 hours	04 - 6 - 12 hours	04 - 6 - 12 hours	04 - 6 - 12 hours
05 - 24/7	05 - 24/7	05 - 24/7	05 - 24/7	05 - 24/7

3.33 Availability of electricity in the toilet block for pumping water to the overhead tank

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - No	01 - No	01 - No	01 - No	01 - No
02 - Yes	02 - Yes	02 - Yes	02 - Yes	02 - Yes

3.34 Availability of electricity in the toilet block after dark

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - No	01 - No	01 - No	01 - No	01 - No
02 - Yes	02 - Yes	02 - Yes	02 - Yes	02 - Yes

3.35 Facilities in the toilet block for children under 5 years of age (●)

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - No	01 - No	01 - No	01 - No	01 - No
02 - Yes	02 - Yes	02 - Yes	02 - Yes	02 - Yes

3.36 Condition of facilities for children under 5 years of age

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01 - No facility	01 - No facility	01 - No facility	01 - No facility	01 - No facility
02 - Poor	02 - Poor	02 - Poor	02 - Poor	02 - Poor
03 - Average	03 - Average	03 - Average	03 - Average	03 - Average
04 - Good	04 - Good	04 - Good	04 - Good	04 - Good

3.37 Sewage disposal system

CTB 1	CTB 2	CTB 3	CTB 4	PTB for slum
01- Laid in the open	01- Laid in the open	01- Laid in the open	01- Laid in the open	01- Laid in the open
02- Septic tank	02- Septic tank	02- Septic tank	02- Septic tank	02- Septic tank
03- ULB sewer line	03- ULB sewer line	03- ULB sewer line	03- ULB sewer line	03- ULB sewer line
04- DEWATS or BIOGAS plant	04- DEWATS or BIOGAS plant	04- DEWATS or BIOGAS plant	04- DEWATS or BIOGAS plant	04- DEWATS or BIOGAS plant

3.38 Distance to the nearest ULB sewer line

01 - No sewer lines
02 - Over 0.5 km from the edge of the settlement
03 - On the edge of the settlement
04 - Within the settlement

3.39 Toilet comments (percentile of population using: community toilets; public toilets outside of the settlement; individual toilets; and/or, open defecation:(●)

4. Water Information

4.01 Total number of stand-posts in use/Not in use (●)

4.02 Total number of taps in use/Not in use

4.03 Total number of hand-pumps in use/Not in use

4.04 Alternative sources of water:

01 - None
02 - Canal/water body
03 - Hand pump
04 - Tanker
05 - Group water connection
06 - Buy from neighbours
07 - Water Stand-posts

4.05 Availability of water:

01 - No service
02 - Less than 2 hours
03 - 2 to 6 hours
04 - 6 to 12 hours
05 - 24/7

4.06 Pressure of water in the system:

01 - No service
02 - Poor
03 - Average
04 - Good

4.07 Coverage of water across the settlement

01 - No service/no coverage
02 - Partial coverage
03 - Full coverage

4.08 Quality of water in the system

01 – No service
02 - Poor
03 – Average
04 - Good

4.09 Water supply comments (condition of pipes (location of breakages and/or leaks) and conservation of water) (●)

5. Waste Management information

5.01 Total number of waste containers (●)

Facility of waste collection (●)	Frequency of waste collection	Coverage of waste collection across the settlement
01 - MLA sponsored tempo	01 – No service 02 - Less than twice a week 03 - Twice a week 04 - Alternate days 05 - Daily	01 - No service/no coverage 02 - Partial coverage 03 - Full coverage
02 – Door to door waste collection	01 – No service 02 - Less than twice a week 03 - Twice a week 04 - Alternate days 05 - Daily	01 - No service/no coverage 02 - Partial coverage 03 - Full coverage
03 - ULB Ghantagadi	01 – No service 02 - Less than twice a week 03 - Twice a week 04 - Alternate days 05 - Daily	01 - No service/no coverage 02 - Partial coverage 03 - Full coverage
04 - ULB Van	01 – No service 02 - Less than twice a week 03 - Twice a week 04 - Alternate days 05 - Daily	01 - No service/no coverage 02 - Partial coverage 03 - Full coverage

05 - Garbage Bin	01 – No service 02 - Less than twice a week 03 - Twice a week 04 - Alternate days 05 - Daily	01 - No service/no coverage 02 - Partial coverage 03 - Full coverage

5.02 Where are the community's open dump sites? (●)
- 01 - Within the settlement
- 02 - In a nearby canal/water body
- 03 - Along the railway line
- 04 - On the edge of the settlement
- 05 - Over 0.5 km from the edge of the settlement
- 06 - None

5.03 Do members of the community deposit waste in the drains?
- 01 - Yes
- 02 - No

5.04 Waste management comments (●)

6. Drainage and Gutter information

6.01 Presence of drains within the settlement
- 01 - No
- 02 - Yes

6.02 Coverage of drains across the settlement
- 01 – No drainage/no coverage
- 02 - Partial coverage (Write %)
- 03 - Full coverage

