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# Container-based sanitation

GUIDELINES AND BEST PRACTICES





## Preamble

This document outlines guidelines for best practices for container-based sanitation (CBS). The development of these guidelines was funded by the City of Cape Town (CCT), to support improved and sustained service delivery within the city. These guidelines can be adopted or adapted in other geographical regions.



## Background

CBS is a sanitation system that consists of a sustained service in which toilets collect excreta in sealable, removable containers (also called cartridges). Once full, the containers are collected and transported to treatment facilities. CBS is a relatively new approach to sanitation (~15 years old), and in 2019 was formally recognised as “improved sanitation” — and household-level CBS models as “safely managed” — by the Joint Monitoring Programme (JMP) for Water Supply and Sanitation, the official UN body for monitoring progress toward the sanitation Sustainable Development Goal (SDG 6). This sanitation typology has been recognised as an improved sanitation facility especially in informal settlements and areas where sewerage sanitation is not possible.

There are three distinct operational areas within the CBS service chain. The first area deals with customer relations with users (marketing, toilet installation, explaining servicing, etc.), which is crucial to establishing connections and trust within served communities.

The second area covers design and operations that directly contribute to the provision of the safely managed sanitation service, including the containment and collection of household waste and subsequent transfer for safe disposal. The final area involves the commercialisation of any reuse product. In practice, different CBS providers will adopt different elements within their service chain.

These proposed guidelines for CBS services draw on the principles of universal access, human dignity, user participation and service standards. These guidelines were informed by the principles of sustainability, affordability, effectiveness, efficiency and appropriateness to communities. Cognisance is taken of the water scarcity context of the country (South Africa), and as such reduction, re-use and recycling are common themes that underpin these guidelines.



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# List of abbreviations

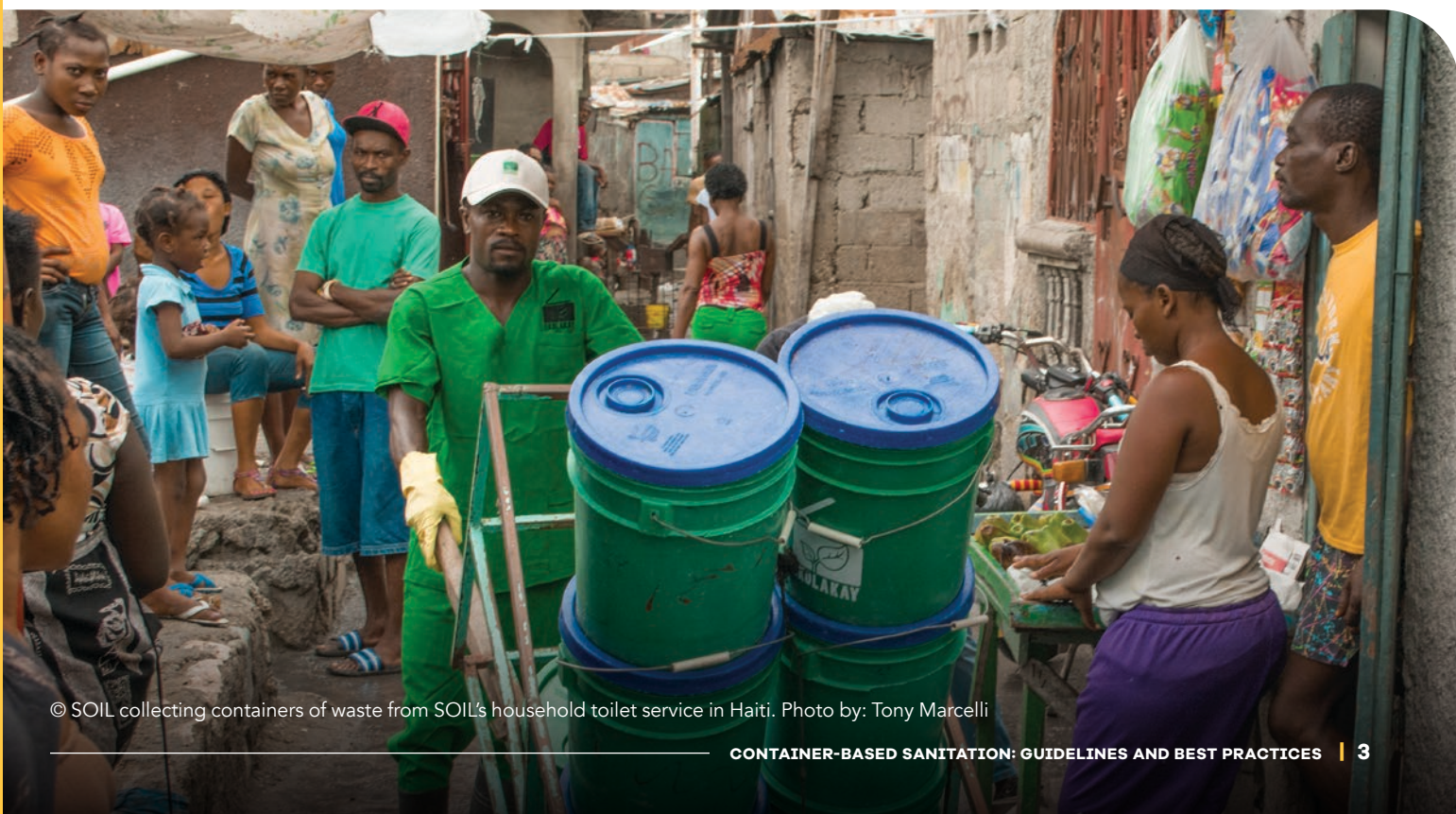
AMPS	Association of Mobile and Portable Sanitation – Africa
ANSI	American National Standards Institute
CBS	Container-based sanitation
CBSA	Container Based Sanitation Alliance
CCT	City of Cape Town
DWS	National Department of Water and Sanitation
FL / Fresh Life	NGO part of the Sanergy Collaborative, providing CBS in Kenya
FSM	Faecal Sludge Management
ISO	International Standards Organisation
OHS	Occupational Health & Safety
PPE	Personal Protective Equipment
PSAI	Portable Sanitation Association International
SDG	Sustainable Development Goal
SOP	Standard Operating Procedures
SSP	Sanitation Safety Planning
UDDT	Urine Diverting Dry Toilet
WHO	World Health Organisation
WRC	Water Research Commission





