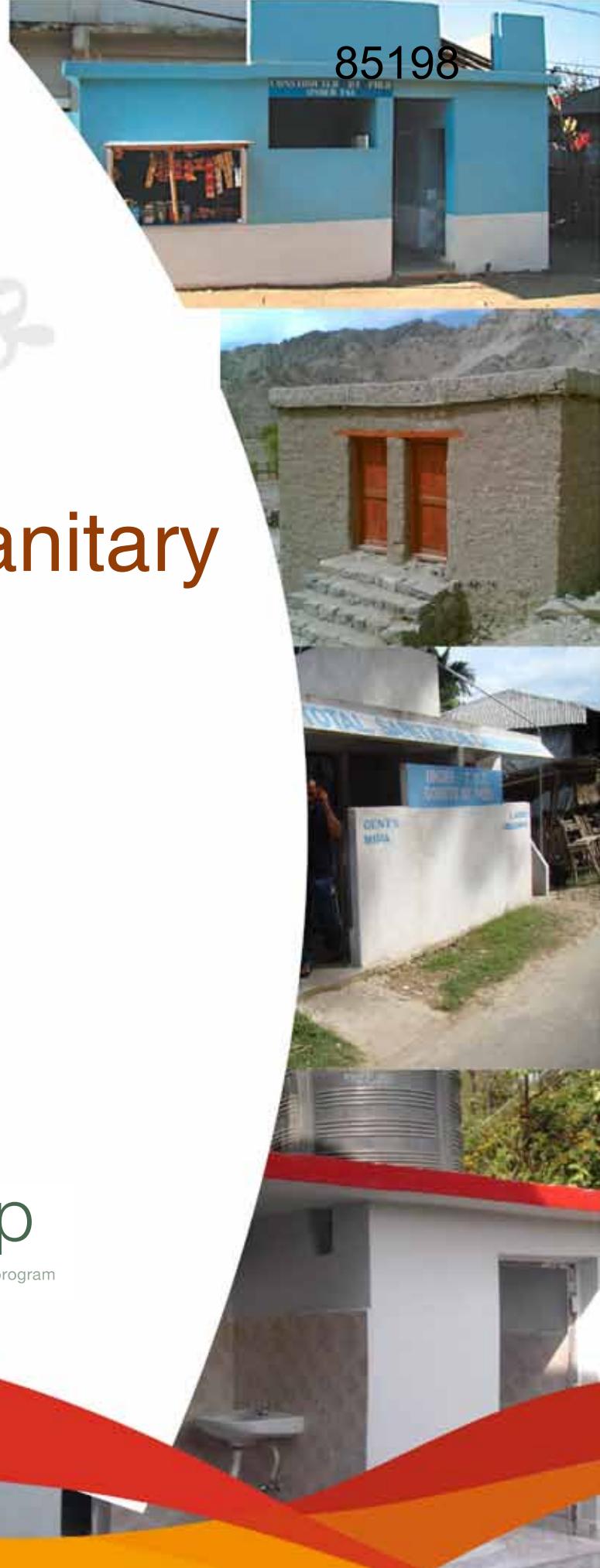




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Establishment and
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**Community Sanitary
Complexes**
in Rural Areas

A HANDBOOK

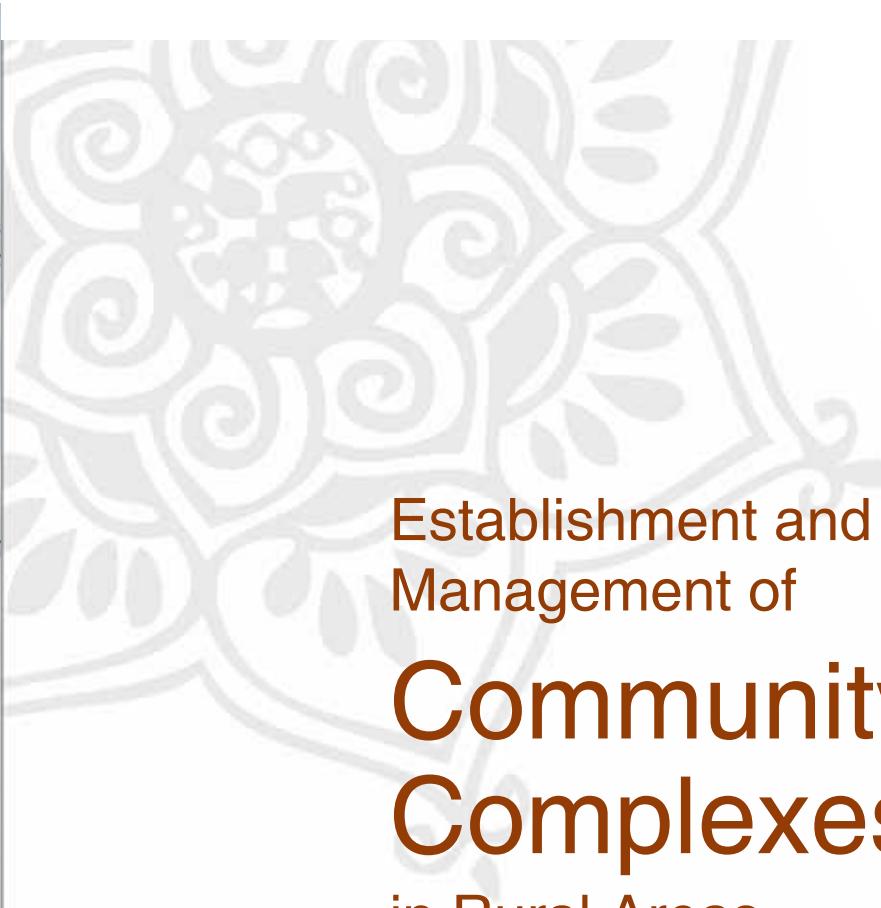


TOTAL SANITATION CAMPAIGN (TSC)

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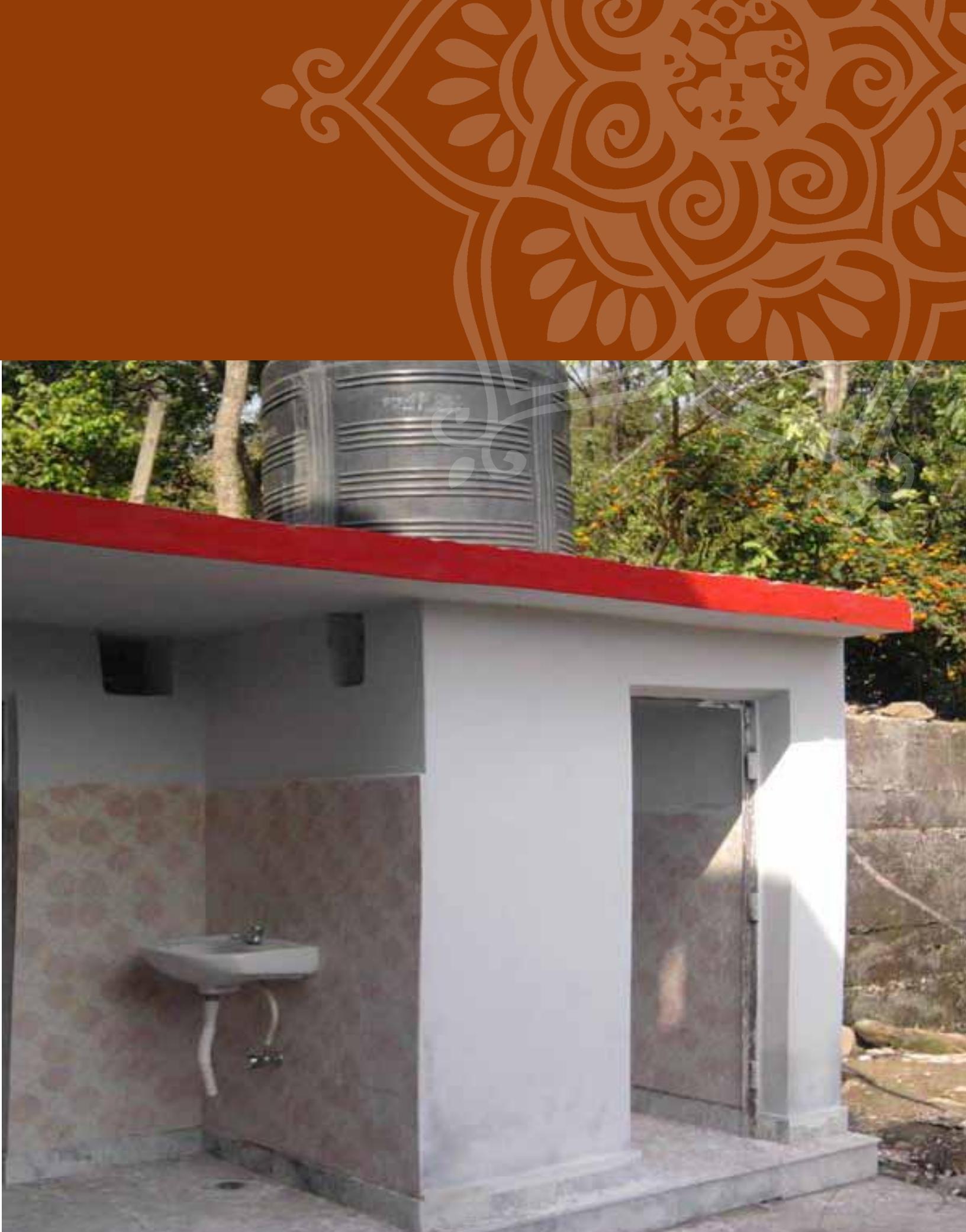


Establishment and
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**Community Sanitary
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in Rural Areas

A HANDBOOK

Department of Drinking Water and Sanitation,
Ministry of Rural Development, Government of India, New Delhi

Water and Sanitation Program (WSP)



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Acronyms and Abbreviations

ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
BCC	Behaviour Change Communication
BPL	Below the Poverty Line
BRGF	Backward Region Grant Fund
CBO	Community Based Organisation
DDWS	Department of Drinking Water and Sanitation
DEWATS	Decentralised Wastewater Treatment System
ECOSAN	Ecological Sanitation
FGD	Focused Group Discussion
GI	Galvanised Iron
IEC	Information Education and Communication
IHHL	Individual Household Latrine
LPG	Liquefied Petroleum Gas
m3	cubic metre
mm	millimetre
NGO	Non-governmental Organisation
NGP	Nirmal Gram Puraskar
NREGS	National Rural Employment Guarantee Scheme
O&M	Operation and Maintenance
PC	Production Centre
PPP	Public Private Partnership
PRI	Panchayati Raj Institution
PVC	Polyvinyl Chloride
RCC	Reinforced Cement Concrete
RSM	Rural Sanitary Mart
SHG	Self Help Group
SSHE	School Sanitation and Hygiene Education
TSC	Total Sanitation Campaign
VIP	Ventilated Improved Pit
WSP	Water and Sanitation Program



**Government of India
Ministry of Rural Development
Department of Drinking Water and Sanitation**

**ARUN KUMAR MISRA
SECRETARY**



Foreword

India remains one of the countries wherein a lot of efforts are still required to eliminate the practice of open defecation. In rural areas, open defecation though reduced in scale continues to be a socially and culturally accepted traditional behavior largely. Low awareness of the potential health and economic benefits of better sanitation and hygiene practices, perception of high costs of having a toilet, the perceived convenience of open defecation are some of the other bottlenecks towards achievement of the goal of Open Defecation Free India. Lack of priority to safe confinement and disposal of human excreta poses significant health risks manifest in the sanitation challenge facing the nation today.

However, the Total Sanitation Campaign (TSC) launched by Government of India in 1999 has gone a long way in achieving and sustaining the status of open defecation free Gram Panchayats in rural India and ensuring healthy and hygienic environment. The vigorous efforts made under this Campaign have helped to achieve rural sanitation coverage to an estimated 70 per cent as of March 2011. The campaign has proved to be one of the most effective programme for its focus on **community-led, demand driven approach**, making long term positive impact on the health profiles and quality of lives of millions of rural people. The campaign has developed strategic components to ensure full coverage of sanitation through financial and programmatic support in software and hardware component of household, school, anganwadi and community sanitation.

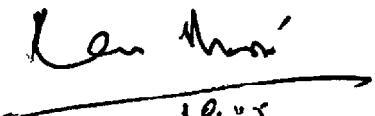
Foreword

The provision of providing sanitation facilities through public toilet complexes is the most suitable option for those who cannot afford individual toilets for monetary reasons or due to lack of space and go for open defecation. Such complexes are useful and valuable option at public places, markets, taxi stands etc. where large congregation of people takes place. The Community Sanitary Complex (CSCs) fosters the cognitive development of healthy sanitation practices in the community. The TSC recognizes Community Sanitary Complexes as one of the options to reduce open defecation and has provision of a maximum unit cost of 2 lakh for construction of CSC, where the sharing pattern amongst Central Government, State Government and the community is in the ratio of 60:30:10. However besides financial resources, technical and management advice are also required for effective construction and maintenance of Community Sanitary Complexes. This is important because lack of adequate knowledge for construction, operation and maintenance, may render such facilities unusable and non-functional.

The Department of Drinking Water and Sanitation has been continuously updating technical notes on rural sanitation to reinforce the quality of interventions. The Handbook on '**Establishment and Management of Community Sanitary Complexes in Rural Areas**' gives very useful insight on the planning, construction, operation and maintenance of sanitary toilet complexes in a sustainable way. The manual is intended primarily for programme implementers to help them understand the critical need for Community Sanitary Complexes and inform them of the guiding principles to be adopted while planning for CSCs. The scope of this document has been made comprehensive by including several aspects like safe disposal or reuse of human waste from toilet complexes and extensive guidance on different options for toilet designs with indicative costs. The manual encompasses both technological and management aspects of CSCs and will be of specific interest to Gram Panchayat representatives, village level motivators and village level sanitation committees etc. who are entrusted with the responsibility for planning for sanitation facilities at the village level.