6.03 Do the drains get blocked?
- 01 - No drainage
- 02 - Yes
- 03 - No

6.04 Is the drainage gradient adequate?
- 01 - No drainage
- 02 - No
- 03 - Yes

6.05 Diameter of the ULB sewer lines across the settlement:
- 01 - No sewer lines
- 02 - Six inch (6”) diameter
- 03 - Eight inch (8”) diameter
- 04 - Ten inch (10”) diameter
- 05 - Twelve inch (12”) diameter
- 06 - Eighteen inch (18”) diameter
- 07 -Twenty four inch (24”) diameter
- 08 - Thirty six inch (36”) diameter

6.06 Drainage comments (mainline connection, if choked why, why inadequate gradient, etc Consider 5.07 while writing comments) (●)

6.07 Presence of Gutters
- 01 - No
- 02 - Yes

6.08 Type of Gutters within the settlement
- 01 - No gutters
- 02 - Kutcha
- 03 - Kutcha & Pucca
- 04 - Pucca

6.09 Coverage of Gutters
- 01 – No gutters
- 02 - Partial coverage
- 03 - Full coverage

6.10 Are gutters covered?
- 01 – No gutters

02 - No
03 – Partly covered
04 - Yes

6.11 Do gutters flood?
01 – No gutters
02 - Yes
03 - No

6.12 Do gutters get choked?
01 – No gutters
02 - Yes
03 - No

6.13 Is the Gutter gradient adequate?
01 – No gutters
02 - No
03 – Yes

6.14 Comments on Gutters

7. Roads and Access information

7.01 Presence of roads within the settlement
01 - No
02 - Yes

7.02 Type of roads within the settlement (●)
01 - Kutcha
02 - Kutcha and pucca
03 - Pucca

7.03 Coverage of Pucca roads across the settlement
01 - No coverage
02 - Partial coverage
03 - Full coverage

7.04 Finish of the roads
01 - Mud
02 - Shahabadi furshi
03 - Paving blocks
04 - Concrete
05 - Tar
06 - Stone Paving

7.05 Average width of internal roads:
01 - Less than 1.5 meters
02 -1.5 – 2 meters
03 - More than 2 meters

7.06 Average width of arterial roads
01 - Less than 3 meters
02 - 3 - 4.5 meters
03 - More than 4.5 meters

7.07 Points of vehicular access to the slum
01 - None
02 - One
03 - More than one

7.08 Is the settlement below or above the main access road?
01 - Above
02 - Above and Below
03 - Below
04 - Same level

7.09 Are the huts below or above the internal access road?
01 - Above
02 - Above and Below
03 - Below
04 - Same level

7.10 Roads & Access comments (×)(●)

ANNEXURE 3- RIM Fact sheet

Rapid Infrastructure Mapping

Datta Nagar,Akurdi

Type of Structure Occupancy

- Occupied house (1216)
- Locked house (118)
- Double house (39)
- Broken house (8)
- Under construction (4)
- Permanent locked house (15)
- Not giving information (14)
- Community Toilet Block (11)
- Total House (1414)

General Information

Slum Name	Datta Nagar,Akurdi
Administrative Ward	A Administrative Ward PCMC
Electoral Ward	8 Electoral Ward PCMC
Approximate Population	7070 people in 1414 dwellings
Year of Establishment	1970
Legal Status	Undeclared
Year of Declaration	
Land Owner	State Government
Approximate Area	46208
Location	Main road
Topography	Flat
Development Plan Reservation	Slum Rehabilitation + Picnic Spot
Development Plan Zoning Proposal	Residential, Public purpose

General Observations

90% of the houses in the slum are semi-pucca, around 7% are katcha and rest are pucca huts. Around 85% households have individual water connection. The open-gutter coverage in the settlement is 70% and drainage network is 40 % and the toilet seat to person ratio is 1: 101.

April 2017

shelter associates

Rapid Infrastructure Mapping

Datta Nagar,Akurdi

Current Place of Defecation

- Used CTB (902)
- Own toilet (97)
- SBM toilet (86)
- Public toilet outside slum (116)
- Shared toilet (15)
- Locked house (120)
- Double house (39)
- Broken house (8)
- Under construction (4)
- Permanent locked house (15)
- Not Giving information (12)
- Existing Drainage Line
- Open Defecation Area
- Community Toilet Block (11)
- Total Houses (1414)

Toilet Information

Number of Community Toilet Blocks	11
Number of Seats (male+female)	94
Cost (per use/per family per month)	Rs. 50/family (For 3 CTBs out of 11)
Toilet maintenance provided by	ULB(8)
Condition of toilet block structure	Poor(5), Average(3)
Cleanliness of toilet block	Poor(6), Average(2)
Type of Water Supply	Water tank(1), Carry from home(8), Piped supply(8)
Facilities for children under 5 years of age	No(8)
Sewage Disposal System	ULB sewer line(8)
Toilet seat to persons ratio	1:101

General Observations

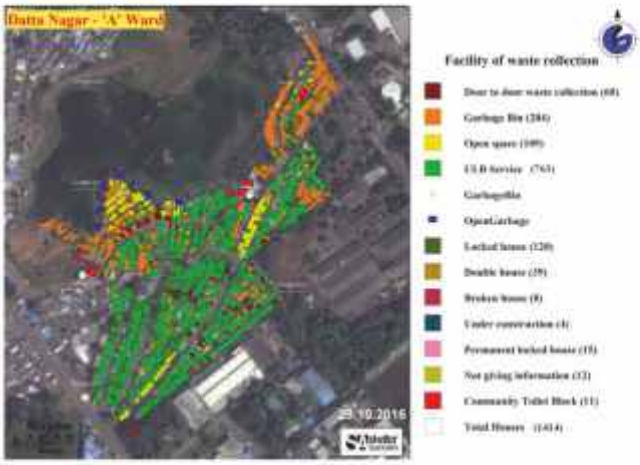
The condition of the toilet block is average but the cleanliness is poor. Also, facility of water is not sufficient. All the unpaid CTBs closed from 11 am to 4 pm.