# Contents

<b>1. Introduction</b>	<b>4</b>
1.1 Rationale	4
1.2 Purpose	4
1.3 Scope	4
1.4 Guidelines preparation	4
<b>2. Definitions</b>	<b>5</b>
<b>3. Guiding principles</b>	<b>6</b>
<b>4. Planning and monitoring of CBS services</b>	<b>8</b>
<b>5. Sanitation chain</b>	<b>10</b>
5.1 Containment: design, construction and deployment of toilets	10
5.2 Servicing, emptying and transport	12
5.3 Container cleaning	14
5.4 Waste treatment and beneficiation	15
<b>6. Workforce</b>	<b>16</b>



# 1

# Introduction

## 1.1 Rationale

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It is estimated that 53% of all new households in the CCT, South Africa are likely to be informal over the next 20 years. The CCT prioritises the installation of full flush toilets but this is not always feasible due to informal settlements being located on land that is not suitable for the construction of sewer infrastructure. When this is the case the CCT provides a range of non-sewered sanitation systems such as chemical toilets and CBS. The aim of these guidelines is to provide the CCT with a framework for minimum levels of service delivery and also demonstrate aspirational guidelines which could be considered to offer an increased level of service delivery. These guidelines are not limited to the Cape Town context, albeit they have been funded by the CCT, and can be used and adapted in other geographical contexts as well.

## 1.2 Purpose

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This document aims to provide a set of minimum guidelines which ensure that a certain level of quality, safety and reliability of the hardware and services rendered are met.

## 1.3 Scope

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The scope of these guidelines relates to container and portable toilets used in informal settlements (this excludes chemical toilets), and specifically their design, deployment, servicing, and subsequent waste treatment or beneficiation.

## 1.4 Guidelines preparation

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These guidelines have been derived from the standards, best practices and policies cited in each section, and from a survey of Container Based Sanitation Alliance (CBSA) members who shared their best practices. GreenCape led the development of these guidelines in partnership with the CBSA and gathered inputs from Fresh Life in Kenya, Sanima in Peru, and SOIL in Haiti as well as the Water Research Commission (WRC) and the National Department of Water and Sanitation (DWS).



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## 2 Definitions

**Basic level of service:** For a household this means (1) an ongoing programme comprising easy-to-understand information about the correct hygiene practices and (2) a humane sanitation solution meeting certain minimum requirements in terms of cost, sturdiness, health benefits and environmental impacts. [Source: [Water Services Act](#)].

**Basic sanitation:** The prescribed minimum standard of services necessary for the safe hygienic and adequate collection, removal, disposal or purification of human excreta, domestic wastewater and sewage from households, including informal households. [Source: [Water Services Act](#)].

**Bucket systems:** A bucket toilet is a basic form of a dry toilet whereby a bucket (pail) is used to collect excreta. Usually, faeces and urine are collected in the same bucket. Bucket systems are illegal due to unsafe design and servicing. [Source: StatsSA].

**Container-based sanitation (CBS):** A sustained sanitation service, featuring toilets with containers that are frequently sealed and collected, typically once to three times per week so that the waste can be safely treated, reused or disposed of. CBS is different from bucket systems as users and workers are kept safe through good design and professional servicing, and waste is safely treated, providing a value-add service. [Source: CBSA].

**Excreta:** Includes but is not limited to urine, faeces, menses, toilet paper, and other human body emissions and biodegradable cleaning products.