This is a result of excellent term work and synergy of contributions from professionals who have worked tirelessly in developing this technical note, ably assisted by WSP-SA. I wish to place on record our deep appreciation of this effort and hope that this document will be immensely useful as a Reference Manual.

Place: New Delhi
Date: 18th May 2011



18.05
(Arun Kumar Misra)

Sustainable Drinking Water and Sanitation for all – 2012

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RURAL SANITARY COMPLEX

AT SUA No.1 PYT. MALPUR BLOCK BHALWAL
UNDER T.S.C. FOR THE YEAR 2009-10.



1. About the Handbook

1.1 What is this Handbook About and Why is it Needed?

The Total Sanitation Campaign (TSC) of the Government of India places high priority on achieving and sustaining the status of open defecation free Gram Panchayats (local governments) in rural areas. The TSC advocates for collective behaviour change through mobilisation of communities to end the practice of open defecation. While the Individual Household Latrine (IHHL) is a major component of the TSC, the aspect of public or community sanitation also assumes greater importance because, in some cases, an IHHL may not be feasible (for example, lack of space for toilet construction), or in situations with a high percentage of floating population (for example, at markets, temples or seasonal fairs). In such cases, a public toilet complex is the best option.

Gram Panchayats often lack adequate knowledge and funds for the construction of public toilet facilities. Even in cases where public toilets have been constructed, the Panchayats face problems in the operation and maintenance (O&M) of these facilities. As a result, these public toilet complexes can fall into disrepair or become unhygienic, and people opt for open defecation instead of using them. This handbook aims to help the Gram Panchayats by providing them more information on how to plan, construct, operate and maintain sanitary toilet complexes.

1.2 Who is it For?

This handbook will serve as resource material for planning, construction, and O&M of public

sanitary toilet complexes in rural areas. It will provide information on different options for toilet designs with indicative costs. The Handbook is of specific interest to Gram Panchayat representatives and village-level motivators, village health societies, village sanitation committees, etc., who are entrusted with the responsibility for planning sanitation facilities at the village level.

The handbook may also be useful for district and state functionaries involved in the implementation of the TSC. It may also be of interest to other professionals and entrepreneurs working in the field of rural sanitation.

1.3 How is the Handbook Structured?

The handbook is structured as follows:

Part 2: Introduction

This section highlights the importance of sanitation in the rural context, the means to achieve total sanitation with the help of TSC, and the key challenges currently being faced in villages to achieve total sanitation.

Part 3: Sanitary Toilet Complexes

This section explains why villages require sanitary toilet complexes, the difference between community and public toilets, and the problems and prospects of sanitary toilet complexes in rural areas.

Part 4: Planning for Sanitary Toilet Complexes

This section lists and explains the key steps involved in planning for construction, and O&M of sanitary toilet complexes.

The Manual on Technology Options for Household Toilets prepared by Ministry of Rural Development, Department of Drinking Water Supply (DDWS) and UNICEF (http://ddws.nic.in/Household_Sanitation_Technical_Options.pdf)

Part 5: Operation and Maintenance Arrangements

This section addresses the most crucial aspect of sanitary toilet complexes, i.e., sustainable O&M arrangements.

Part 6: Technical Designs for Sanitary Toilet Complexes

This section provides **indicative** designs, drawings, and costs of different units of sanitary toilet complexes with different options for safe disposal systems of waste water.

In this document, the following definitions for community or public toilet are used:

Community toilet: A community toilet is a facility which is built when there is no required space or funds available for constructing IHHLs. It is used, owned and maintained by community members or local governments.

Public toilet: A public toilet is a facility which is built for the use of a floating population such as migrant workers, visitors, and tourists, etc., who visit the village area frequently because of its commercial, religious or tourist attractions.

1.4 Related Documents

For information on other topics related to this Handbook, it might be useful to consult the following documents:

2. Introduction

2.1 Importance of Sanitation in Rural Areas

Sanitation is a broad term which includes safe disposal of human waste, waste-water and solid waste, domestic and personal hygiene, food hygiene, etc. Safe disposal of human waste is the most important aspect of sanitation. In a developing country, over 80 percent diseases are caused due to infections transmitted through direct or indirect routes from human waste.

The immediate benefits of improved sanitation in rural areas include:

- Dignity and social status;
- Privacy and safety;
- Convenience and comfort;
- For women and girls, avoidance of sexual harassment and assault; and
- Less embarrassment with visitors in homes.

Most importantly, the medium- and long-term impacts of sanitation include:

- Improved health;
- Decrease in mortality and morbidity;
- Improved water quality;
- Improved productivity;
- Decrease in incidence of drop-out in school, particularly girl students, and hence improved literacy; and
- Poverty alleviation.

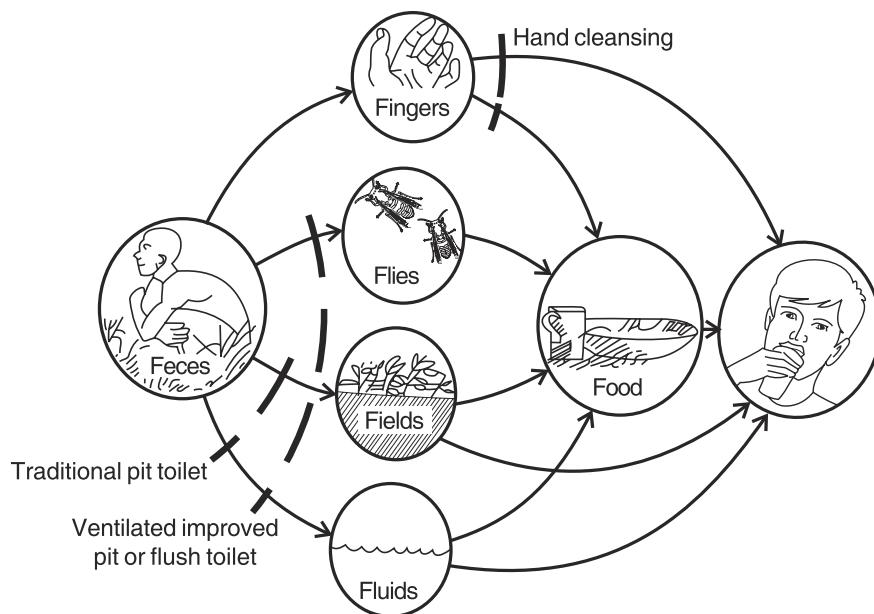
Open defecation is still practiced in many rural areas, resulting in serious social, health and economic problems. Human waste left in the open helps in breeding and transmission of

pathogens which carry disease and infection. Human waste contain a spectrum of pathogens, and over 50 types of different infections are transmitted through direct or indirect routes from such waste. Also, in villages, people generally defecate near the source of water, which contaminates water bodies resulting in even greater infection through use of that water for various purposes such as drinking, cooking, bathing, washing. The health consequences of such actions are clearly visible amongst villagers in the form of high and repeated cases of illness, especially diarrhoeal diseases, which lead to loss of working days affecting the earning potential of the affected person and thus the economic productivity of the village as a whole. Figure 1 illustrates various route of transmission of infections from open defecation.

The problem is most acute for children, women and young girls. Children, especially those under five, are most prone to diarrhoea which can sometimes prove fatal. The effect of a child falling ill in early life is visible later in the form of inadequate physical and cognitive development. Loss of school days is another problem in times of illness.

In the case of women, lack of sanitation facilities often forces them to restrict themselves by reducing and controlling their diet, which leads to nutritional and health impacts. As they have restricted mobility in many cultures, it further reduces access to facilities or open defecation areas distant from home. Women, especially adolescent girls, face risks of sexual assault when they are looking for privacy to defecate. This risk is also increased in the absence of

Figure 1: Transmission routes of infection



Source: Participatory Hygiene and Sanitation Transformation Manual (PHAST) 1998, after Wagner and Lanoix 1958.

Wood S, Sawyer R and Simpson-Hubert M. 1998. PHAST Step-by-Step Guide: A Participatory Approach for the Control of Diarrheal Disease. Geneva: World Health Organization.

sex-separated facilities, particularly in schools. Moreover, during puberty, menstrual hygiene is affected in the absence of proper sanitation facilities which may result in serious reproductive problems at a later age.

Apart from the health and economic disadvantages of open defecation, the aesthetic environment of the village is also affected by foul smells and dirty pathways. Thus, access to proper sanitation facilities is of the utmost importance in a village to overcome the ill-effects of open defecation.

In India, over 72 percent of the population live in rural areas. The status of sanitation coverage in rural villages has improved considerably during the last few years (from 22 percent in 2001 to 71 percent in 2011 as per the online monitoring of DDWS). However, concerted effort is required for further sustainable sanitation coverage leading

to improved health and productivity. Attaining full sanitation coverage in rural areas is more challenging due to the fact that people from various socio-cultural and economic groups live together while having quite different levels of awareness and motivation. Often, socio-cultural aspects of sanitation are more challenging to overcome than techno-economic aspects.

It is an accepted fact that, directly and indirectly, the impact of poor sanitation is much higher on the poor. Most of those earning on a daily wage basis lose out on income in the case of illness due to poor sanitation. Further, other members of the family who look after the sick also lose their daily earnings or schooling (in the case of children). In most rural areas, health facilities are rarely available in the vicinity, forcing people to take the advice of a private doctor (doctors or quacks) who charge very high fees, leading to higher economic losses.

2.2 Total Sanitation Campaign and its Key Provisions

TSC is the flagship programme of the Government of India for rural sanitation. TSC supports village communities in ending open defecation in their areas and achieving total sanitation, to enhance social dignity and privacy, and ensure a hygienic and healthy living environment. The creation of demand for sanitation among people through Behaviour Change Communication (BCC) and supporting them with information on technological options to construct and use safe sanitation facilities is the prime objective of the TSC.

TSC works on the principle of 'low to no subsidy' where nominal support in the form of an incentive is given to households living Below the Poverty Line (BPL) as reward for construction and usage of toilets. However, the main focus of the programme is to create sustainable behaviour change among the people, through capacity building and motivation to build IHHLs.

In cases where IHHLs cannot be built due to lack of space or financial resources or both, a community toilet is the only option to improve sanitation. TSC also extends financial support for the construction of community toilets or public toilets for floating population. It also supports management of solid and liquid waste, and school and aganwadi sanitation. Hygiene education to form healthy habits among children is also promoted in schools and aganwadis. For further details on TSC and its guidelines refer to <http://ddws.nic.in/popups/TSC%20>

Guideline%20Oct07.pdf. A short summary is also presented in Annex 1.

2.3 Key Challenges in Achieving Total Sanitation in Rural Areas

The most important challenge for effective implementation of the sanitation programme in rural areas is that most rural populations are poorly informed or not overtly aware of the linkage between sanitation and health. To meet this challenge, creating awareness and understanding which will lead to the desire to access a toilet and use it is important. The best option for access is through the construction of a latrine by the household, which is owned, operated and maintained for its own use and benefit. These individual toilets can be built through various low or high cost technological options to suit the household's means.

However, in villages, for some households, affording a low-cost toilet option may be a problem, even with external incentives/subsidies available for construction and usage. Or, in other instances, availability of the required space may be a problem; in some cases, there may be issues related to ownership of land (example, with migrant labour). In all these instances, the provision of a community toilet may be the only option. In certain villages, there may be a heavy rush of floating population, that is, people who do not live in the village but visit it for various reasons such as religion, tourism, commerce, etc. In these locations, public toilets are required to meet the needs of these people who visit for a short duration.

Box 1:

Some Important Points to be considered before Implementing Sanitary Toilet Complexes in Rural Areas

- They are expensive to build; sometimes the cost can run into lakhs of rupees depending on the number of toilet seats!
- O&M of these facilities is often a challenge and need to be planned properly upfront and thereafter monitored regularly. Since it is a public property, users fail to maintain it with the same care as with individual toilets. Therefore, at the implementation stage, active involvement of the community to undertake maintenance should be assured.
- These facilities need to be maintained – there should be some person or institution responsible for its maintenance; this caretaker who will maintain the facility needs to be paid. In addition, the maintenance of the facility involves other costs, like water, cleaning material, etc., all of which will incur regular costs.
- Also, someone should monitor the maintenance regularly. This system has to be put in place by creating awareness and motivation among the local communities, to inculcate the habit of use and ownership of the toilet complex by the community.

So community or public toilets should be constructed only when all other options such as individual or shared toilets are not possible.

3. Sanitary Toilet Complexes

3.1 Definition

A sanitary toilet complex is an infrastructure for the use of the community and/or floating population. A sanitary toilet complex takes care of safe disposal/reuse of human waste in addition to the objective of providing a toilet facility that enhances privacy and dignity. Depending on the nature of ownership, O&M sanitary toilet complex may be categorised as either community toilet or public toilet. The design aspect remains the same in both cases. The number of toilet seats in both cases depends upon the expected number of users per day. Facilities for bathing and washing may also be provided in addition to toilets.

Community toilet:

A community toilet is a facility which is built when there is no space available or constraints in financial capacity available for constructing an IHHL. It is used, owned and maintained by community members. It is mostly located within the community, where people reside.

A community toilet may also have other utilities such as a bathing facility or a place for washing clothes, depending upon the needs of the community.

Public toilet:

A public toilet is a facility which is built for the use of the floating population such as migrant workers, visitors, and tourists, etc., who visit the village area frequently because of its commercial, religious or tourist attraction. Public toilets may be owned by the Gram Panchayats, private

trusts, Non-governmental Organisations (NGOs), Community Based Organisations (CBOs), Self Help Groups (SHGs), youth clubs, or even private entrepreneurs, who ensure proper O&M of the system. They are not necessarily located within the habitation, but close to the area where the floating population gathers.