April 2017

shelter associates

Rapid Infrastructure Mapping

Datta Nagar, Akurdi



Waste Management Information

Total number of waste containers	4
Frequency of clearance of waste containers	Every alternate day
Facility Waste Collection	Door to door waste collection, ULB van, Garbage bin, Open space, Inside gutter
Coverage of Waste Collection Across the Settlement	Full coverage
Location of community open dump site(s)	At the edge of the settlement

General Observation

ULB van covers majority of the settlement except a few with narrow lanes. Door to door waste collection facility is available to a small part and so few households dump garbage in open dumping site. Although it was not recorded in the survey, waste dumped in gutter was found.

SA shelter associates

Rapid Infrastructure Mapping

Datta Nagar, Akurdi

Water Information

Total Number of Stand-Posts (in use/NOT in use)	6 / 0
Total Number of Hand-pumps (in use/NOT in use)	0 / 0
Percentage with an Individual Water Connection	
Availability of Water	Less than 2 hrs
Pressure of water in the system	Average
Coverage of water across the settlement	Full coverage
Quality of water in the system	Average
Alternative Source of Water	Group water connection, Buy from neighbour, Water standpost
Total Number of Taps (in use/NOT in use)	24 / 0

General Observation

85% households have individual water connections. These water pipelines pass through gutter lines. Rest of the settlement depends on the water standposts provided.

SA shelter associates

Rapid Infrastructure Mapping

Datta Nagar, Akurdi

Road

- Cuba
- PavingBlockRoad
- TarRoad
- Community Toilet Block (11)
- Total Houses (1414)

Roads & Access Information

Presence of Roads Within the Settlement	**Yes**
Type of roads within the settlement	**Pucca**
Finish of the Roads Across the Settlement	**Paving blocks, Concrete, Tar**
Average Width of Internal Road	**More than 2m**
Average Width Arterial Roads	**3-4.5m**
Points of Vehicular Access	**More than one**
Level Variation between the Settlement and the Main Road	**Above and below**
Level Variation between Huts and the Internal Road	**Above and below**

General Observations

The main road and the internal wide road is tar finished where as the internal narrow lanes are made of paving block and concrete.

April 2017

SA shelter associates

Rapid Infrastructure Mapping

Datta Nagar, Akurdi

Dattanagar Ward A
Electoral Ward # 08

- Drainage Line 200mm(6)
- Drainageline 300mm (9)
- Proposed Drainage Line
- Manholes
- Chambers
- Drainage Slope
- Open Defecation Area
- Community Toilet Block (11)
- Total Houses (1414)

Drainage Information

Presence of drains within the settlement	**Yes**
Coverage of drains across the settlement	**Partial coverage**
Do the drains get blocked?	**Yes**
Is the drainage gradient adequate?	**Yes**

General Obeservation

Drainage network covers a significant part of the settlement with few lines been proposed. Around 44% more households can be connected to the existing drainage.

April 2017

SA shelter associates

Rapid Infrastructure Mapping

Datta Nagar, Akurdi

Gutter

- Open Gutter
- Community Toilet Block (11)
- Total Houses (1414)

Gutter Information

Presence of gutters within the settlement	**Yes**
Type of gutters within the settlement	**Kutcha and pucca**
Coverage of gutters within the settlement	**Partial coverage**
Are the gutters covered?	**Partly covered**
Do the gutters flood?	**Yes**
Do the gutters get choked?	**Yes**
Is the gutter gradient adequate?	**Yes**

General Obeservation

Gutter coverage is seen in 80% of the slum. Waste is dumped leading to choking of the open gutters.