**Faecal sludge:** Human excreta (faeces and urine), water, anal cleansing materials, menstrual hygiene products, and sometimes solid waste (liquid and solid contents) that accumulates in container-based vaults, pit latrines, septic tanks, community toilets, or mobile toilets. It is not transported through a sewer network. [Source: [National FSM Strategy](#)]

**Indigent:** People living in one household who collectively earns less than R1600 per month and who have registered the household as indigent with the relevant water services provider (WSP). It is the responsibility of the WSP to re-evaluate the status of indigent households on a regular basis to ensure integrated water demand management. [Source: Amended from the [National Water Act](#)]

**Informal settlement:** Informal settlements are residential areas that do not comply with local authority requirements for conventional (formal) townships. They are, typically, unauthorised and are invariably located upon land that has not been proclaimed for residential use. They exist because urbanisation has grown faster than the ability of government to provide land, infrastructure and homes. [Source: [Informal Settlement Handbook](#)]

**Mobile / portable toilets:** Toilets which can be moved either manually or with lifting equipment, not connected to a sewer pipe, to a pit or to a septic tank. [Source: [National FSM Strategy](#)]

**PPE:** Personal protection equipment, mandated by health and safety protocols.

**Safely Managed Sanitation:** The containment, extraction and transport of excreta to a designated disposal or treatment site, or its hygienic re-use to ensure that the excreta pose no risk to human health or the natural environment. [Source: Amended from the [National Water Act](#)]

**Sanitation services:** The collection, removal, disposal or purification of human excreta and domestic wastewater, sewage and effluent resulting from the use of water for domestic purposes. [Source: Amended from the [Water Services Act](#)]

**Sanitation value chain:** for on-site sanitation systems means excreta capture, containment, emptying of the pit, containment or tank, transportation, treatment, beneficial use or safe disposal of faecal sludge. [Source: [Draft National Water and Sanitation Norms and Standards](#)]

**Urine diversion:** Separation of urine from other excreta that occurs at the dry toilet.

**Urine Diverting Dry Toilet (UDDT):** A fixture for collecting, containing, or transporting urine and faeces separately without the use of water through independent piping.



# 3

## Guiding principles

### Overall sources of standards and best practices:

- [National sanitation policy](#)
- [WHO guidelines for sanitation and health](#)
- WRC Guidelines for Faecal Sludge Collection, Disposal and Valorisation 2022
- ISO 4500 – OHS
- [CBS Implementation guide 2020](#)

### Portable toilet industry standards:

- AMPS Best Practice and Guidelines for mobile and portable toilets where connection to a sewer is not practical (Africa)
- [British Standard BS EN 16194:2012](#) Mobile non-sewer-connected toilet cabins. Requirements of services and products relating to the deployment of cabins and sanitary products (UK)
- [ANSI/PSAI Z4.3-2023](#): Sanitation – Non-sewered Waste-Disposal Systems - Minimum Requirements (US)
- [PSAI code of excellence](#) (US)

The values underpinning the future of sanitation services in South Africa acknowledges the Batho Pele principles which includes consultation, service standards, access, courtesy, information, openness and transparency, redress and value for money. Sanitation service provision in the country is based on the principles of [Source: [National Sanitation Policy of 2016](#)]:

01

#### The right to access to basic sanitation

Ensuring universal access to basic sanitation is recognised as a Constitutional responsibility of the national sphere of government, with constitutional responsibility of provision of basic sanitation services at the local sphere of government. Local government must take reasonable measures to realise this right.

02

#### Prioritising hygiene and end-user education in sanitation service provision

Hygiene education is crucial to maximise the public benefit of sanitation service provision. Sanitation improvement must prioritise hygiene education in planning and implementation. End-user education is necessary for consumers to understand their sanitation rights, responsibility and water conservation and demand management requirements. End-user education must also be prioritised in sanitation improvement. Hygiene and end-user education must be continuous, have varying emphasis based on local needs and address all geographic areas of the country.

03

#### Prioritising basic sanitation services to vulnerable people and unserved households

Provision of basic sanitation services must be prioritised and supported for vulnerable people and unserved households. Basic sanitation service provision to vulnerable people must accommodate the special access requirements of these individuals and households.

04

#### People-centred and demand-driven sanitation service provision

Provision of sanitation services must be people-centred and demand-driven. Sanitation services must recognise sanitation as a right and consider consumer's expectations and needs in planning and implementing sanitation services. This will maximise benefits to the local economy through local job creation and use of local enterprises. Decision making and control will be devolved as far as possible to accountable local structures. There is a reciprocal obligation on communities to accept responsibility for their own development and governance.

05

### User pays principle

Beneficiaries of the water management system shall contribute to the cost of its establishment and maintenance on an equitable basis. This is a central principle to ensure sustainable and equitable development, as well as efficient and effective management. Implementation, regulation and enforcement of the user pays principle are central to sustainable sanitation service provision. In the instance of sanitation services to indigents, beyond a free basic sanitation service, the user pays principle also applies.

06

### Sanitation has economic value

The way in which sanitation services are provided must reflect the growing scarcity of good water quality in South Africa in a manner which reflects their value and does not undermine long term sustainability and economic growth. The public and economic benefit of improved sanitation must be recognised and valued. The economic value of sanitation by-products should be recognised and the reuse of these products should be encouraged, particularly as a resource in energy generation. The economic value of sanitation is recognised concurrently with recognition of the social value of sanitation.

07

### Integrated development

Sanitation developments are not possible in isolation from development in other sectors. The public health benefits of improved sanitation are maximised when sanitation is planned and provided in an integrated manner with other basic services. Co-ordination is necessary with all tiers of government and other involved parties and maximum direct and indirect benefit must be derived from development in, for instance, education and training, job creation and the promotion of local democracy. The Integrated Development Plan process is the primary level at which coordination should take place.