Problems and Prospects of Implementing Sanitary Toilet Complexes in Rural Villages

Sometimes, a sanitary toilet complex is a useful way to completely end the practice of open defecation in the village. While community toilets act as a medium to help families who cannot otherwise have an IHHL, public toilets address the needs of the floating population. Overall, sanitary toilet complexes help in ensuring social dignity and privacy, and maintaining the health status of the village.

However, O&M of community or public toilets could become a problem as these facilities are not owned by the users but used by many. Because of a diffused sense of ownership, often no one is willing to take responsibility for maintenance nor can people be held accountable for ensuring the hygienic O&M of the facility.

In the case of community toilets, the number of users may be low on a daily basis, due to which the cost of maintaining the facility may end up being high. Lack of adequate income of the Gram Panchayats makes it difficult to provide sufficient funds for maintenance. Also, in rural areas, there may be socio-cultural issues in the use of community toilets because

of caste and class distinctions. Therefore, while providing community toilets, this aspect of rural life needs to be considered to ensure that, after construction, all intended users are using the facility and there are no conflicts.

In the case of public toilets, because the visitors use the facility for a short time before leaving the area, they are not motivated to take the responsibility of maintaining the toilets, nor is it practical to leave the maintenance to them. Their behaviour towards toilet use and hygiene practices also varies widely, so the extent of maintenance and costs at the time of use can be high.

Given the above issues in O&M of community and public toilets, it is necessary to ensure ways and means for O&M at the planning stage at planning stage before the facilities are designed or constructed, which has to be done in consultation within the community. The arrangements finally undertaken should have adequate provisions for supporting the marginalized communities in the village such as women, the poor, etc. Some options for sustainable O&M of sanitary toilet complexes have been described in the relevant chapter.

4. Planning for Sanitary Toilet Complexes

4.1 Key Steps Involved in Planning of Sanitary Toilet Complexes

The Gram Panchayat should plan for the facility; this would include the location, number of seats for toilets and urinals and other facilities needed such as hand washing facilities, washing and bathing facilities, number of water storage facilities, supply and source of water, and the technology to be used in building the sanitary toilet complex. For effective decision making, basic information is required to install and operate a toilet complex.

4.1.1 Community Toilets

Step 1: Collecting general information

In the case of community toilets, the following general information should be collected:

- Number of households without individual toilet facilities in the village and the probable number of users for a sanitary toilet complex;
- Age profile of the users – the number of children and the elderly;
- Convenient distance from the users' houses – it should not be too far from their houses (otherwise they may prefer open defecation over using community toilets);
- Selection of a suitable site for the sanitary toilet complex is perhaps the most challenging aspect in a village. Such land is usually not available within the targeted community. Sometimes the Gram Panchayat or local landlords may have unused space available to construct the toilet complex. The Gram

Panchayat and community should approach such landlords to persuade them to provide space for a Sanitary Toilet Complex. The sanitary toilet complex; and

- Any socio-cultural issues between households in terms of caste and class in the use of common toilets.

An illustrative template on the kind of information required is provided in Annex2.

The process for collecting information can begin in the following manner:

- The Gram Panchayat should hold a village-level sensitisation meeting with prospective users and other stakeholders such as the Accredited Social Health Activist (ASHA), Anganwadi workers, Auxiliary Nurse Midwife (ANM), school teachers, etc., who can educate the community as to the health benefits of ending open defecation. Women's groups, local masons, NGOs, if any, etc., should also be involved in the discussion on the necessity of a sanitary toilet complex;
- The Gram Panchayat, with the help of various Panchayati Raj Institution (PRI) functionaries, SHGs or a local NGO, can carry out a village level survey regarding households without IHHLs, willingness of people to have toilets, and potential land in the village to construct a sanitary toilet complex; and
- The Gram Panchayat can identify and assign leaders/volunteers from the community to motivate people to use toilets and involve themselves in the process of creating an open defecation free village.

Step 2: Involving the villagers in decision making for building community toilets

After collecting general information, it would be important to involve the village community in planning to ensure that any infrastructure created meets their needs. When the toilet meets their needs, they would be amenable and willing to use and maintain it. The Gram Panchayat should understand and discuss points detailed in Table 1.

All these issues should be addressed and an amicable decision by the community should be arrived at. The key advantages of involving the community are:

- All doubts in the mind of the villagers with regard to the project are clarified and answered to avoid any resistance at a later stage;

- The toilets are constructed, based on the feedback and suggestions of the villagers and as per their requirements and needs for convenient everyday use; and
- The resources already available with the villagers can also be used such as a patch of land, unskilled construction labour, local expertise of masons and plumbers, small savings, etc., which will help in reducing cost.
- Some tools that can be used by the Gram Panchayat to involve the villagers in the planning process and help find answers to the questions posed in Table 1 are:
- **Identifying stakeholders.** A stakeholder is anyone who is involved with the project in any form. Identified stakeholders can be prioritised based on their importance to the project and, accordingly, roles and responsibilities can be assigned to them (Annex 3);
- **Drawing a participatory village map:** Using chalk or colour powder (rangoli) on ground or

Table 1: Points to be discussed with the community

Key Questions	Tools
Do the villagers agree that building a community toilet is the best option? If yes..... - Where should the facility be located? - How many seats should the toilets have? - What technology are they most comfortable using?	Drawing a village map; Focused Group Discussions (FGDs); short listing technology options
Who would be the key beneficiaries of community toilets?	Identifying stakeholders
Do the beneficiaries have any specific socio-cultural issues in sharing a toilet facility?	FGDs, individual interviews, voting
How will the project costs be funded – capital and maintenance?	FGDs
Who will be responsible for operating and maintaining the community toilet?	Identifying stakeholders, FGDs
In what ways can the villagers contribute in project implementation?	Identifying stakeholders, drawing a village map, FGDs

- on chart papers, a rough map of the village can be drawn through people's participation; this map can mark the house locations, free spaces, sites for open defecation, water bodies, etc. This will help in identify possible locations for constructing a toilet, depending on the density of the targeted population, free spaces available for the toilet complex, etc. A picture in the form of a map will help in wider thinking and finding of new ideas and options;
- **Group discussions:** Information on specific toilet needs and preferences can be gathered through group discussions with different sets of beneficiaries such as women, the elderly, village leaders, etc.;
 - **Individual interviews:** The views of marginal groups like the poor, women, besides views of others, can be understood through individual interviews. Certain sensitive topics such as problems faced by women due to open defecation, in maintaining menstrual hygiene and health, etc. due to the non-availability of toilet and bathing facilities, can be discussed through personal interviews. These interviews can help identify the demands of the users, such as provision of bathing chambers, disposal system for sanitary napkins, etc. These are often very important to ensure that the users, especially women in the community are comfortable and motivated to use and maintain the community toilet;
 - **Voting:** Often, a particular suggestion given by a community member, say for the location of the community toilet, may not be acceptable to others. In such cases, a secret vote by the targeted beneficiaries can be taken before finalising the decision. This is especially useful to give a voice to the poor who are often marginalised. However, voting should be considered as a last option; the preferred option should be to forge consensus among all; and
 - **Short listing technology options:** The choice of technology for the toilet should be

easy and cost effective to ensure appropriate O&M in the future. The technology should be selected taking into account the socio-cultural aspect of the community. The technology should also be such that the people are comfortable to use it and do not feel conscious. The choice of technology should be discussed with the people. It may be easier for people to understand the technology, if it can be explained to them with the help of pictures. They can then rank their technology choice and make a final decision on the preferred technology.

4.1.2 Public Toilets

Step 1: Collecting general information

In the case of a public toilet, the following general information should be collected in the planning phase:

- Finding locations such as market places/ shopping areas / religious sites where people need toilets.
- Making a list of the number of occasions in a week/month/year and the approximate number of days when a large number of people generally visit the village;
- Estimating the approximate number of people visiting the village during these events or days.

This information will be useful in deciding whether the Gram Panchayat should spend money on constructing the facility or not; if yes, then how many toilet seats should be made; which technology should be used; which construction material should be used, etc. A public toilet is not used only by the floating population; it is regularly used by people living in its vicinity also. Therefore, such a toilet complex is always in use, however, the number of visitors is higher during events.

Box 2:

CASE STUDY: Community Involvement in Planning, Implementation and Maintenance of Village Sanitary Infrastructure

Dhamner village in Satara district of Maharashtra is an example of community involvement in total sanitation and waste water management. The village has 550 residential houses spread over a main village and three hamlets. In the year 2000, residents of Dhamner came together under a dynamic leader and decided to undertake measures to manage individual and community waste water with the goal of a cleaner and healthier village. Government functionaries acted as facilitators while villagers were encouraged to decide take a decision on and set up sanitation facilities at their own expense. Dhamner residents were thus motivated for towards overall development of the village which has resulted in total sanitation coverage of the village as well as an efficient and low-cost system of waste management.

At the Gram Sabha, villagers of Dhamner decided to take measures to hygienically and productively manage sullage. It was decided to construct partially-covered roadside drains and use Reinforced Cement Concrete (RCC) pipes where necessary. It was made mandatory for each house to connect their its domestic waste water to the community drain. A chamber was provided between the house and the main drain, and a grid placed at each opening between the main drain and a household connection to stop materials like such as paper and plastics from entering the drainage system. The sullage is collected at four low-lying points. The stabilized effluent has been utilized for to water a children's park and playground, and developing horticultural gardens and orchards.

Individual connections to the drains are maintained by the families and the community drainage system by the Gram Panchayat. For the last four years, the Gram Panchayat has not needed to spend any money for on maintenance. The park and horticultural gardens are maintained by women's self help groups SHGs and a youth club.

For the initial construction of the system, the total capital expenditure was Rs. 9,46,000. A part of this was raised from contributions and voluntary labor by the local people. A major share was provided from the Rajya Sabha member's discretionary fund. The village Panchayat is expecting earnings from the sale of the produce of the orchards as well.

Dhamner is an example of what can be achieved when there is community involvement, collective efforts and dynamic leadership with the government acting as a facilitator. The technology used is low-cost, easily manageable and environment-friendly. In recognition of its achievements, Dhamner village Panchayat received the Nirmal Gram Puraskar, a national award for clean environment, in 2005.

Edited Abstract abstract from Dr. S.V. Mapuskar's Case Study: Community involvement makes waste water management a success story in a Maharashtra village, India Infrastructure Report 2007.

Step 2: Involving key stakeholders in decision making for implementing public toilets

The Gram Panchayat should make decisions related to the location, size, technology, operation, maintenance and implementation costs in consultation with the relevant stakeholders such as traders, temple authorities, tourist boards, etc. FGDs can be organised with

the relevant people to discuss their views on building a public toilet.

4.2 Construction of a Sanitary Toilet Complex

Once the Gram Panchayat decides that a community or public toilet has to be constructed, the work starts on drawing out a detailed plan

for the construction and O&M of the toilet. The technology options, costs, institutional arrangements, etc., are decided. In doing this, help may be sought from specific field experts from outside such as engineers, finance specialists, institutional experts, etc. All these processes have to be undertaken by the GP, in consultation with the community and with support from the outside experts. The key processes would include:

- Technology analysis;
- Cost analysis;
- Setting up arrangements for O&M;
- Provision of water for the toilet and bath;
- Construction of facilities, including financial management;
- Operation and maintenance, including financial management, and
- Finding suitable cost recovery mechanisms, possibly including advertisement agencies to use the walls of the public toilet for advertisement of products useful for villagers in order to make the system economically sustainable.

4.2.1 Technology Analysis

The objective of this stage is to take forward the discussion started during the time of community involvement to short list technology options for the disposal of human waste from public toilets. Two or three options can be assessed in detail to find the most suitable technology.

Each technology option should be assessed against a set of parameters covering technical assessments, costs assessments, O&M, ease of use and environmental sustainability. Table 2 provides a technology assessment template and lists the key questions to be answered for each parameter.

Inclusion of Additional Facilities

The village residents, especially women and adolescent girls, lack privacy for bathing. Thus while deciding the technology and design of the toilet complex, the options of bathrooms and washing areas could also be included; provisions for menstrual management may also be considered. This will increase the utility of the toilet complex and attract more users which will lead to an increase in the income potential of the complex.

Provision of Water

Provision of water in a sanitary toilet complex is an important aspect of operation and maintenance of the facility. Water is needed round the clock for the sanitary toilet complex to operate and be maintained properly. In most villages, adequate water supply may not be often available. Choice of technology which does not use water or use limited water may be considered in the design phase in such villages. A hand pump is one of the most suitable options if the installation of piped water supply is not possible. Alternative approaches, such as a forced lift hand pump, could also be considered.

4.2.2 Cost Analysis

4.2.2.1 Types of costs

After short listing technology options, it is advisable to estimate the cost of each option. This can be done by breaking down the costs into two stages, which correspond to two types of costs:

- i. Costs incurred in construction and operationalising the toilet, that is, capital cost; and
- ii. Costs incurred after the toilet is opened for use by the public that is O&M costs.

Table 2: Template for technology assessment

Assessment Parameter	Key Questions	Technology 1	Technology 2	Technology 3
Technical	<ul style="list-style-type: none"> Is the required water supply available for this technology to work? Is the soil type suitable, e.g., for operation of soak ways under this technology? Is there enough space/transport available for ensuring disposal/removal of sludge? Does this safeguard human and environmental health? Is the technology socio-culturally acceptable to the community 			
Financial	<ul style="list-style-type: none"> What is the capital cost? What are the sources of funding for this? What is the O&M cost? Is there any revenue generating potential from this technology like biogas production, composting, etc? 			
Operation and Maintenance	<ul style="list-style-type: none"> Will this technology be easy to operate and maintain, given the local expertise of masons? Will this technology be comfortable to use for different sets of users like women, children, and the elderly? Will this technology help in diversifying the use of the community toilet with additional facilities like bathing chambers for women, etc? Will this technology offer easy maintenance on a day- to-day basis for the users? Will the O&M cost of this technology be viable enough? Can these costs be raised from the users/other sources? 			
Environmental	<ul style="list-style-type: none"> What would be the effect of this technology on the general environment of the village with regards to soil, groundwater, foul smell, etc? 			