April 2017

For more information, please visit our website
www.shelter-associates.org

SAshelter associates

ANNEXURE 4- Spatial Queries

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

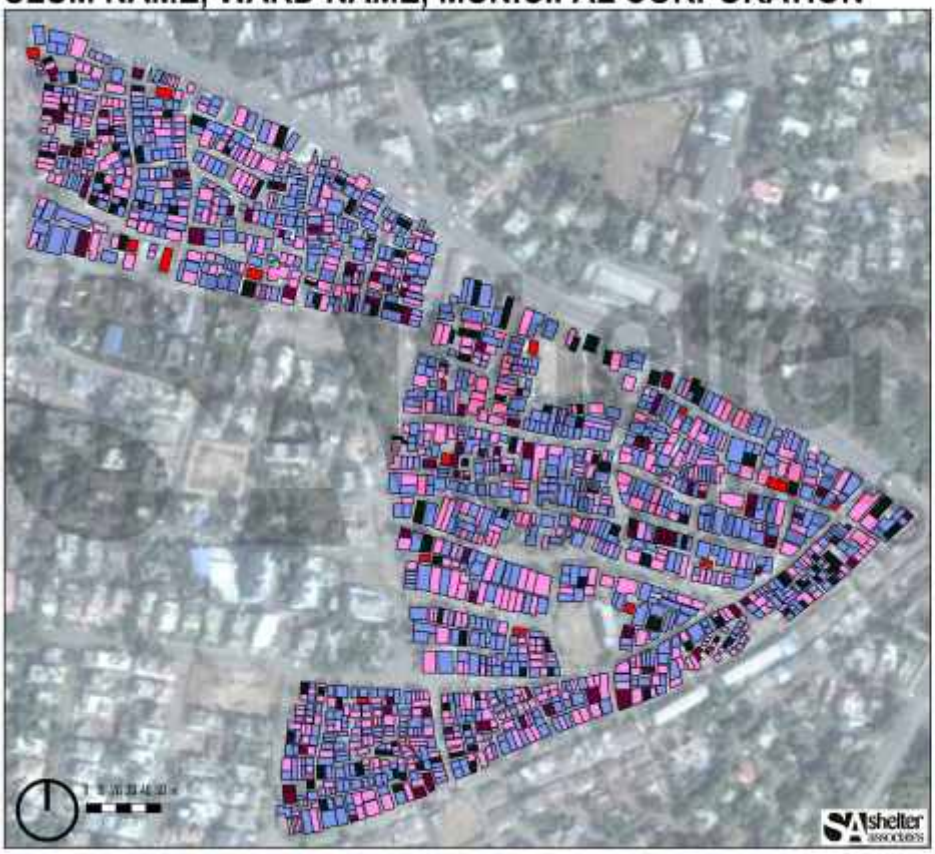
01. TYPE OF STRUCTURE OCCUPANCY

- Occupied house [1386]
- Locked house [127]
- Double house [25]
- Broken house [9]
- House under construction [34]
- Permanently locked house [14]
- House not giving information [10]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION



02. DOES THE HOUSEHOLD HAVE GIRL CHILDREN UNDER AGE 18?

- Yes [557]
- No [829]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

03. TYPE OF STRUCTURE OF THE HOUSE

- Pucca [431]
- Semi-pucca [743]
- Kutcha [212]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

04. OWNERSHIP STATUS OF THE HOUSE

- Own house [1248]
- Semi-pucca [138]
- Not giving information [0]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

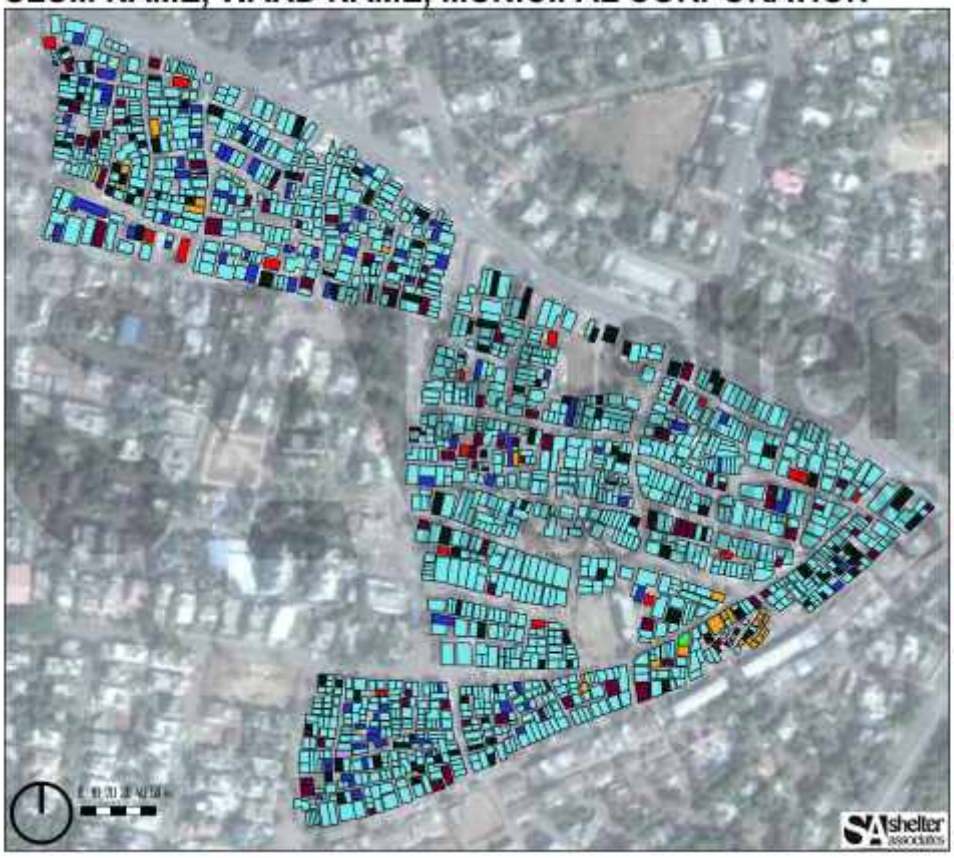
05. HOUSE AREA IN SQ. FT.