08

### Recognising the value of sanitation by-products

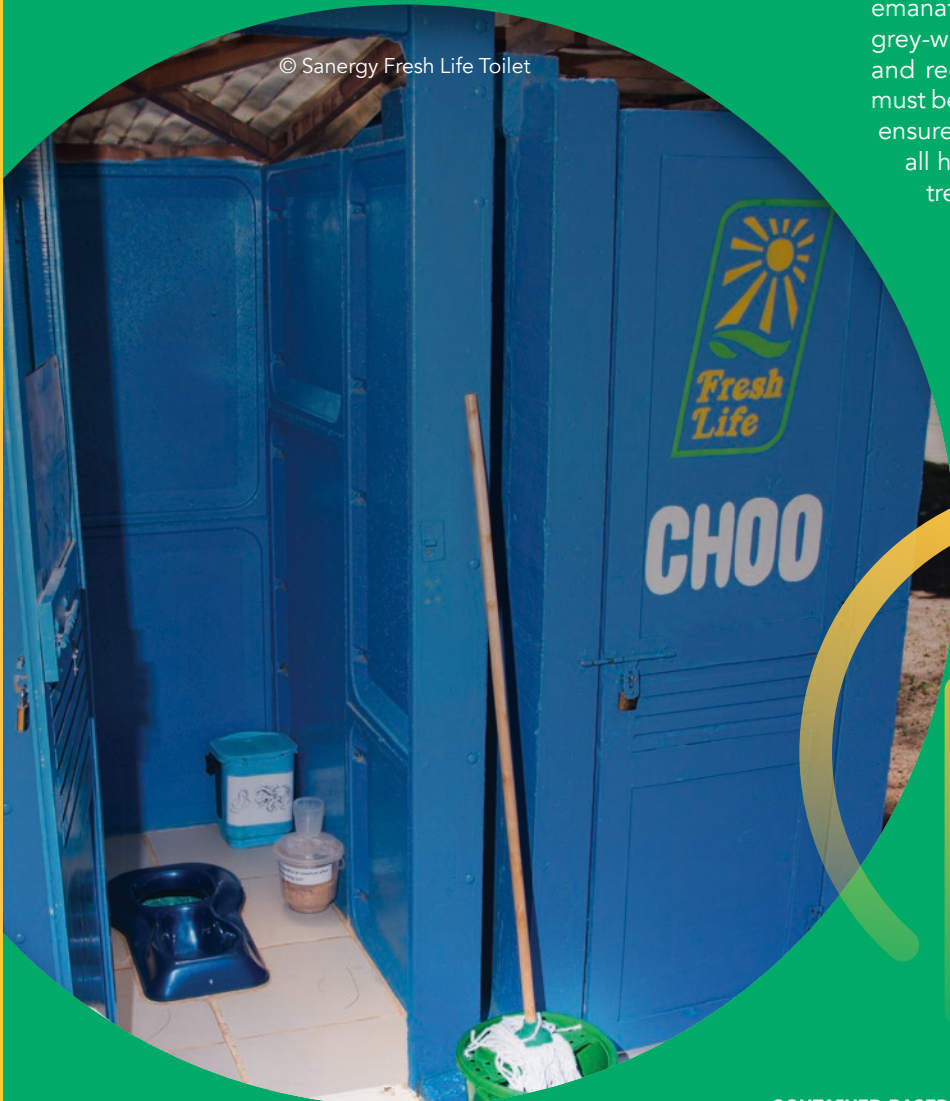
The value of sanitation by-products needs to be fully realised and reinvested into the system so as to foster increased investments and generate efficiency gains. A stronger focus is needed on maximising recovery, use, reuse and recycling of sanitation by-products. This could deliver efficiency gains along the entire sanitation value chain, as the by-product would become a valuable resource instead of a cost that needs to be minimised or avoided.

09

### Integrated waste management

Human waste is only one of a range of wastes emanating from households, including solid waste, grey-water and human waste. Management, reuse and recycling of these household waste streams must be in an integrated and coordinated manner to ensure safe storage, removal and management of all household waste (including the recycling and treatment of waste water).

© Sanergy Fresh Life Toilet





# 4

## Planning and monitoring of CBS services

SAFE MINIMUM STANDARDS	BEST PRACTICE EXAMPLES
<b>Monitoring in place for all safe minimum standards:</b> functional toilets, servicing frequency and quality, container cleaning, waste disposal or treatment.	<ul style="list-style-type: none"> <li>• QR codes on toilets or containers to record collections.</li> <li>• GPS tracking of collection vehicles</li> </ul>
<b>Users can easily report issues</b> such as missed collections, defective toilets, leakages.	<ul style="list-style-type: none"> <li>• Mobile / WhatsApp / USSD number visible on toilets</li> <li>• Maximum response time is monitored</li> </ul>
<b>Operators have clear incentives</b> for high performance and sanctions for repeated quality issues.	<ul style="list-style-type: none"> <li>• Embedding performance-based incentives in tenders and contracts.</li> <li>• Allocating a portion of the contract as a performance-based bonus if achieving a certain threshold.</li> <li>• Analyse whether incentives or sanctions are more effective to incentivise good performance based on other sectors.</li> <li>• A set time for answer and a time for redress is agreed and monitored.</li> <li>• User &amp; servicing personnel attitude</li> <li>• Leaving the toilet clean after the servicing exercise.</li> </ul>

ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<b>Co-creation:</b> Services are planned and monitored through a co-creation process to devise appropriate toilet and servicing options.	<ul style="list-style-type: none"> <li>• CBSA members – engagement of communities during baseline and initial planning.</li> <li>• Gathering feedback on toilet look and feel (e.g. resemblance to flush toilet, ease of use...)</li> <li>• Determining the level of community involvement.</li> </ul>
<b>Transparent and accessible publication</b> of audits and performance of service provision.	<ul style="list-style-type: none"> <li>• Blue and Green Drop-like Reports for CBS where municipalities and metropolitians are scored against these guidelines for sanitation provision. This serves as a further driver to motivate, monitor and accurately evaluate their servicing contractors.</li> </ul>
<b>Periodic documentation</b> and sharing of lessons learnt and best practices.	
<b>Regular engagement of communities</b> to gather feedback, adapt services and share information.	
<b>Monitoring additional benefits of CBS:</b> water used and saved, households served where other services do not yet exist, carbon emission reductions.	

# 4

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# 5

## Sanitation chain

Toilets used for CBS services can be distinguished whether they are:

- **In-home toilets**, typically small portable units which can be moved by users and placed where convenient.
- **Standalone toilets**, placed within a superstructure, and usually fixed after being installed.

In order to minimise smells, two methods can be used:

- **Toilets with chemicals** rely on a small quantity of chemicals in the container to neutralise odours, allowing flushing.
- **Waterless toilets** (or dry toilets) rely on minimising water inputs to keep the waste dry, for instance using a “dry flush” (plastic liner sealing tight) or urine diversion, with the addition of a bulking and drying agent.

The following standards apply to any categories, unless explicitly specified.



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### 5.1 Containment: design, construction and deployment of toilets

#### Key sources of standards:

- SANS/ISO 30500 Non-sewered sanitation systems: Prefabricated integrated treatment units – General safety and performance requirements for design and testing
- [CBS implementation guide](#)

#### For dry toilets:

- NSF/ANSI Standard 41: Non-Liquid Saturated Treatment Systems
- [Recode Model Code for Composting and Urine Diversion Toilets](#)

SAFE MINIMUM STANDARDS	BEST PRACTICE EXAMPLES
<p><b>Safe minimum:</b> Toilets are adapted to users’ needs and preferences; do not leak waste; are easy to clean; and resist daily use and regular emptying.</p>	<ul style="list-style-type: none"> <li>• Avoiding toilets built for the leisure industry, which are designed for infrequent use.</li> <li>• Withstanding frequent servicing (3x weekly)</li> <li>• Container resists shocks (transport of containers on vehicle), stacking.</li> </ul>
<p><b>In-home toilets:</b> Such small toilets should minimise the smell of both excreta and chemicals, be completely leak-proof, and minimise space used.</p>	<ul style="list-style-type: none"> <li>• Capacity: Determined between emptying frequency (see following section), acceptability for users (usually smell), logistic and economics. Typically, 10 to 20 litres.</li> </ul>
<p><b>Standalone toilets:</b> A superstructure provides sufficient ventilation, lighting, security, space for users’ need.</p>	

ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<p><b>User engagement:</b> Future users are engaged actively to determine preferences.</p>	<ul style="list-style-type: none"> <li>• At least consultations and choice between options.</li> <li>• Ideally a co-creation process to understand behaviour drivers and potential blockages.</li> </ul>
<p><b>Users determination:</b> Toilets will be provided for set users, such as a given household or group of households. The methodology for allocating users is transparent.</p>	<ul style="list-style-type: none"> <li>• In-home household toilets.</li> <li>• Standalone toilets, i.e. in an outside superstructure.</li> <li>• Private shared toilets, i.e. toilets shared between a set group of households.</li> </ul>
<p><b>Usage preference:</b> Engagement determines user preference between:</p> <ol style="list-style-type: none"> <li>1. Sitting and squatting</li> <li>2. Anal cleansing methods</li> <li>3. Size of toilet seat</li> </ol>	<ul style="list-style-type: none"> <li>• Anal cleansing can be performed with the user's preferred material, with safe disposal for contaminated materials. If washing, possibly not above a dry toilet. If wiping, understanding whether paper can go in the toilet.</li> <li>• Toilet seats inserts for young children.</li> </ul>
<p><b>Smell and nuisance:</b> The toilet should be safe, reliable, environmentally sound, easy to keep clean, keep smells to a minimum and prevent the entry and exit of flies and other disease-carrying pests.</p>	<ul style="list-style-type: none"> <li>• Urine-separating dry toilets to minimise smell by keeping waste dry.</li> <li>• Cover or way of not seeing faeces when not in use.</li> <li>• Toilets properly ventilated to reduce odour and moisture.</li> </ul>
<p><b>Toilets with chemicals:</b> If chosen, they should be built in a way to ensure no smell.</p>	<ul style="list-style-type: none"> <li>• Sliding trap or U-bend to prevent chemical smell in home.</li> <li>• Materials resistant to chemicals</li> </ul>
<p><b>Dry toilets:</b> If chosen, they should ensure that there is no smell (using additives if needed), no urine back splashing, and clear instructions for use.</p>	
<p><b>Standalone toilets:</b> If the toilet is located within a superstructure, it needs to provide privacy, security and protection against the weather, sufficient lighting and ventilation, with floors and walls allowing ease of cleaning. The toilet should be placed within a safe walking distance to the household(s), and on flat ground. Ensure that the walkway to the toilet is well-lit.</p>	<p>Association of Mobile and Portable Sanitation (AMPS):</p> <ul style="list-style-type: none"> <li>• Less than 100m from the household.</li> <li>• Minimum width and length 920mm when measured from door to wall at a height above the seating area.</li> <li>• Minimum height 2000mm when measured from floor to highest point of the cabin.</li> <li>• Lockable from the inside.</li> <li>• Holder for toilet paper.</li> <li>• Ventilation pipe min <math>\varnothing</math> 50mm.</li> </ul> <p>Fresh Life:</p> <ul style="list-style-type: none"> <li>• Mirror, washbasin, soap holder, coat hook.</li> <li>• Full upstructure models that protects the toilet during flooding.</li> </ul>
<p><b>Servicing considerations:</b> The container needs to be easy and safe to service frequently and clean, minimising spillages. The container size should match usage and servicing needs.</p>	<ul style="list-style-type: none"> <li>• Bag liners or containers: resist temperature, washing (or biodegradable), resist puncture or leakage, cost. Replaceable bag in a fixed container, or:</li> <li>• Replaceable container with a tight-fitting lid.</li> <li>• Stackable containers for transportation.</li> </ul>
<p><b>Materials:</b> The toilet should be manufactured with materials that are easily cleaned, and will not rust.</p>	<ul style="list-style-type: none"> <li>• AMPS: Fibreglass / smooth plastic.</li> <li>• Corrosion Resistance: Components in contact with excreta to be constructed of corrosion-resistant material such as stainless steel or durable polymers.</li> <li>• Urine storage tanks need to be built with PET, PEN, polyamide (Nylon) or a blend of PET, PEN, ethyl vinyl alcohol (EVOH), Nylon, HDPE – see 9 CFR 178.274.</li> </ul>



ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<p><b>Carbon impact and circular economy:</b> As long as this does not compromise durability and safety, low-carbon construction and circular economy principles should be adopted.</p>	<ul style="list-style-type: none"> <li>• Minimising high-carbon materials (steel, cement)</li> <li>• Using recycled materials.</li> <li>• Smaller containers and frequent collections (at least once every 10 days) minimise methane production.</li> </ul>
<p><b>Customisation, desirability and stigma:</b> Toilets do not reinforce any stigma placed on users. Engagement helps to understand what makes them desirable.</p>	<ul style="list-style-type: none"> <li>• Anonymising containers, or to the contrary making them uniquely identifiable – highly context-dependent.</li> <li>• Choice of colour for the seat, toilet, etc.</li> <li>• Choice of seat size.</li> </ul>
<p><b>Theft:</b> The toilet is built in a way that does not attract theft.</p>	<ul style="list-style-type: none"> <li>• Not using metal for doors (Fresh Life)</li> <li>• Providing in-home toilets.</li> <li>• Providing padlocks for private shared facilities.</li> <li>• Using concrete or other hard-to-move materials for the superstructure (Fresh Life).</li> </ul>
<p><b>Inclusion:</b> Accommodations to be made for users with disabilities &amp; elderly people. Gender specific facilities e.g. sanitary bins for enhancing menstrual hygiene.</p>	<ul style="list-style-type: none"> <li>• Assessment using <a href="#">Washington Questions</a><sup>1</sup>.</li> <li>• Ground-level access, handrails, sufficient space, non-slip floor.</li> <li>• AMPS: door opening 800mm wide, cabin interior 1500mm x 1500mm.</li> </ul>
<p><b>Greywater disposal:</b> Plans are made to dispose of greywater.</p>	

## 5.2 Servicing, emptying and transport

### Key sources of standards:

- [ISO 24521](#): Activities relating to drinking water and wastewater services – Guidelines for the management of basic onsite domestic wastewater services
- National OHS guidelines
- Sanima and SOIL Sanitation Safety Planning



SAFE MINIMUM STANDARDS	BEST PRACTICE EXAMPLES
<p><b>Servicing:</b> Containers are emptied at a regular interval, in a manner safe for workers, users and communities, leaving toilets clean and functional. (Route planning &amp; scheduling).</p>	<ul style="list-style-type: none"> <li>• Twice / three times per week, unless users are willing to change their container themselves or have a way to seal bags.</li> <li>• SOPs ensure collections are done safely.</li> </ul>
<p><b>Missed collections</b> can be easily reported and are acted upon.</p>	<ul style="list-style-type: none"> <li>• Users have easy ways to contact operators, and report issues (missed collections, unsafe handling...).</li> <li>• The monitoring system ensures actions are taken as a result. E.g. Use of QR codes that are scanned after every collection (Fresh Life)</li> </ul>
<p><b>Safety:</b> The health and safety of users, operators and communities is ensured at all times.</p>	<ul style="list-style-type: none"> <li>• Standard Operating Procedures for collections.</li> <li>• Using <a href="#">WHO Sanitation Safety Planning</a> – mapping of hazards and exposure risks.</li> <li>• Provision of PPE for operators (gloves, masks, boots, etc.) Both servicing personnel and users who change containers for themselves should be provided with PPEs.</li> <li>• Means to ensure airtightness of the containers and cleaning of the toilets in case of any spillage. All waste cartridges must be leak-proof</li> <li>• Training the servicing personnel on handling procedures, lifting techniques, PPE use and safety protocols.</li> <li>• Sanitizing and disinfection – For servicing equipment, containers, toilets after collection and vehicles handling waste to prevent cross contamination.</li> </ul>
<p><b>Waste service provider registration with the CCT.</b></p>	<p>The CCT Bylaws require that any waste service provider be registered. This can be done by following the instructions in <a href="#">this link</a>.</p>

ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<p><b>Servicing intervals:</b> The interval between servicing needs to be decided and users informed in order to minimise inconvenience and keep the systems functional.</p>	<ul style="list-style-type: none"> <li>• Set day(s) of the week for collections.</li> <li>• Deciding collection intervals based on what is acceptable for users (smell and sight of excreta), size of containers, and economics and logistics.</li> </ul>
<p><b>User involvement:</b> Users are informed of expectations placed on them, and of the service they obtain.</p>	<ul style="list-style-type: none"> <li>• Providing set day(s) and time intervals.</li> <li>• Providing a safe place to put containers for collection.</li> <li>• Users have a clear expectation of the condition of the toilet after servicing, and when their next collection would be.</li> <li>• Regular check-in with users or representatives are scheduled to ensure the system works as intended.</li> </ul>
<p><b>Contingencies:</b> A plan for contingencies needs to be drawn up in case a servicing is missed or will be missed.</p>	<ul style="list-style-type: none"> <li>• Providing an extra container or bag if unforeseen circumstances arise.</li> <li>• Having extra capacity (e.g. chemical toilets) to deploy.</li> <li>• Planning for vehicle breakdown.</li> <li>• Spill containment emergency response protocols</li> </ul>
<p><b>Waste consolidation:</b> If needed, specific locations are designated to consolidate waste from containers / bags into larger containers.</p>	<ul style="list-style-type: none"> <li>• Timelines for transfer to the treatment plant.</li> <li>• Specifications for the larger containers</li> <li>• PPE requirements during consolidation</li> </ul>
<p><b>Providing consumables:</b> Plans are made to dispose of greywater.</p>	<p>For instance: drying / bulking products; hygiene products; toilet paper; etc.</p>



ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<b>Toilets with chemicals:</b> Any additives should minimise smell and avoid negative effects for subsequent treatment and beneficiation. .	<ul style="list-style-type: none"> <li>• AMPS: chemicals must include a safety data sheet, be REACH 1907 certified, and be accepted by the target waste treatment plant.</li> <li>• AMPS: Use non-formaldehyde chemicals.</li> </ul>
<b>Dry toilets:</b> If providing urine-diverting dry toilets, urine has to be collected or disposed of safely, and an additive provided to dry excreta.	Urine disposal includes ground infiltration (if groundwater isn't used for drinking), or collection for safe disposal – see "Waste treatment and beneficiation" section.
<b>Drying / bulking additives:</b> For dry toilets, consumables are provided to reduce smell and dry excreta.	For instance, sawdust (good desiccant and odour elimination, depends on wood species), sugarcane bagasse, peanut shells, ash, charcoal dust – depending on what is available.
<b>Service quality assurance:</b> A monitoring and incentives/ sanctions system is in place to ensure collectors are performing as intended.	<ul style="list-style-type: none"> <li>• Phone / WhatsApp / USSD number visible on toilets and containers.</li> <li>• A set time for answer and a time for redress is agreed and monitored.</li> <li>• Avoid source consolidation (gathering and consolidating waste (faeces and urine) at their point of origin before they are collected and transported)</li> <li>• User &amp; servicing personnel attitude</li> <li>• Leaving the toilet clean after the servicing exercise.</li> </ul>
<b>In-home toilets:</b> Instructions are provided to users for access to containers.	<ul style="list-style-type: none"> <li>• Asking users to leave containers in a certain location.</li> <li>• Allowing access to dwelling or sheltered place.</li> </ul>
<b>Standalone toilets:</b> Instructions are provided to users to allow access to service personnel.	<ul style="list-style-type: none"> <li>• Spare key</li> <li>• Possible simultaneous emptying of waste bin – with instructions to dispose of sanitary waste.</li> </ul>
<b>Vehicle design &amp; maintenance:</b> Compliance with road regulations. Regular inspections and maintenance checks.	

## 5.3 Container cleaning

SAFE MINIMUM STANDARDS	BEST PRACTICE EXAMPLES
Containers or bags are cleaned before being returned to users.	<ul style="list-style-type: none"> <li>• Pressure washing</li> <li>• Soaking in chlorine solution</li> <li>• Sun drying</li> </ul>
Workers are issued with PPE and operate along agreed SOPs.	PPE includes PVC gloves, gumboots, aprons, masks with filters, face shields, disposable hats and gloves.
Trainings	Operators trained on the SOPs Trainings of any safety protocols involved
Maintenance of any machinery involved	

ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<b>Location:</b> The cleaning location does not cause nuisance to neighbouring communities.	<ul style="list-style-type: none"> <li>• Away from inhabited areas.</li> <li>• In shelter that minimises smells.</li> </ul>

## 5.4 Waste treatment and beneficiation

### Key sources of standards:

- [ISO 31800](#) – Faecal sludge treatment units
- [WHO guidelines for sanitation and health](#)
- [Guide Standard: Treated Faecal Sludge Compost for Non-food Applications, IAPMO – I TFSC – 01: 2022](#)

Note: the choice of pedestal will affect which treatment options are feasible, and the impact on existing treatment plants:

- Dry toilets will increase loading at conventional plants, and can clog inlets.
- Flushing toilets will input larger volumes.