Box 3: Types of Cost

Capital costs are the expenses, which are incurred only once to make the facility operational and ready for use such as land, construction labour and materials, construction supervision, etc.

Operating costs mean the expenses incurred in running of the facility on a daily basis such as cleaning, cost of water and soap, etc.

Maintenance costs refer to the costs needed to keep the technology in proper working condition such as repair works, pipe and drain cleaning, etc.

Capital costs

Capital costs are the expenses which are incurred only once to make the facility operational and ready for use. The key capital costs are categorised below:

- **Land:** In the case of community or public toilets, generally the land is provided by the Gram Panchayat when available. In some cases, it may also come from rich landowners or the community at large. In any case, the land value must be estimated and included as part of the capital costs of the project under the heading “donation” or “people’s participation”.
- **Labour:** The project would require skilled and unskilled labour. Generally, an outside agency would be hired for construction, supervision and management which would be responsible for bringing in skilled labour. Often, the community often contributes in kind by providing unskilled labour which must be included in the overall labour cost at market prices under the head ‘community participation’;
- **Materials and equipment:** The cost of construction material such as cement, sand, gravel, bricks, steel, etc., can be accounted for as per purchase. The cost of equipment and sanitary fittings would depend on the type of technology used and can be added at market value; and
- **Project management and promotion:** This would involve a variety of other costs such as:
 - Costs incurred by the Gram Panchayat on community engagement in the initial stages to involve them in decision making and raising awareness. This will also include any cost spent on training community facilitators for information gathering;
 - Cost of training and capacity building of village motivators, local masons and

plumbers for the use of technology;

- Cost of sanitation and hygiene promotion, Information Education and Communication (IEC) campaigns, BCC; and
- Construction supervision and management costs.

Of these costs, some are technology-specific and would be different for different technologies depending upon the space/land required, the type of superstructure required, the sophistication of equipment and fittings needed, etc. Table 3 provides an indication on how the costs can vary with the selection of technology (cf. Annex 4).

It should be noted that the superstructure is of least importance in order to ensure safe disposal of excreta. Its primary function is to provide privacy and protection to the user. Undue emphasis on a costly superstructure in the design of the toilet can be easily avoided. The cost may vary depending upon the type of superstructure decided on. Locally available material such as bamboo, mud, bricks, wood, plastic, etc., can be used for the superstructure and can cut costs. However, sustainability and durability of the material used and its maintenance requirements must be taken into account.

Operation and Maintenance Costs

Broadly speaking, operation costs mean the expenses incurred in running the facility on a daily basis such as:

Material

- Cost of toilet cleaning brush, toilet cleaning powder/solution, disinfectant;
- Provision of water and soap for hand washing;
- Provision of locks in bathrooms for safety from theft of equipment; and
- Cost of water for flushing.

Table 3: Variation in cost basis technology selected

Type of Technology	Land	Construction Material and Equipment	Degree of Skilled Labour	Sanitary Fittings Required	Overall Cost of Technology
Ventilated Improved Pit (VIP) Toilet	Low	Cement, brick, gravel, sand, Polyvinyl Chloride (PVC)	Medium	Squat plat, foot rests, fly net, vent pipe	Medium
Pour Flush Toilet with Twin Pit	Medium	Cement, bricks, sand, gravel, steel	Medium	Toilet pan, water seal trap, junction chamber, drains	Medium
Eco-san Toilet	Medium	Cement., brick, sand, gravel, steel	High	Hole covers drains, vault doors for collection of compost	High
Decentralised Wastewater Treatment System (DEWATS)	High	Cement, bricks, sand, gravels, PVC pipes	Very high	Water seal, pan, RC structure with PVC pipe fittings	High
Biogas	Medium high	RCC or brick structure	Very high	Pan, trap piping work, biogas plant	High

Labour

- Wages of a watchman or *safai karamchari*. These may be unpaid if villagers volunteer, but the cost must be included on the basis of market rates.

Maintenance costs refer to costs incurred for less frequent activities such as listed below. These works are undertaken at specific intervals, say monthly or quarterly or as and when needed, to keep a technology in proper working condition.

Material

- Cost of repair including replacement of parts (if needed), repair of parts, etc.; and
- Cleaning material required for regular desludging of drains and tanks including costs of cleaning equipment. Transportation of the sludge to a treatment facility and disposal.

Labour

- Cost of labour employed for repair works such as a plumbing or masonry; and
- Cost of labour employed for the upkeep of sanitary infrastructure such as pipes, drains, tanks, pits, etc. This may be skilled or unskilled. Generally the unskilled labour can often be from the village and unpaid for.

Management and promotion

- Monitoring costs incurred by the Gram Panchayat to ensure that the public toilets are in use and running smoothly; and
- Any promotional or awareness activity undertaken by the Gram Panchayat.

4.2.2.2 . Funding of costs

Capital costs: The affordability of a technology option depends not only on the cost of that technology but also on the availability of funds from various sources. Since a community toilet is public infrastructure, most of the capital cost is met through grants from ongoing schemes of the state and central governments or multilateral agencies and donors. Capital costs may not pose too much of a challenge for the Gram Panchayat given the focus of government on ending open defecation in rural areas. Capital costs are generally funded through a combination of sources such as:

- Government schemes (state and central);
- Award money;
- Gram Panchayat funds;
- Funds from multilateral, bilateral agencies, NGOs, corporate houses, etc.; and
- Small contributions by users, etc.

Since sanitation is a crucial issue and affects many aspects of village life, some funds can also be taken for community toilets from other rural schemes of the central government such as the National Rural Employment Guarantee Scheme (NREGS), the Backward Regions Grant Fund (BRGF), etc., for community toilets,

If the village attracts tourists due to cultural or religious significance, then the Gram Panchayat can approach the state tourism department for funds to build public toilets for the floating population. Or if the village attracts a floating population because of its commercial significance during times of markets or trade fairs, the state industrial boards or the commerce department can provide some funds for the construction of public toilets.

Box 4:

Funding for Community and Public Toilets

Capital costs may be easier to fund through grants from government and multilateral agencies. TSC also has some funds available for this purpose.

O&M costs are very difficult to fund given the low ability and willingness to pay amongst the users who are mostly BPL families in the case of community toilets, and the floating population in the case of public toilets.

O&M costs:

Costs for O&M of community toilets are usually borne by the users, depending on the O&M arrangement. O&M cost recovery poses a challenge for the Gram Panchayat, given the limited ability and willingness to pay amongst the users who are mostly BPL families. In such a scenario, factors such as the revenue generating potential of the technology option and O&M arrangement become very important.

In the case of public toilets, the source of funding to meet O&M cost can be undertaken through a variety of means. The O&M costs may be recovered through a ‘pay for use’ basis. However, any charge for use should be reasonably low to promote social benefits rather than profit from the system. Any charge should be fixed by the concerned Gram Panchayat in consultation with community members.

Public Private Partnerships (PPP) is emerging as a viable option for O&M. PPP refers to any method used by the public sector, that is, government, to contract with the private sector, which may construct and/or operate the sanitation facility, while the government, that is, the Gram Panchayat or any other authority retains the responsibility of providing for service provision for the public good. Thus in the case of

public toilets, a PPP can help in two ways: (i) it might bring in more funds from the private sector, which may be a local NGO or a factory owner, industry, or religious boards, etc.; and (ii) help in using the managerial and technical expertise of the private sector in the O&M of the facility.

4.2.2.3. Enhancing revenue potential

Depending on the technology option used, there may be scope for generating revenue from the facility which can be used for O&M. Some of the recent successful experiments in revenue generation from community toilets include:

- **Sale of treated waste water:** This can be sold at a nominal cost to those who require large amounts of untreated water such as rich farmers having large tracts of land for irrigation or to nearby industries, if available nearby; and
- **Production of biogas:** Production and utilisation of biogas from human waste for cooking, lighting and even for electricity generation have good economic potential in rural areas. In most rural areas, people are dependent on fire wood for cooking since

Liquefied Petroleum Gas (LPG) is rarely available. Under such conditions, biogas will prove a boon for the community. Initially, people may hesitate to use biogas for cooking but, since it has direct economic benefits, people will use biogas for cooking purpose as well in rural areas. Biogas production requires regular maintenance which requires skills; it should be ensured that such skills are available within the community. Also, in addition to the faecal material put in the plan, additional organic material may also be required to be added.

Financial support for building a night-soil based biogas plant may be sought from the Ministry of New and Renewable Energy, Government of India, which provides central financial assistance under its biogas programme.

The effluent as well as sludge of the biogas plant have good plant nutrient values and can be used as compost for agriculture in rural areas or sold commercially in the neighbouring city areas where the demand for such organic products can be high.

5. Operation and Maintenance Arrangements for Sanitary Toilet Complexes

After the identification of stakeholders and other community engagement exercises undertaken in the planning stage, the Gram Panchayat will have some clarity on ‘who’ the people are who can potentially take responsibility for O&M. The question now arises as to ‘how’ these people contribute to O&M. What would be the arrangement under which they can work? Who will lead the O&M arrangement? How would the funds for O&M be arranged? All these questions are of specific significance for the O&M process, because this process has the longest life span, that is, O&M will have to be continually carried out till the facility is in use and the life of the facility will depend on its O&M. Also O&M is most crucial to ensure that the actual goal of the project is being achieved. If the toilet falls into a state of disrepair and is not cleaned regularly for users, the asset will deteriorate and the interest of people in using the facility lost over a period of time. Thus, a formal O&M arrangements have to be made in which the interest of the people is sustained. Some of the models which can be used for O&M are:

Community management: In this arrangement, the community members may carry out the work themselves, or play a managerial role and pay an outside party (third party), such as an assigned cleaner, to do it for them.

The immediate users, that is, the households assigned to use the facility, may form a group and undertake O&M through various ways:

Box 5: Key O&M Arrangements

Community Management: – Self management between user households.

Community Contracting: – User households hire a person/agency to do carry out O&M for them and beneficiaries pay a monthly charge based on the family card.

NGO/SHG/CBO Involvement : – User households or the Gram Panchayat hires NGOs/ SHGs/CBOs for to undertake O&M and paid pay on a monthly basis per family.

Private Sector Participation (PPP): – A private sector party undertakes the entire O&M or specific activities in O&M through the following modes:

- Contracting;
- Leasing; or
- Independent service provision.

- i. Each household can take the responsibility for O&M in turns on a monthly/weekly basis;
- ii. All households can together hire/contract a cleaner for O&M. In cases where the village has SHGs, the job of everyday maintenance can also be given to them at a nominal cost. This would not only act as a revenue generating source for the SHG but will also ensure that the community’s resources are retained within the community. Such arrangements are called community contracting;

- iii. Costs for O&M (for daily O&M as well as for repair and maintenance) can be worked out and divided among the community members using the facility on a monthly basis. A monthly pass could be given to each family and the person responsible for the maintenance should be assigned to collect the money from families and maintain the system;
- iv. Where the Gram Panchayat is financially capable, it should assign a person to maintain the system in return for monthly payment and provide the required cleaning material;
- v. In certain cases, where the number of households using the community toilet is identifiable and limited, the individual seats in a community toilet can be allocated to a few households (typically three or four) by the Gram Panchayat. The door to the individual seat can be kept locked, and the keys given to each household. This means that only these households would be able to use the toilet seats, and it would be their responsibility to maintain the toilet. This ensures that the complex is maintained properly;
- vi. In some suitable cases, a small shop (or similar commercial space) selling daily household items can be attached to the sanitary toilet complex. This will help community members save time in buying essential household items and also increase the number of users of the toilet complex. The shopkeeper may be assigned to maintain the toilet complex. The Gram Panchayat can charge monthly rental for the shop and take responsibility for the maintenance out of the funds received. This can prove to be a source of income for the Panchayat; and
- vii. The outer walls of a sanitary toilet complex can be used for advertisement of products

used in rural areas. This aspect is more important for public toilets located at public places or markets, etc. Income generated from such advertisements can prove to be a good resource for the Gram Panchayat which, in turn, should help maintain public toilets from its own funds.

NGO/CBO/SHG involvement: The advantage of involving a local collective group (NGO/SHG/CBO) in the O&M of community and public toilets is their ability to work closely with the community because of the rapport they have built over a period of time.

In the case of community toilets, many times, the households sharing the facility may not share a good rapport with each other which may result in everyday conflicts for O&M. NGO/SHG/CBO involvement will help in managing communication between households and help resolve any issues that may arise in the use of common facilities. The NGO/SHG/CBO may entirely operate and maintain the facility for the household users at a nominal cost recovered from them as user fee.

In the case of public toilets where the responsibility for O&M cannot be fixed on the floating population because of their short span of use, the NGO/SHG/CBO can take up O&M of the facility. This would also be helpful when the community is not ready to take the responsibility for O&M of a public toilet as they do not directly use it.

However, it is important to note that the NGO/SHG/CBO may have humanitarian objectives, but they need to recover their operational costs which would be slightly higher than the costs that the community would have spent in case of self management. Therefore, the involvement of the NGO/SHG/CBO should be carefully decided.

Private sector participation: Private sector participation in O&M would be useful for specific tasks for which the community lacks financial or skilled human resources such as technology support, treatment or disposal of waste, maintenance of sanitary fittings and pipes, etc., that are part of O&M arrangements.

Private sector participation can be sought in a number of ways:

- I. **Contracting:** The Gram Panchayat can contract out the entire O&M or specific O&M activities to a private sector party. Generally, this involves contracting out those tasks for which skills are not locally available;
- II. **Leasing:** In this case, the private sector party will rent over the entire facility from the Gram Panchayat (owner) and take care of all aspects of O&M. In return, the private party will charge a user fee to recover its operational costs (including rent) and earn a nominal profit. This kind of an arrangement is potentially more expensive and more suitable for urban areas where the communities are

scattered and less willing in managing their own infrastructure; and

- III. **Independent service provision:** In this arrangement, the toilet facility will be developed and maintained entirely by a private sector party through its own resources and then opened for public use. This model is used primarily for public toilets where the floating population cannot assume ownership and responsibility for O&M. Care has to be taken those specific needs of women, the elderly, etc., are not neglected. Religious boards or market committees can create public toilets through this model to enhance the value of their location by offering convenience services to visitors. In this case, the outer walls of the toilet complex can be made available for advertisement purposes to earn money to make the system sustainable.