- <=100 [108]
- 101-199 [153]
- 200-299 [467]
- 300-399 [0]
- >=400 [658]
- Locked house [127]
- Unoccupied house [92]
- Existing Drainage Line
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION



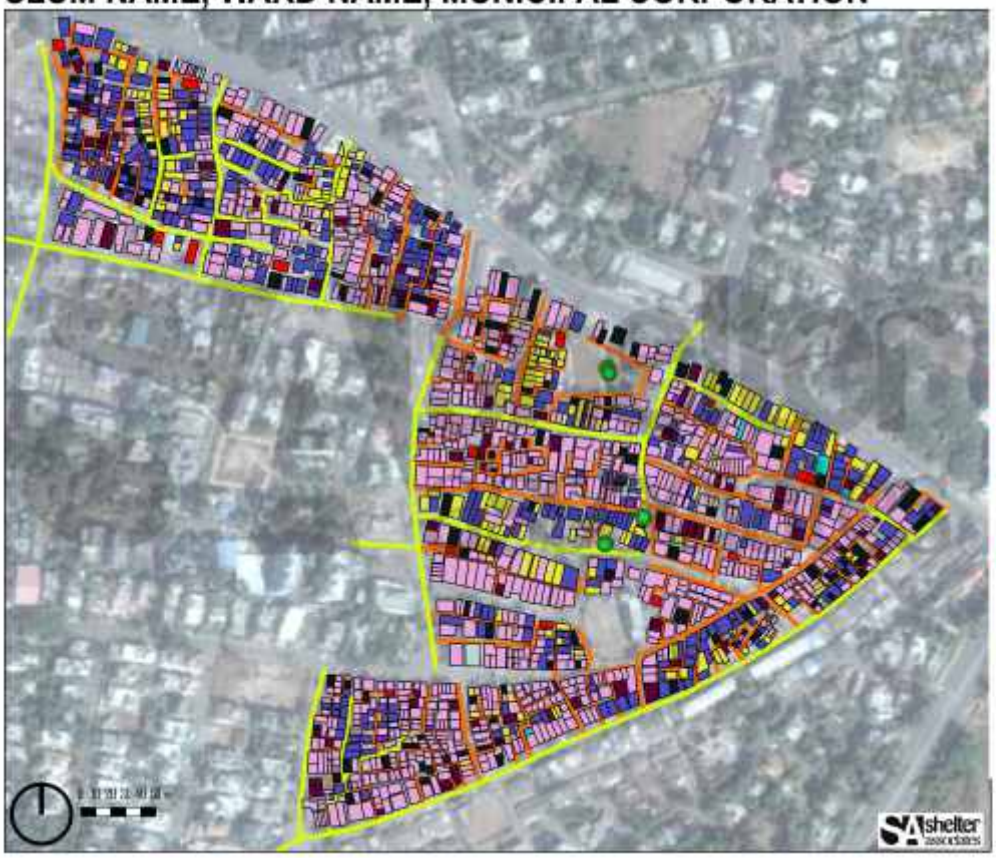
06. TYPE OF WATER CONNECTION

- Individual connection [1260]
- Shared connection [97]
- Water standpost [26]
- Hand pump [2]
- Water tanker [1]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]
- Borewell [0]
- Handpump [1]
- WaterTank [0]
- WaterStandpost [5]
- Well [0]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION



07. FACILITY OF SOLID WASTE COLLECTION

- Door to door waste collection [854]
- ULB service [148]
- Garbage bin [373]
- Open space [1]
- Along/inside canal [0]
- Inside gutter [4]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]
- Garbage Bins [4]
- Open Garbage [0]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

08. DOES ANY FAMILY MEMBER HAVE ANY OF THE CONSTRUCTION SKILLS GIVEN BELOW?

- Mason [141]
- Construction labour [14]
- Plumber [5]
- Carpenter [12]
- None [1214]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