Unless a dedicated plant is used, volumes and loading should be checked against operational factors at the chosen plant.

SAFE MINIMUM STANDARDS	BEST PRACTICE EXAMPLES
<p>Waste is either:</p> <ol style="list-style-type: none"> <li><b>1. disposed of safely</b> as per WHO guidelines, or</li> <li><b>2. treated in treatment plants</b> that comply with <a href="#">ISO 31800</a>, national guidelines and <a href="#">WHO guidelines for safely managed sanitation</a></li> </ol>	<ol style="list-style-type: none"> <li><b>1.</b> Disposal in covered trenches if no treatment option is accessible – see <a href="#">guidelines for deep row entrenchment and impact report</a>.</li> <li><b>2.</b> Treatment alongside other faecal sludge or wastewater in faecal sludge treatment plant or wastewater treatment, if the treatment plant can cope with the waste characteristics (especially increased BOD and pathogenic load) – see <a href="#">guide on co-treatment</a>.</li> <li><b>3.</b> Treatment in dedicated plant, accounting for waste characteristics.</li> <li><b>4.</b> Simple primary treatment through dewatering, e.g. unplanted drying beds.</li> </ol>

ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<p><b>Assessing potential:</b> An assessment should be done to determine the potential of waste beneficiation regarding:</p> <ul style="list-style-type: none"> <li>• Pathogen removal</li> <li>• Nutrient and energy recovery</li> <li>• Cost recovery</li> <li>• Energy consumption.</li> </ul>	<p>Evaluating the waste characteristics, market potential, revenue potential, acceptability and safety.</p> <p>Reference:</p> <ul style="list-style-type: none"> <li>• <a href="#">Faecal sludge and septage treatment guide</a></li> <li>• <a href="#">Guide to Sanitation Resource Recovery Products &amp; Technologies</a></li> <li>• <a href="#">REVAMP tool</a> to evaluate value from waste</li> </ul>
<p>Refer to existing and draft standards for treatment and use of by-products.</p>	<p>Land application of biosolids: <a href="#">ISO 19698</a></p> <p>Solid biofuels: <a href="#">ISO 18125</a> and <a href="#">ISO 16948</a></p> <p>Biogas production: ISO 23898 (gasification system) and ISO 19388 (operation of anaerobic digestion facilities) – both under development</p> <p>Pyrolysis, incineration: <a href="#">ISO 20736</a></p> <p>Liquid fertiliser from urine – no standard yet.</p>

Because CBS toilets can keep the waste streams separate and minimise liquid content (depending on toilets and processes used), the resulting waste can be appropriate to produce a range of by-products.

These can include:

- Animal protein (through Black Soldier Fly larvae treatment).
- Composting, co-composting (with organic waste) and vermicomposting.
- Biochar through pyrolysis.
- Fuel briquettes.
- Biogas (if waste has a higher liquid content)
- Liquid fertiliser from urine.



**Key sources of standards:**

- [WRC report: Understanding and addressing the exposure of workers, the public and the environment to pathogens during pit emptying](#)
- [WHO guidelines for sanitation and health](#)
- ISO 4500 – OHS

SAFE MINIMUM STANDARDS	BEST PRACTICE EXAMPLES
<p><b>Health and Safety:</b> Sanitation workers’ safety needs to be ensured through personal protective equipment, vaccination, access to deworming.</p>	<p><a href="#">Occupational Health and Safety Act</a></p>
<p><b>Safety protocols are developed for key areas:</b></p> <ul style="list-style-type: none"> <li>• Staff medical protection</li> <li>• Health and safety monitoring</li> <li>• Container servicing</li> <li>• Waste processing</li> <li>• Emergency spillages</li> <li>• Reuse product safety protocol</li> <li>• General safety protocols</li> </ul>	<p>Protocols typically include:</p> <ul style="list-style-type: none"> <li>• Medical protection plans: staff training, vaccinations, health checks.</li> <li>• Health and safety monitoring plan: spot checks, incident reporting, investigations.</li> <li>• Container servicing: describing the processes and quality level expected.</li> <li>• Waste processing: biohazard zones, waste transfer, cleaning, PPE.</li> <li>• Emergency spillage protocol: manage spillages of dangerous materials including excreta.</li> <li>• Reuse product safety protocol: handling of materials, quality control, operating machinery, equipment maintenance.</li> <li>• General safety protocols: lifting, driving, handling excreta, operating machinery.</li> </ul>
<p><b>Staff is trained</b> on health and safety and SOPs</p>	

ASPIRATIONAL STANDARDS	BEST PRACTICE EXAMPLES
<p>The workforce enjoys a decent employment, that does not attract shame and brings pride.</p>	<p>Use of branding and positive messages. Washing facilities. Incentives and motivations for good user service.</p>



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For more information and support contact:  
**GreenCape:** [info@greencape.co.za](mailto:info@greencape.co.za) | (021) 811 0250  
**Container Based Sanitation Alliance:** [contact@cbsa\\_global](mailto:contact@cbsa_global)