It should be noted that the selection of the mode of O&M would be highly dependent on the technology used in the facility apart from other factors such as cost and convenience.

6. Technology Options for Sanitary Toilet Complexes

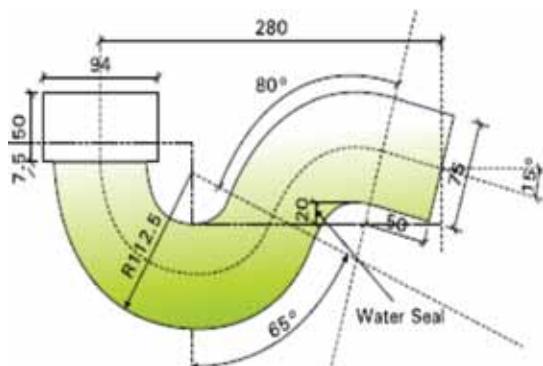
A sanitary toilet complex has two key components:

1. Toilet seat with superstructure; and
2. Disposal system for human waste.

Figure 2 A: An S trap or water seal



Figure 2 B: Drawing of a water seal showing 20 mm



6.1 Toilet Seat with Superstructure

Toilet seat: The toilet seat consists invariably of a toilet pan and a water seal or S trap. The pan is a squatting pan having with a slope of about 28-29°, same as those used for household toilets. The S trap has a (a) water seal of 20 mm, or less requiring 1.5 to 2 litre of water to flush human waste per use of the toilet. The pan and trap may be of ceramic or fibre/plastic. The fibre/plastic pan and trap are useful in certain situations, such as rural areas, due to light weight, lower cost, longer life, resistance against breakage and ease of transportation.

Number of seats: The number of seats in a toilet complex is determined by the approximate number of users per day ; 40 users per seat is the optimum. The required required number of seats for a sanitary toilet complex in a village can be estimated accordingly.

Usually, the ratio of seats for man and women

Figure 3: A pan with a 28 degree slope



is taken as 1:1; however, for rural areas, it is advisable to use the ratio of 1:1.5, that is for a toilet complex having 10 seats, there should be six seats for women and four for men. However, the ratio should reflect local circumstances. In addition, the complex may also have a number of urinals for women and men, to cater to the floating male population.

Superstructure: The superstructure is an essential component in maintaining privacy and dignity. There may be a variety of materials for the superstructure and locally available material can be used for the purpose. However, it should always be kept in mind that a public toilet is a permanent structure and material selected should not require frequent replacement or repair, as funds would not be available with the community or Gram Panchayat for this.

The walls of the superstructure could be of bricks and cement or any other low cost material. The walls need not be very high, but enough to provide user privacy (this is true especially in children's block). The roof of the superstructure may be of RCC or red stone with cement or Galvanised Iron (GI) sheet. RCC is the most durable, requiring least or no repair or maintenance, but costs more. Other Red stone costs a little less than RCC but its life is much shorter than that of RCC. A GI sheet superstructure is more durable and costs almost the same as red stone. In most cases, GI sheet is now being used as it has a long life and requires low repair and maintenance.

The door of the toilet complex is also an important consideration. Three different materials are being used : (1) wood (2) iron; and (3) plastic. The most common material used for doors is wood and iron sheet. In rural areas, wooden doors are the most viable as they are easy to repair and cost less. Plastic doors are durable but cost more (almost double) than the other two.

Toilet design: The following designs with indicative cost estimates for the superstructure of the sanitary toilet complex are included in Annex 4 (this is not an exhaustive list and is only indicative; the final design will have to be adapted to the specific situation in discussion with the community):

a. A five-seat toilet complex with RCC roof without bathing facility:

This is the simplest and most economical toilet complex for villages. In case of paucity of the required space for a large toilet complex at any point, units one location, five-seat toilet complexes can be installed at different places wherever required. An advantage of such a small units is that a whole unit can be demarcated exclusively for females or males, instead of having a combined toilet complex for both.

(For a drawing of a five-seat toilet complex, refer to Annex 4A; for an indicative cost of the unit refer to Annex 4B)

b. A 8-seat toilet complex without bathing facility, with RCC or GI sheet roof:

A 8-seat toilet complex with five seats each for men and women is another option. It is suitable for locations where the required space is available at a single place. There is no bathing facility available in this model, taking into account the cost of the unit.

(For a drawing of a 8-seat toilet complex, refer to Annex 4C; for an indicative cost of the toilet complex, refer to Annex 4D)

c. An eight-seat toilet complex with bathing units (for women):

This model consists of four seats each for women and men, and bathing units for women. The units for men and women are separate. There is a proper grill/gate into the toilet block entry. There is also provision of space for a hand pump on

both sides. Since, in most rural areas, piped water is not available, a hand pump/tube well may be the only suitable option for water. The cost estimate does not include the cost of the hand pump or tube well. It may vary widely depending on site conditions and type of water supply, and can be added as per actual.

(For a drawing of an eight-seat toilet complex, refer to Annex 4E; for an indicative cost of the toilet complex, refer to Annex 4F)

Based on the site condition, it is advisable to attach one small shop for daily household items with the toilet complex. This will help make toilet block economically viable in terms of its maintenance and operation. Such a shop can be attached with any of the above units depending on availability of funds.

6.2 Waste Disposal Systems

The toilet designs mentioned above can be clubbed with any of the waste disposal systems given here:

a. Soak pit technology: Wherever the water table is low, a soak pit is the best option in terms of cost and O&M. There should be two such pits which can be used alternately; after one is filled, human waste should be diverted into the second pit. The capacity of each pit should be large enough to last for a minimum of two years. It is advisable to use two soak pits on each side -- women's and men's -- of the toilet block. Collecting waste from both sides at a common point would mean flowing wastes for a longer distance and thus more water required. In such case, the pit also fills up quickly.

(For a drawing of the soak pit, refer to Annex 5A; for an indicative cost of two soak pits, refer to Annex 5B)

b. Decentralised wastewater treatment system (DEWATS): DEWATS is suitable for locations where water is required to be reused for agriculture. It is a modified septic tank system, with three or four chambers, depending on the quality and quantity of wastewater. The first chamber is always a settling chamber and the others are treatment chambers where bacteria grow on a growth media such as stones, cinders, coir, or any rough plastic material. The effluent quality is good enough to be used for agriculture purposes. An important advantage of this system is that it removes the wastewater, including bathing and washing water, along with black water.

(For a drawing of DEWATS, refer to Annex 5C; for an indicative cost the system, refer to Annex 5D)

c. Biogas plant: Biogas is most suitable for areas where people have no cultural taboos against it. Where such taboos exist, biogas can be used for lighting the toilet block using mantle lamps. The effluent from a biogas plant can be used for agriculture, where agricultural land is available. Cost-wise, a biogas plant is the more expensive than other technologies; however its economic benefits in term of uses of biogas for cooking, lighting and electricity generation, the reuse of effluents, and its environmental impact make the technology acceptable. Depending on the number of users of the toilet complex, the size of the biogas plant can be selected based on:

- i. 9 cubic metre (m^3) capacity (around 300 users of toilets per day)

(For drawings, refer to Annex 7A; for indicative cost estimates, refer to Annex 7B)

- ii. 15 m³ capacity (around 500 users per day)

(For drawings, refer to Annex 8A; for indicative cost estimates, refer to Annex 8B)

d. Community toilet with Ecological Sanitation (ECOSAN) technology: A community toilet with ECOSAN is a complete and integrated facility with a superstructure and waste disposal/reuse system. The ECOSAN system is more suitable for high water table and rocky areas where the soak pit system cannot work effectively. In rural areas, it has higher economic benefits as biodegraded waste as well as separately collected urine may be used for agriculture

purposes. However, the psychological taboo in using a dry toilet and handling human waste proves a challenge in it challenging for making this system be socio-culturally acceptable to the community. ECOSAN toilets are more expensive than the conventional soak pit system and the community requires higher levels of awareness and training to use and operate.

An ECOSAN community toilet at Musiri, Tamil Nadu, has been implemented and is being maintained by SCOPE, Trichy. It has two blocks, one each for men and women with 7 with seven toilets in each block, that is, a total of 14 seats. Other features/important points for operation are annexed.

(For a detailed drawing of a 14-seat ECOSAN toilet, refer to Annex 9A; for an indicative cost, refer to Annex 9B)

Annex 1:

TSC and its Guidelines

The TSC is a comprehensive programme aimed at ensuring sanitation facilities in rural areas, with a broader goal to eradicate the practice of open defecation. TSC, as a part of reform principles, was initiated in 1999 when the Central Rural Sanitation Programme was restructured making it demand-driven and people-centred. It follows the principle of 'low to no subsidy' where a nominal subsidy in the form of incentives is provided to rural poor households for construction of toilets. TSC places strong emphasis on IEC, capacity building and hygiene education for effective behaviour change with the involvement of PRIs, CBOs, and NGOs. The key intervention areas are Household Latrines (IHHL, School Sanitation and Hygiene Education (SSHE), community

sanitary complexes and Anganwadi toilets, supported by Rural Sanitary Marts (RSMs) and Production Centres (PCs). The main goal of the Government of India is to eradicate the practice of open defecation. To boost this endeavour, the Government of India instituted the Nirmal Gram Puraskar (NGP) to recognise the efforts of fully covered PRIs and those individuals and institutions that have contributed significantly in ensuring full sanitation coverage in their areas of operation. The project is being implemented in rural areas using the district as the unit of implementation.

For more information on the TSC and the NGP and their guidelines, please refer to ddws.nic.in

Annex 2:

Indicative Information Template for Collecting General Information

Suggestive Information Template	
1.	Population Related Information Total population of the village <i>Males (including children)</i> <i>Females (including children)</i> <i>Children (below 3 years)</i> <i>Elderly (above 60 years)</i> Total no. of households in the village No. of BPL households
2.	Sanitation Related Information No. of households which do not have access to IHHL, shared toilet, existing community or public toilets
3.	Preference for Toilet No. of households which may not have the resources or have other constraints to have access to IHHL, shared toilet, existing community or public toilets No. of households which do not have IHHL and are willing to avail of a community toilet No. of people who do not have access to any sanitation facility but are willing to contribute towards O&M
4.	Specific Information Required in Case of Public Toilets Estimate of the floating population -- daily, monthly or seasonally, and annually Type of users, for example, if the toilet is required in a trade fair held monthly or bi-monthly then the users would be mostly males Distance of the area of significance (market place, temple, etc.) from village settlement

Annex 3:

Tools for Engaging the Community and for Collective Decision Making

Identifying Stakeholders

Stakeholders are the people who are affected by or significantly affect the project. Stakeholders would include people such as beneficiaries/actual users of the community or public toilet, people who will help in building it including the local mason, people volunteering to engage in manual labour, people sharing costs, etc. Once they have been clearly identified, it will be easier to:

- Analyse their resources, skills, willingness and ability to participate in the project;
- Seek their support in planning the various activities; and
- Fix responsibilities for O&M.

This will ensure their active and sustained involvement in the project in the long run by giving them a sense of participation and right to decision making in the various processes.

How to Conduct a Stakeholder Meeting

A stakeholder meeting would require some pre-planning on the part of the Gram Panchayat and community facilitators.

- Community facilitators should ensure participation and appropriate representation in relation to gender, caste and economic levels. Members from the target group, that is, people having no household toilets due to lack of the

required funds and space, should be given adequate representation in the meeting. It is important to ensure that people are not sitting in clusters with their existing peer groups;

- A neutral place with adequate space and shelter from protection against weather should be arranged as the exercise is time consuming. Time and day of the meeting will also have to be carefully selected to ensure maximum participation, especially from women;
- Documentation of the discussions, ideas, observations, suggestions, feedback, etc., should be made in the form of field notes to help in planning later; and
- Community facilitators can prepare different charts for each of the three processes: (i) planning; (ii) implementation and construction; and (iii) O&M, with a list of key activities to be undertaken under each process. During the discussion, it would be beneficial to assess the interest of various stakeholders against various listed activities. Accordingly, work can later be divided amongst the stakeholders.

Steps to Conduct an Identifying Stakeholders Exercise

1. A formal opening by the Gram Panchayat representative and introduction of community facilitators;
2. **Ice breaking exercise:** A small exercise to break down hierarchical barriers amongst the gathering so that they can interact freely

- in a relaxed environment to share and learn together;
3. **Introduction to the exercise:** Community facilitators explain what they are going to do in this exercise, how it is to be done, what are going to be the key results, and how it will help the community in decision making;
 4. **Identification of key stakeholders:** The participants write the name of each stakeholder on paper chits provided by the community facilitators and place them on a large table, or the floor. Help will have to be given to people who cannot write;
 5. **Choosing and clubbing key stakeholders:** A comprehensive list of all key stakeholders is made and displayed. The community facilitators will have to use their own discretion in selecting/clubbing key stakeholders into common interest groups to help narrow down the long list;
 6. Thereafter, the main resources and skills available with the stakeholders will be listed;
 7. Stakeholders' names can then be divided into different activities under the three key processes: (i) planning; (ii) implementation and construction; and (iii) O&M, with the help of the charts displayed on the walls;
 8. All the participants can then be divided into three groups according to the three processes mentioned above. There should be some degree of pre-meditation in this group formation so as to keep the relevant stakeholders in relevant groups;
 9. Responsibilities are then divided amongst various stakeholders by the community facilitators. The community facilitators would have to not only ensure that the discussion yields positive results, but also intervene and use their judgment when the community is unable to see all the pros and cons of a particular decision;
 10. The O&M arrangements which the community has finalised can be captured as a diagram on a chart by the facilitators. It would also be beneficial to distribute this and the organisation structure, and the roles and responsibility chart, amongst all participants.