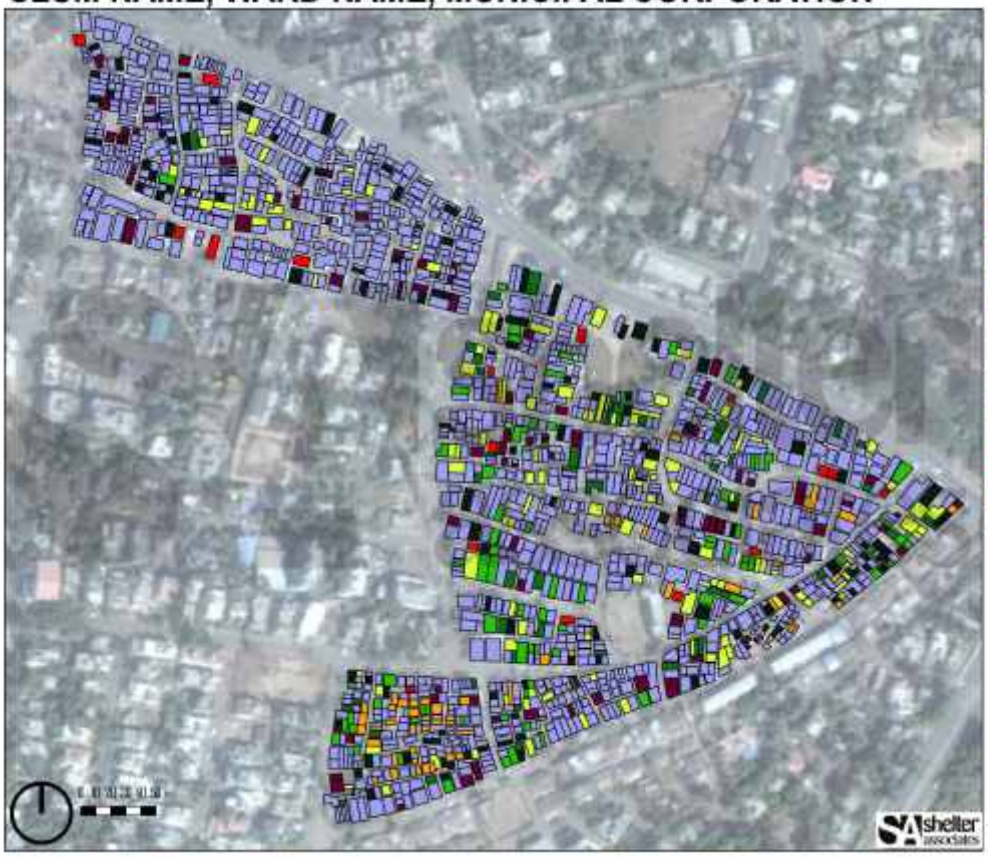
09. HAVE YOU APPLIED FOR AN INDIVIDUAL TOILET UNDER SBM?

- Yes [299]
- No [1087]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION



11. HOW MANY INSTALLMENTS HAVE YOU RECEIVED?

- 0 [52]
- 1 [118]
- 2 [79]
- 3 [50]
- Not applied for SBM [1087]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

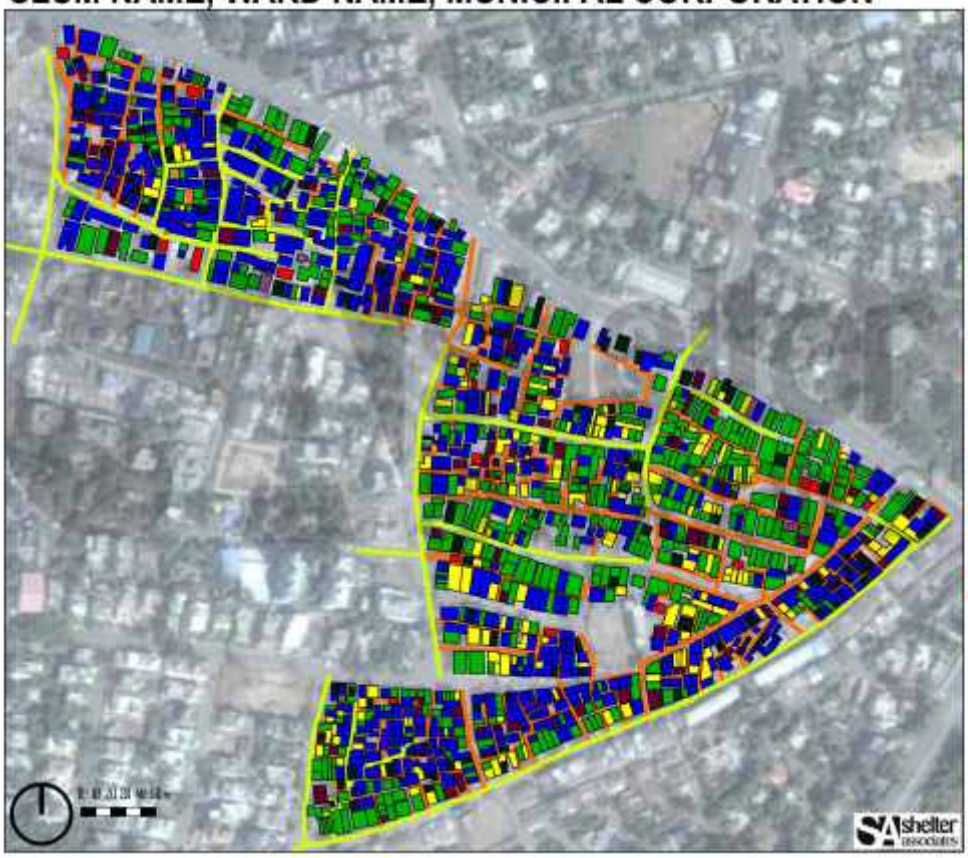
13. STATUS OF TOILET UNDER SBM

- Completed, connected and in use [171]
- Completed, connected and not in use [2]
- Completed and not connected [1]
- Under construction [14]
- Construction yet to start [111]
- Not applied for SBM [1087]
- Locked house [127]
- Unoccupied house [92]
- Existing Drainage Line
- Proposed Drainage Line
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION



14. CURRENT PLACE OF DEFECATION

- Own toilet [485]
- SBM (Installment) [171]
- That use CTB [723]
- Shared toilet [6]
- Public toilet outside slum [1]
- Locked house [127]
- Unoccupied house [92]
- Existing Drainage Line
- Proposed Drainag Line
- Open Defecation Area [0]
- Community Toilet Block [17]

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

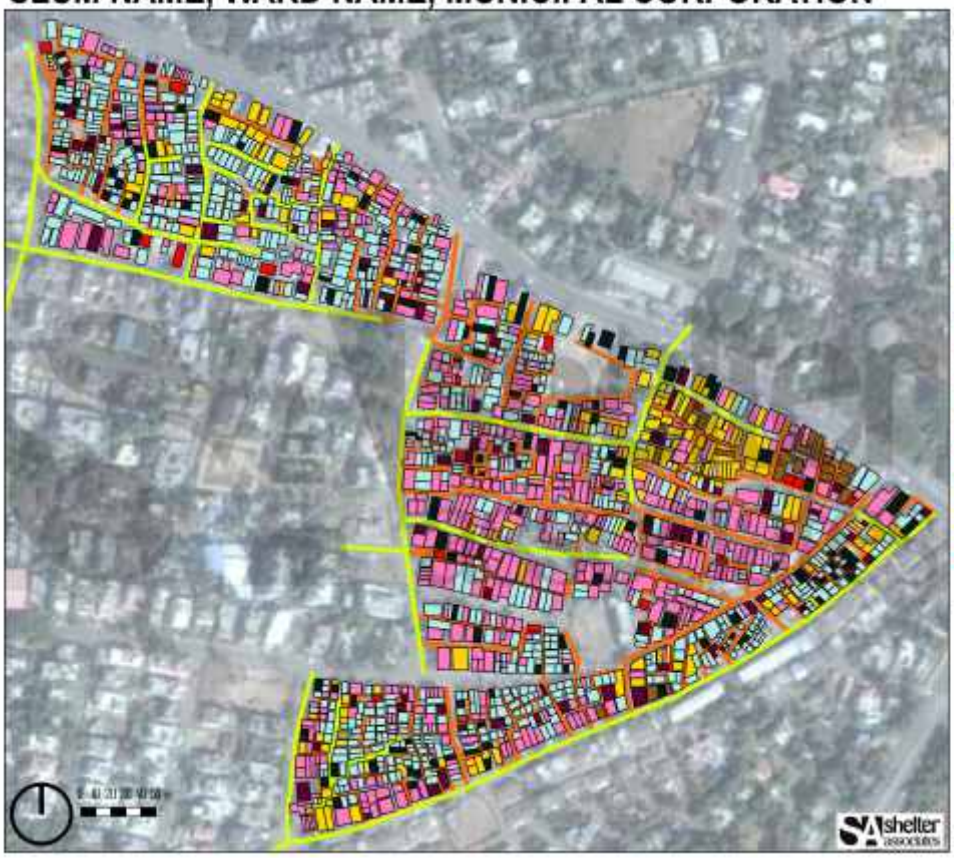
16. ARE YOU INTERESTED IN AN INDIVIDUAL TOILET?

- Yes [433]
- No [169]
- Locked house [127]
- Unoccupied house [92]
- Community Toilet Block [17]
- Remaining houses
- Existing Drainage Line
- Proposed Drainage Line

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION



21. WHAT IS THE INDIVIDUAL TOILET CONNECTED TO?

- Directly to sewer line [169]
- Twin pit latrine [1]
- Individual septic tank [469]
- Connected to gutter /nala [22]
- Locked house [127]
- Unoccupied house [92]
- Remaining houses
- Community Toilet Block [17]
- Existing Drainage Line
- Proposed Drainage Line

Total Houses [1605]

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

00.00.20XX

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

SLUM NAME, WARD NAME, MUNICIPAL CORPORATION

ANNEXURE 5- Critique of CTBs

In 1999 SA were invited by the Pune Municipal Corporation (PMC) to participate in a community toilet block (CTB) project. The then PMC Municipal Commissioner's idea was revolutionary as this was the first time that the PMC brought beneficiaries into the process of sanitation provision in their slums. SA's involvement in this initiative started with an analysis of the reasons why CTBs, which were being procured by the PMC and many other Urban Local Bodies (ULB) across India, were failing to realise their designed impacts. SA identified issues ranging from the procurement process, the design of the facilities and the CTBs operation and maintenance strategy. The issues were all found to reduce the success of the CTB projects.

The majority (70%) of the slums in Pune were not connected to the sewage network which meant that the CTBs were connected to aqua privy tanks. The aqua-privy tanks were not an appropriate solution for sewage waste management as they blocked easily and frequently cracked allowing untreated sewage to seep into the surrounding area and contaminating the site. Once the area around the CTB was soiled, the communities began to dump household waste there which in turn attracted flies, mosquitoes, and pigs and further reduced the sanitary condition of the settlement.