Indicative Template

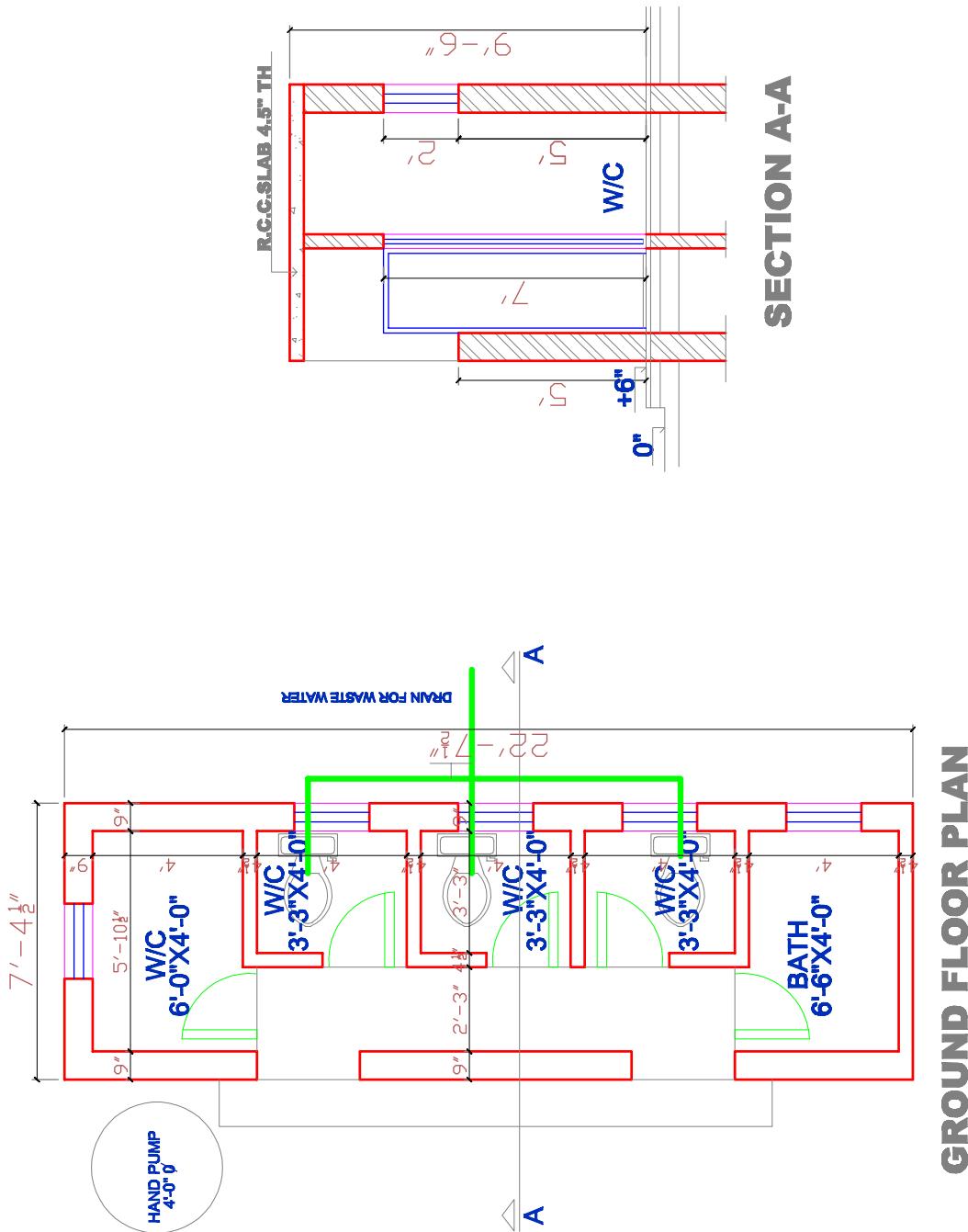
Stakeholder	Resource	Willingness	Ability
Central Government	3	2	2
State Government	3	1	2
Gram Panchayat	2	3	2
Private Sector in the Village	3	1	3
NGOs	2	2	1
School and College in the Village	1	3	1
People having IHHL	2	2	1
People not having IHHL	2	3	1
Floating Population	1	2	1
-x-			
-y-			
-z-			
Scale 1-3 indicating 1=low; 2= medium; 3= high			

An organisation structure or working framework developed at the end of this participatory exercise will help in ensuring that no stakeholder is left out; all stakeholders have an equal voice in working towards a facility which will benefit them;

any resistance or conflict is mitigated at initially point so that the project is well accepted and runs smoothly; and a sense of ownership is built in to ensure sustainability.

Annex 4A:

Drawing of a Five-seat Toilet Complex



TITLE : SANITARY TOILET COMPLEX FOR RURAL AREAS (4-W/C'S, 1-BATH)

Annex 4B:**Indicative Cost of a Five-seat Toilet Complex**

ABSTRACT OF COST FOR 4 SEATER AND 1 BATH TOILET COMPLEX
(Rate Based on DSR 2007)

Sl. No.	Item	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1	2	3	4	5	6
1.	Earth work in excavation over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m; disposed earth to be leveled and neatly dressed all kinds of soil				
	i) Depth upto 1.50 m below G.L.	m ³	5.60	103.40	579
2.	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	m ³	2.08	2,449.00	5,094
3.	Brick work with F.P.S. bricks of class designation 75 in foundation & plinth in: cement lime mortar 1:6 (1 cement : 6 coarse sand)	m ³	4.62	2,121.75	9,802
4.	Half brick masonry with FPS bricks of class designation 75 in cement foundation and plinth in cement mortar 1:4 (1 cement: 4 coarse sand)	m ²	3.31	270.35	895
5.	Brick work with F.P.S. bricks of class designation 75 in foundation & plinth in: cement lime mortar 1:6 (1 cement : 6 coarse sand) and extra for brick work in superstructure above floor V level for each four floors or part thereof by mechanical means by lifting material using mobile crane.	m ³	8.10	2,311.75	18,725

Annexures

1	2	3	4	5	6
6	Providing half brick masonry with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure, above floor V level every floors or part thereof by mechanical means by lifting material using mobile crane	m ²	24.86	287.20	7,140
7.	Providing and laying damp-proof course 40 mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5 mm nominal size)	m ²	4.40	144.15	634
8.	12 mm cement plaster of mix 1:6 (1 cement : 6 coarse sand)	m ²	60.67	72.70	4,411
9.	15 mm cement plaster on rough side of single or half brick wall of mix 1:6 (1 cement : 6 coarse sand)	m ²	81.64	84.55	6,903
10.	Applying priming coat with rady mixed red oxide zinc chromate primer of approved brand and manufacture on steel galvanised iron/steel works	m ²	24.42	12.65	309
11	Providing and fixing ISI marked flush door shutters conformingt to IS:2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters - 25 mm thick (for cupboard) including ISI marked nicked plated bright finished M.S. Piano hinges IS : 3818 marked with necessary screws	m ²	9.770	1,317.65	12,873
12	Painting with oil type wood preservative of approved brand and manufacture : new work (two or more coats)	m ²	24.42	12.80	313
13	Cement concrete flooring 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) finished with a floating coat of neat cement including cement slurry, but excluding the cost of nosing of steps etc. complete: 40 mm thick with 20 mm nominal size stone aggregate.	m ²	13.19	192.95	2,545

1	2		3	4	5	6
14.	Providing and fixing white vetreous china water closet squatting pan (Indian type) : Orissa pattern W.C. pan of size 580 × 440 mm	Nos.	4.00	1,010.85	4,043	
15.	Providing and fixing trap of self cleaning design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : sand cast Iron S&S as per IS : 1729	Nos.	5.00	442.10	2,211	
16.	Providing and fixing ISI marked oxidised MS handles conforming to IS : 4992 with necessary screws etc. complete - 125 mm	Nos.	10.00	10.20	102	
17.	Providing and fixing ISI marked oxidised MS tower bolt black finish, (Barrel type) with necessary screws etc. complete - 250 × 10 mm	Nos.	5.00	33.90	170	
18.	Providing and fixing ISI marked oxidised MS sliding door bolts with nuts and screws etc. complete - 300 × 16 mm	Nos.	5.00	79.60	398	
19.	White washing with lime to give an even shade - new work (three or more coats)	m ²	60.67	6.75	410	
20.	Finishing walls with water proofing cement paint of required shade : new work (two or more coats applied @ 3.84 kg/10 spm)	m ²	81.64	30.80	2,515	
21.	Providing laying & jointing glazed stone ware pipes Grade 'A' with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete : 100 mm diametre : 100 mm diameter and providing & laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) alround S.W pipe including bed concrete as per standard design : 100 mm daimetere S.W pipe.	Rm	5.00	263.30	1,317	

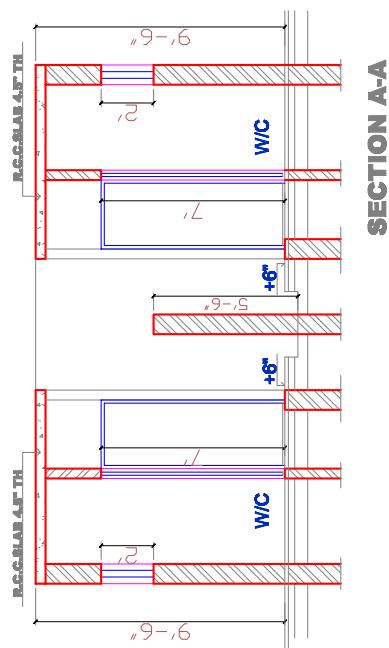
Annexures

1	2	3	4	5	6
22.	Cement plaster skirting (upto 30 cm. height) with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement : 18 mm thick.	m ²	19.74	168.50	3,326
23.	Providing and fixing cement jali - 255 mm thick	m ²	1.86	277.35	516
24.	Providing and fixing steel door frame	kg	126.00	51.15	6,445
25.	Filling available excavated earth (excluding rock) in trenches, plinth sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m	m ³	5.05	45.70	231
26.	Carriage earth	m ³	0.55	63.32	35
27.	Providing & laying in position specified grade of reinforced cement concrete excluding the cost of centering shuttering, finishing & reinforcement - All work upto plinth level: 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size)	m ³	1.20	3,359.60	4,032
28.	Reinforcement for RCC work including straitening, cutting bending, placing in position and binding all complete : Mild steel and Medium Tensile steel bars	Kg	95.00	41.50	3,943
29.	Centering and shuttering including strutting, propping etc. and removal of form for suspended floors, roofs, landings, balconies and access platform	m ²	15.80	41.50	656
Drain 10 m Length					
30.	Earth work in excavation over areas (exceeding 30 cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m; disposed earth to be leveled and neatly dressed all kinds of soil				
	i) Depth upto 1.50 m below G.L.	m3	1.46	103.40	151

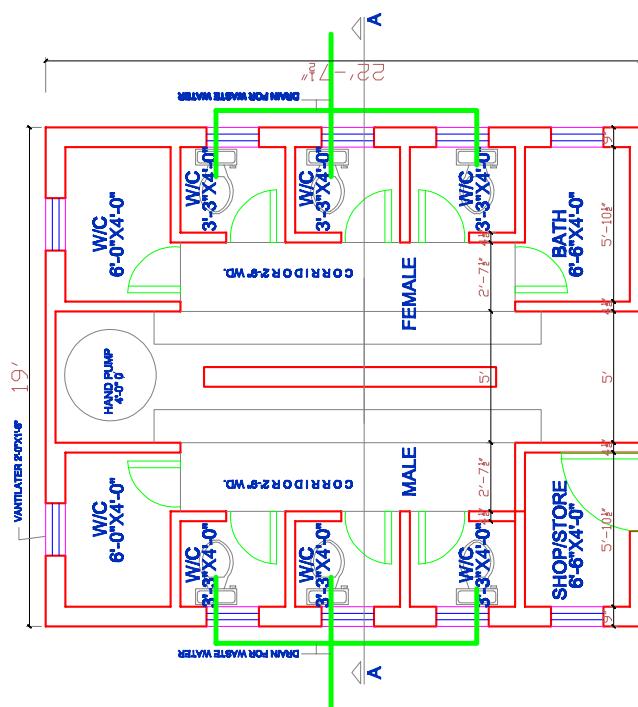
1	2	3	4	5	6
31	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	m ³	0.40	2,449.00	980
32	Providing half brick masonry with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure, above floor V level every floors or part thereof by mechanical means by lifting material using mobile crane	m ²	2.75	287.20	790
33	12 mm cement plaster of mix 1:4 (1 cement : 4 coarse sand)	m ²	7.50	82.55	619
34	25 mm thick stone slab to cover the drain	m ²	3.00	450.00	1,350
				Total Rs.	104,459
	Add 26% enhancement on Rs. 104,459				27,159
				Total Rs.	131,618
				Say Rs.	131,600

Annex 4C:

Drawing of an Eight-seat (4+4) Toilet Complex with One Bath for Women and One Shop



TITLE : SANITARY TOILET COMPLEX FOR RURAL AREAS (8-W/C'S, 1-BATH AND 1-SHOP/STORE)



Annex 4D:

Indicative Cost of an Eight-seat (4+4) Toilet Complex with One Bath for Women and One Shop

**ABSTRACT OF COST FOR 8 SEATER 1 BATH 1 SHOP TOILET COMPLEX
(Rate Based on DSR 2007)**

Sl. No.	Item	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1	2	3	4	5	6
1.	Earth work in excavation over areas (exceeding 30 cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m; disposed earth to be leveled and neatly dressed all kinds of soil				
i)	Depth upto 1.50 m below G.L.	m ³	10.81	103.40	1,118
2.	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	m ³	4.87	2,449.00	11,927
3.	Brick work with F.P.S. bricks of class designation 75 in foundation & plinth in: cement lime mortar 1:6 (1 cement : 6 coarse sand)	m ³	7.27	2,121.75	15,425
4.	Half brick masonry with FPS bricks of class designation 75 in cement foundation and plinth in cement mortar 1:4 (1 cement: 4 coarse sand)	m ²	14.93	270.35	4,036
5.	Brick work with F.P.S. bricks of class designation 75 in foundation & plinth in: cement lime mortar 1:6 (1 cement : 6 coarse sand) and extra for brick work in superstructure above floor V level for each four floors or part thereof by mechanical means by lifting material using mobile crane.	m ³	13.08	2,311.75	30,238

Annexures

1	2		3	4	5	6
6.	Providing half brick masonry with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure, above floor V level every floors or part thereof by mechanical means by lifting material using mobile crane		m ²	21.05	287.20	6,046
7.	Providing and laying damp-proof course 40 mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5 mm nominal size)		m ²	18.90	144.15	2,724
8.	12 mm cement plaster of mix 1:6 (1 cement : 6 coarse sand)		m ²	67.80	72.70	4,929
9.	15 mm cement plaster on rough side of single or half brick wall of mix 1:6 (1 cement : 6 coarse sand)		m ²	224.19	84.55	18,955
10.	Applying priming coat with rady mixed red oxide zinc chromate primer of approved brand and manufacture on steel galvanised iron/steel works		m ²	41.51	12.65	525
11	Providing and fixing ISI marked flush door shutters conformingt to IS:2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters - 25 mm thick (for cupboard) including ISI marked nicked plated bright finished M.S. Piano hinges IS : 3818 marked with necessary screws		m ²	16.600	1,317.65	21,873
12	Painting with oil type wood preservative of approved brand and manufacture : new work (two or more coats)		m ²	41.51	12.80	531
13	Cement concrete flooring 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) finished with a floating coat of neat cement including cement slurry, but excluding the cost of nosing of steps etc. complete: 40 mm thick with 20 mm nominal size stone aggregate.		m ²	33.16	192.95	6,398

1	2	3	4	5	6
14.	Providing and fixing white vetreous china water closet squatting pan (Indian type) : Orissa pattern W.C. pan of size 580 × 440 mm	Nos.	8.00	1,010.85	8,087
15.	Providing and fixing trap of self cleaning design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : sand cast Iron S&S as per IS : 1729	Nos.	11.00	442.10	4,863
16.	Providing and fixing ISI marked oxidised MS handles conforming to IS : 4992 with necessary screws etc. complete - 125 mm	Nos.	20.00	10.20	204
17.	Providing and fixing ISI marked oxidised MS tower bolt black finish, (Barrel type) with necessary screws etc. complete - 250 × 10 mm	Nos.	10.00	33.90	339
18.	Providing and fixing ISI marked oxidised MS sliding door bolts with nuts and screws etc. complete - 300 × 16 mm	Nos.	10.00	79.60	796
19.	White washing with lime to give an even shade - new work (three or more coats)	m ²	222.19	6.75	1,500
20.	Finishing walls with water proofing cement paint of required shade : new work (two or more coats applied @ 3.84 kg/10 spm)	m ²	67.80	30.80	2,088
21.	Providing laying & jointing glazed stone ware pipes Grade 'A' with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete : 100 mm diametre : 100 mm diameter and providing & laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) alround S.W pipe including bed concrete as per standard design : 100 mm daimetere S.W pipe.	Rm	16.00	263.30	4,213

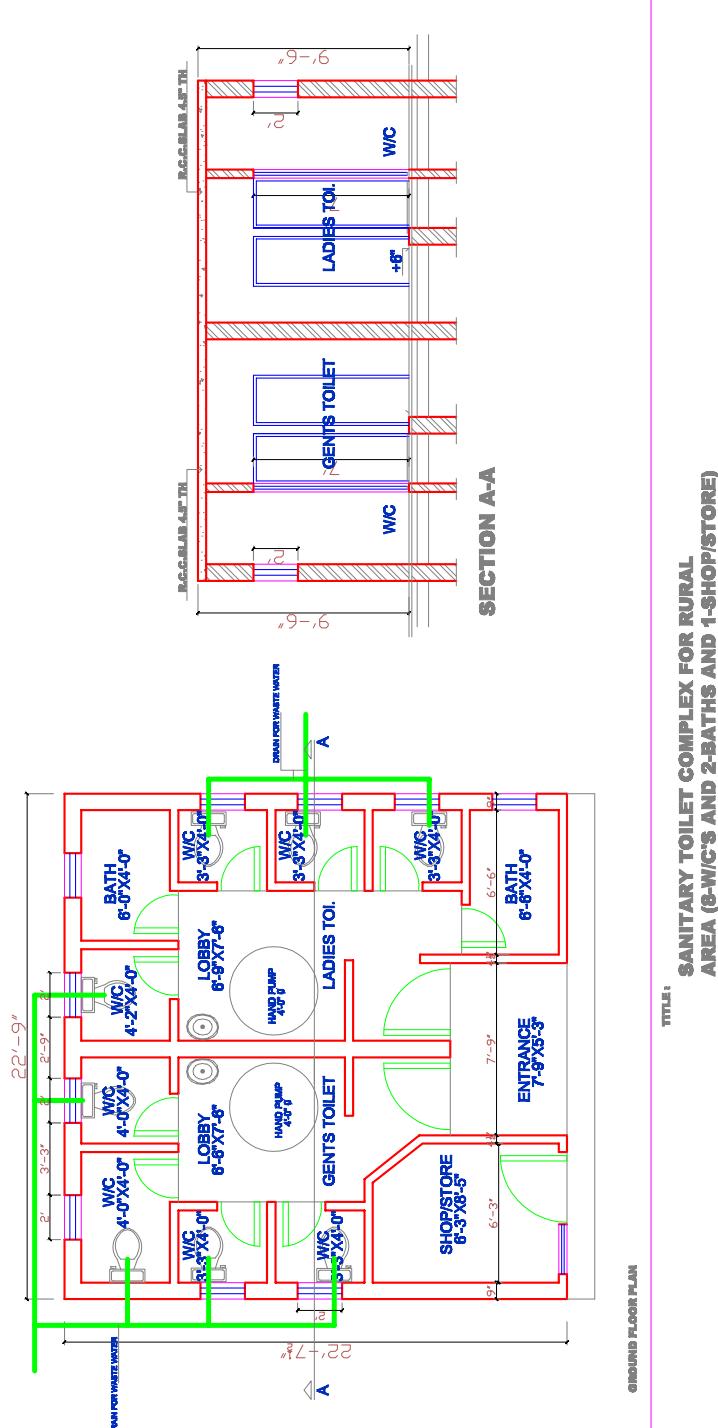
Annexures

1	2	3	4	5	6
22.	Cement plaster skirting (upto 30 cm. height) with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement : 18 mm thick.	m ²	12.60	168.50	2,123
23.	Providing and fixing cement jali - 255 mm thick	m ²	3.72	277.35	1,032
24.	Providing and fixing steel door frame	kg	192.00	51.15	9,821
25.	Filling available excavated earth (excluding rock) in trenches, plinth sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m	m ³ 6	15.01	45.70	68
26.	Carriage of earth	m ³	4.20	63.32	266
27.	Providing & laying in position specified grade of reinforced cement concrete excluding the cost of centering stuttering, finishing & reinforcement - All work upto plinth level: 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size)	m ³	3.46	3,359.60	11,624
28.	Reinforcement for RCC work including straitening, cutting bending, placing in position and binding all complete : Mild steel and Medium Tensile steel bars	Kg	272.00	41.50	11,288
29.	Centering and shuttering including strutting, propping etc. and removal of form for suspended floors, roofs, landings, balconies and access platform	m ²	30.32	41.50	1,258
Drain 10 m Length					
30.	Earth work in excavation over areas (exceeding 30 cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m; disposed earth to be leveled and neatly dressed all kinds of soil				
	i) Depth upto 1.50 m below G.L.	m ³	1.46	103.40	151

1	2	3	4	5	6
31	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	m ³	0.40	2,449.00	980
32	Providing half brick masonry with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure, above floor V level every floors or part thereof by mechanical means by lifting material using mobile crane	m ²	2.75	287.20	790
33	12 mm cement plaster of mix 1:4 (1 cement : 4 coarse sand)	m ²	7.50	82.55	619
34	25 mm thick stone slab to cover the drain	m ²	3.00	450.00	1,350
				Total Rs.	188,803
	Add 26% enhancement on Rs. 188,803				49,089
				Total Rs.	237,892
				Say	238,000

Annex 4E:

Drawing of a Unit with Eight Seats (4+4) with Two Baths for Women and One Shop



Annex 4F:

Indicative Cost a Unit with Eight Seats (4+4) with Two Baths for Women and One Shop

ABSTRACT OF COST FOR 8 SEATER, 2 BATH AND 1 SHOP TOILET COMPLEX (Rate Based on DSR 2007)					
Sl. No.	Item	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1	2	3	4	5	6
1.	Earth work in excavation over areas (exceeding 30 cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m; disposed earth to be leveled and neatly dressed all kinds of soil				
	i) Depth upto 1.50 m below G.L.	m ³	12.55	103.40	1,298
2.	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	m ³	5.58	2,449.00	13,665
3.	Brick work with F.P.S. bricks of class designation 75 in foundation & plinth in: cement lime mortar 1:6 (1 cement : 6 coarse sand)	m ³	8.24	2,121.75	17,483
4.	Half brick masonry with FPS bricks of class designation 75 in cement foundation and plinth in cement mortar 1:4 (1 cement: 4 coarse sand)	m ²	14.90	270.35	4,028
5.	Brick work with F.P.S. bricks of class designation 75 in foundation & plinth in: cement lime mortar 1:6 (1 cement : 6 coarse sand) and extra for brick work in superstructure above floor V level for each four floors or part thereof by mechanical means by lifting material using mobile crane.	m ³	16.60	2,311.75	38,375

Annexures

1	2	3	4	5	6
6.	Providing half brick masonry with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure, above floor V level every floors or part thereof by mechanical means by lifting material using mobile crane	m ²	84.95	287.20	24,398
7.	Providing and laying damp-proof course 40 mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5 mm nominal size)	m ²	10.01	144.15	1,443
8.	12 mm cement plaster of mix 1:6 (1 cement : 6 coarse sand)	m ²	71.90	72.70	5,227
9.	15 mm cement plaster on rough side of single or half brick wall of mix 1:6 (1 cement : 6 coarse sand)	m ²	238.06	84.55	20,128
10.	Applying priming coat with rady mixed red oxide zinc chromate primer of approved brand and manufacture on steel galvanised iron/steel works	m ²	55.35	12.65	700
11	Providing and fixing ISI marked flush door shutters conformingt to IS:2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters - 25 mm thick (for cupboard) including ISI marked nicked plated bright finished M.S. Piano hinges IS : 3818 marked with necessary screws	m ²	22.140	1,317.65	29,173
12	Painting with oil type wood preservative of approved brand and manufacture : new work (two or more coats)	m ²	55.35	12.80	708
13	Cement concrete flooring 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) finished with a floating coat of neat cement including cement slurry, but excluding the cost of nosing of steps etc. complete: 40 mm thick with 20 mm nominal size stone aggregate.	m ²	42.30	192.95	8,162

1	2	3	4	5	6
14.	Providing and fixing white vetroous china water closet squatting pan (Indian type) : Orissa pattern W.C. pan of size 580 × 440 mm	Nos.	8.00	1,010.85	8,087
15.	Providing and fixing trap of self cleaning design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : sand cast Iron S&S as per IS : 1729	Nos.	12.00	442.10	5,305
16.	Providing and fixing ISI marked oxidised MS handles conforming to IS : 4992 with necessary screws etc. complete - 125 mm	Nos.	26.00	10.20	265
17.	Providing and fixing ISI marked oxidised MS tower bolt black finish, (Barrel type) with necessary screws etc. complete - 250 × 10 mm	Nos.	13.00	33.90	441
18.	Providing and fixing ISI marked oxidised MS sliding door bolts with nuts and screws etc. complete - 300 × 16 mm	Nos.	13.00	79.60	1,035
19.	White washing with lime to give an even shade - new work (three or more coats)	m ²	238.05	6.75	1,607
20.	Finishing walls with water proofing cement paint of required shade : new work (two or more coats applied @ 3.84 kg/10 spm)	m ²	71.90	30.80	2,215
21.	Providing laying & jointing glazed stone ware pipes Grade 'A' with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete : 100 mm diametre : 100 mm diameter and providing & laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) alround S.W pipe including bed concrete as per standard design : 100 mm daimetere S.W pipe.	Rm	20.00	263.30	5,266