The toilet seat to person ratio was incredibly high which meant that beneficiaries were required to wait in a queue at peak times, which was frustrating, uncomfortable and inconvenient for the community. The inadequate seat to person ratio also meant that toilets were frequently blocked and the cleanliness of the facilities deteriorated; the huge numbers of people using each CTB meant that the daily cleaning by the PMC employees was ineffective and did little to keep the toilets clean. In case where the CTBs were also found to have an inadequate water supply the level of cleanliness was even worse. The CTBs also had no provision for small children whose only option, therefore was to defecate out in the open on the ground around the CTB. The practice of open defecation (OD) along with the effluents evacuating the privy tanks made the outbreak of diseases, such as diarrhea, common in the slums.

The inconvenience of using the CTBs and the poor sanitary conditions in and around the CTBs meant that the communities practised OD thereby exposing themselves to health and safety risks such as disease, physical attack and sexual assault. The safety aspect of poor sanitation in slums cannot be overstated as SA found that many women and girls restrict their intake of food and drink during the day to reduce their need to go to the toilet and reduce their risk of exposure to Eve teasing, sexual harassment and sexual assault. This strategy can have severe consequences for their health and cognitive development and, if the women are pregnant this strategy can also be detrimental to the health and development of the unborn child.

The community members themselves did not treat the facility as a valuable community resource. SA found that often members of the community would not leave the toilet in an appropriate state for the next user and also observed in some cases that fixtures and fittings had been vandalised and/or stolen. Had the community been involved in the procurement and design of the facilities they might have placed a greater value on them and felt a collective responsibility for their condition and maintenance.

SA found problems with CTB projects not only at a community level but also at level of the Urban Local Body (ULB). It was found that most ULBs used CTBs to address the sanitation needs within informal settlements as the PMC lacked accurate data regarding the extent and condition of existing sewage infrastructure. In the absence of data the CTBs severed as a default proposal where projects were designed and implemented without the input or support of the beneficiary community. This methodology may have seemed simpler than bespoke proposals based on accurate data but in reality created significant problems for the ULBs. Firstly the initial expenditure to build a CTB was high, and secondly the budgetary allocations made for their maintenance represented a substantial portion of the administrative ward offices budget which was a recurring commitment.

Informed by an understanding of the issues with CTB projects at both the community level and the ULB level SA partnered with Baandhani, an informal federation of men and women from informal settlements in Maharashtra. Baandhani surveyed, counselled and mobilised the communities with whom the SA team planned and refined the proposed CTB projects prior to their implementation.

Through this inclusive approach SA designed CTBs which addressed issues raised by the beneficiaries and addressed the problems experienced by the ULB; water connections were made mandatory and the aqua privies were replaced by septic tanks. Another design feature was the inclusion of 'baby channels' within the female section to provide a place for young children to defecate. SA's CTBs were designed to include a residence for a caretaker and their family thereby providing on-site maintenance; the caretakers were also responsible for collecting the monthly fee from each household that used the CTB to cover the cost of keeping the CTB clean and operable. SA's CTBs were procured with the input and support of the beneficiaries which meant that the communities valued the CTBs as an important resource which they had a collective responsibility to maintain.

Despite the success of SA's CTB projects the NGO has shifted focus to projects where data is collected and analysed so that improved sanitation can be provided in a more targeted fashion. SA now facilitates access to improved sanitation on an individual basis where each home has its own toilet; One Home, One Toilet (OHOT). SA's OHOT projects have a high degree of community support, are more convenient to use, are usable by young children, are connected to municipal services and do not require a high financial commitment from the ULB. The individual toilets are also safer than defecating out in the open or visiting a CTB so women find it more convenient and find it easier to practice menstrual hygiene.

SA's investigation into CTB projects illustrated that a data-led development process could lead to more targeted, cost effective and sustainable solutions to India's sanitation crisis. This realisation led to the establishment of what has become the cornerstone of SA's culture and working methodology: poverty mapping.

While CTBs can be defined as improved sanitation facilities SA's assertion is that CTB projects do not represent value for money as they are ineffective, expensive to procure and the high costs associated with maintenance make them unsustainable. They also require a large area to site the building meaning that they are not practical in informal settlements without open space or, if the informal settlement has open space, they consume open space which could be put to better use by the community. Cost comparisons reveal that OHOT projects are more economical than CTB projects when compared to the capital expenditure and subsequent maintenance obligation placed on the ULB's. When measured against CTB projects OHOT projects:
(1) have a lower life-cycle costs per seat, because there is no maintenance commitment required from the ULB
(2) provide a higher quality sanitation service
(3) are more convenient for the beneficiary family
(4) are a safer defecation arrangement
(5) are more impactful.

The Ministry of Urban Development's National Urban Sanitation Policy states that the “provision of individual toilets should be prioritised” but, with the lack of accurate data, ULBs are unable to apply the objectives of the policy to their city's sanitation planning policy document and formulate impactful projects. The temptation to default to CTB options is understandable but SA would encourage ULBs and other sanitation providers to use the toolkit to prepare projects which achieve tangible and long lasting change, to uplift some of India's most vulnerable citizens; after all unsanitary arrangements for defecating is not an indicator of poverty but a significant contributing factor.

shelter associates

A/17, Sarasnagar Siddhivinayak Society, Opposite Nehru Stadium, Shukrawar Peth,Pune - 411002
Telephone : 020 24440363 info@shelter-associates.org www.shelter-associates.org

Designed and Illustrated at
DesignDirections Pvt. Ltd.
www.designdirections.net