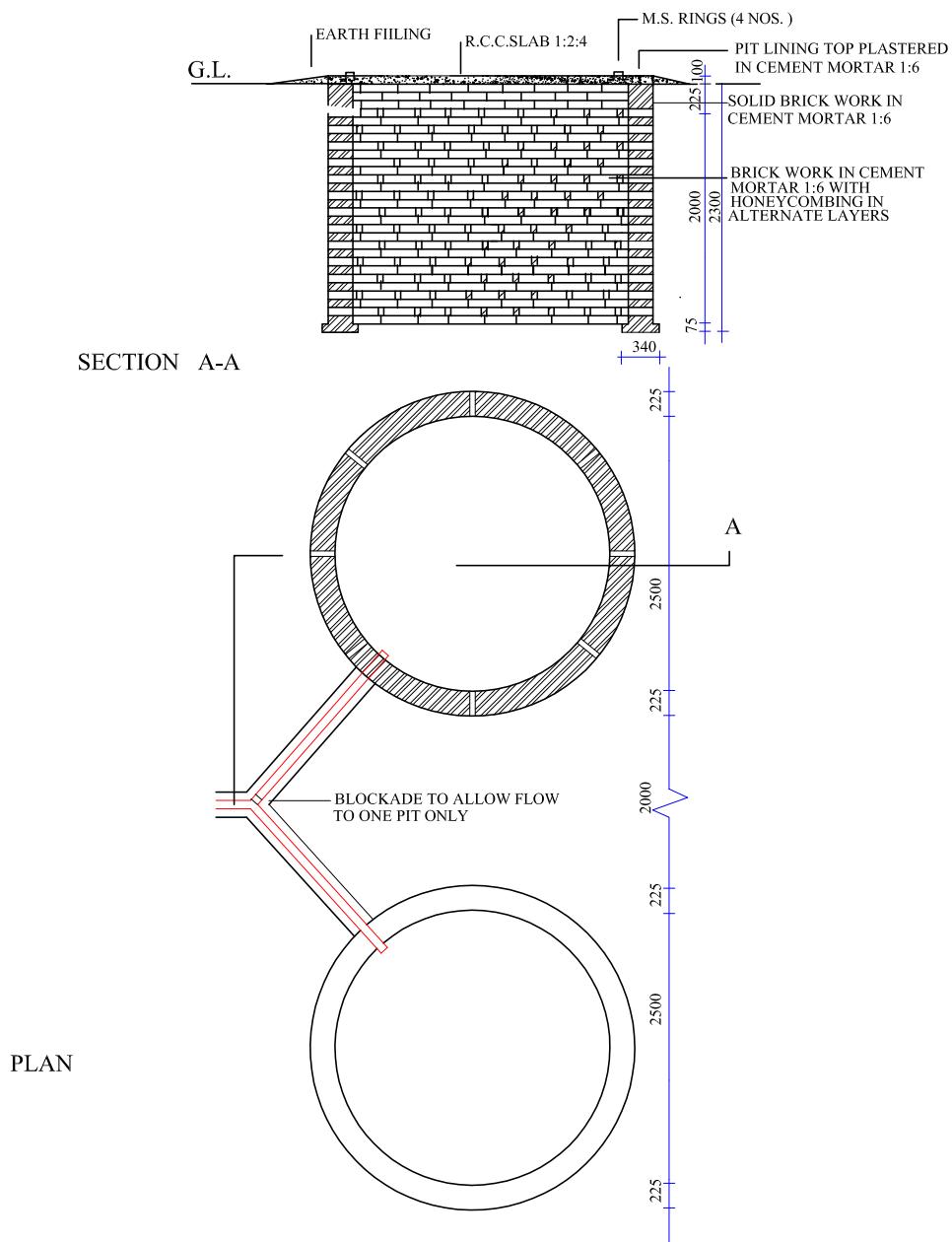
Annexures

1	2	3	4	5	6
22.	Cement plaster skirting (upto 30 cm. height) with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement : 18 mm thick.	m ²	44.00	168.50	7,414
23.	Providing and fixing cement jali - 255 mm thick	m ²	3.72	277.35	1,032
24.	Providing and fixing steel door frame	kg	290.00	51.15	14,834
25.	Filling available excavated earth (excluding rock) in trenches, plinth sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m	m ³	17.49	45.70	799
26.	Carriage earth	m ³	4.94	63.32	313
27.	Providing & laying in position specified grade of reinforced cement concrete excluding the cost of centering stuttering, finishing & reinforcement - All work upto plinth level: 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size)	m ³	5.47	3,359.60	18,377
28.	Reinforcement for RCC work including straitening, cutting bending, placing in position and binding all complete : Mild steel and Medium Tensile steel bars	Kg	430.00	41.50	17,845
29.	Centering and shuttering including strutting, propping etc. and removal of form for suspended floors, roofs, landings, balconies and access platform	m ²	47.88	41.50	1,987
Drain 10 m Length					
30.	Earth work in excavation over areas (exceeding 30 cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m; disposed earth to be leveled and neatly dressed all kinds of soil				
	i) Depth upto 1.50 m below G.L.	m3	1.46	103.40	151

1	2	3	4	5	6
31	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	m ³	0.40	2,449.00	980
32	Providing half brick masonry with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure, above floor V level every floors or part thereof by mechanical means by lifting material using mobile crane	m ²	2.75	287.20	790
33	12 mm cement plaster of mix 1:4 (1 cement : 4 coarse sand)	m ²	7.50	82.55	619
34	25 mm thick stone slab to cover the drain	m ²	3.00	450.00	1,350
				Total Rs.	255,498
	Add 26% enhancement on Rs. 255498				66,429
				Total Rs.	321,927
				Say Rs	322,000

Annex 5A:

Drawing of Soak Pits for 100 Users of Toilet Per Day With Two Years Capacity



ALL DIMENSIONS IN mm

TWIN LEACH PITS OF 100 USER 2 YEARS CAPACITY

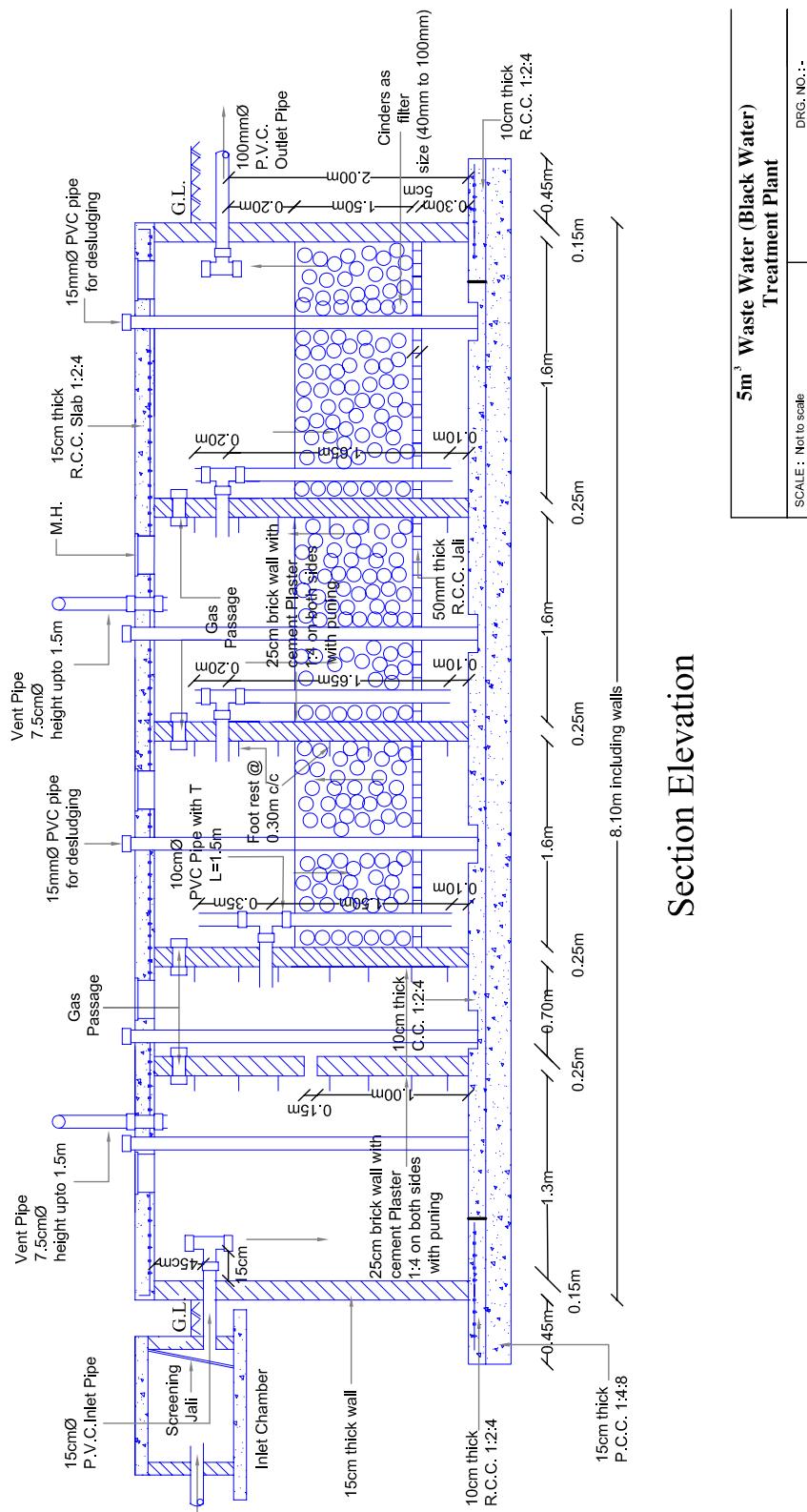
Annex 5B:

Indicative Cost for a Twin Soak Pit

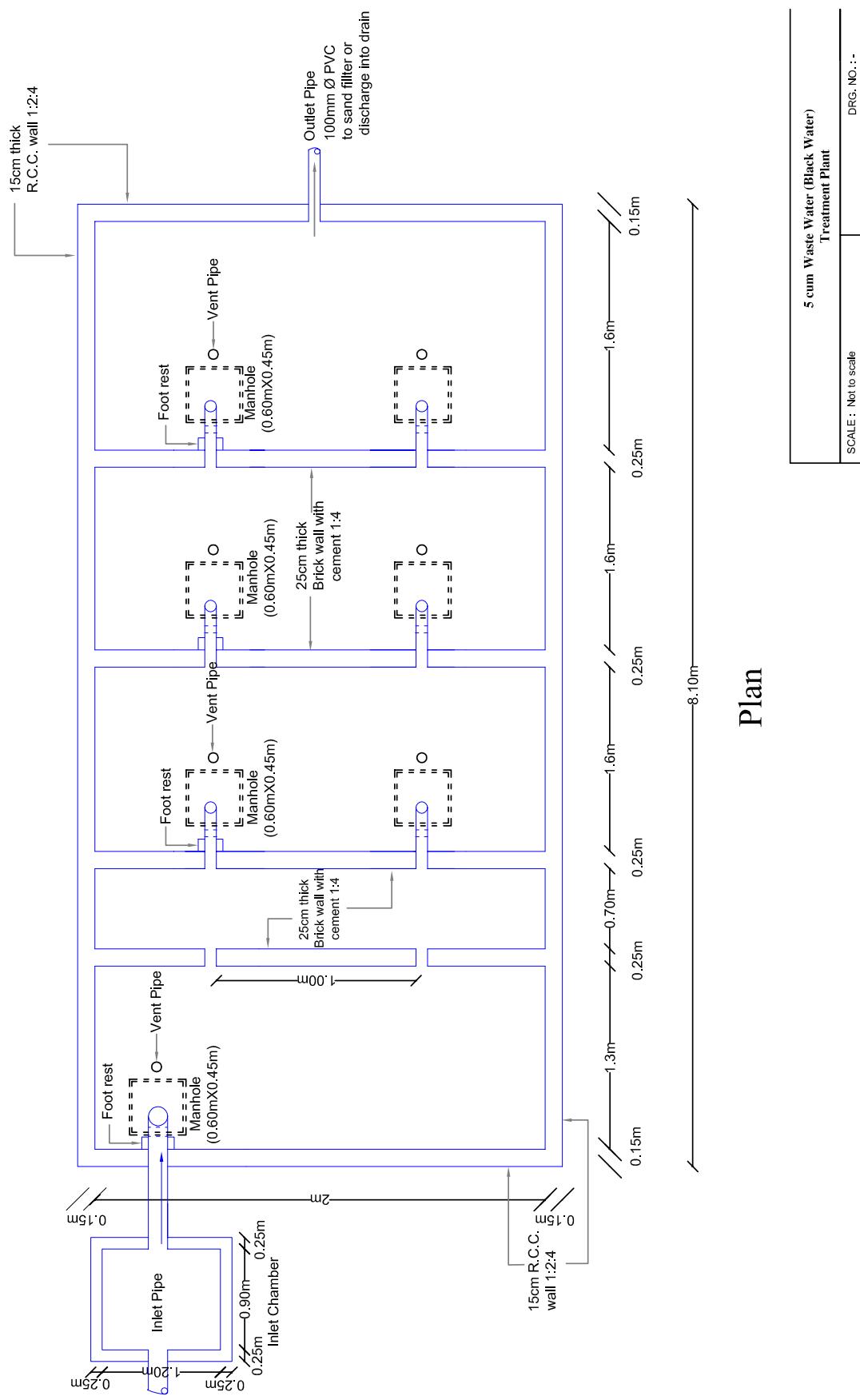
Cost of Twin Leach Pits 100 User of 2 Years Storage Capacity					
Sl. No.	Item	Unit	Rate (Rs.)	Qty.	Amount (Rs.)
1	2	3	4	5	6
1	Earth work in excavation				
	Depth upto 1.5 m below ground	m ³	103.4	20.45	2115.00
	Depth upto 3.0 m below ground	m ³	122.3	10.24	1252.00
2	Earth filling in trenches	m ³	45.7	2.85	130.00
3	Disposal of surplus earth locally		lump sum		200.00
4	Brick work in cement mortar 1:6 in foundation	m ³	2,121.75	0.44	934.00
5	Honey comb brick work, 225 mm thick in cement mortar 1:6 in foundation	m ³	1507.7	7.5	11308.00
6	Brick work in cement mortar 1:6 in foundation	m ³	2357.40	0.87	2051.00
7	Extra for circular brick work, mean radius not exceeding 6 m	m ³	259.6	8.32	2160.00
8	12 mm plaster in cement mortar 1:6	m ²	67.25	3.85	259.00
9	Pre-cast R.C.C. 1:2:4 slab excluding reinforcement	m ³	4,082.25	1.37	5593.00
10	Reinforcement for R.C.C. work.	Kg.	40.00	107.5	4300.00
11	Providing and fixing M.S. rings for lifting slab	Each	40.00	8	320.00
	Total				30622

Annex 6A:

Drawing of a DEWATS



Section Elevation



Annex 6B:**Indicative Cost of a DEWATS****Drawing No. 1**

Estimated Cost 5 cum Waste Water (Black & Gray Water) Treatment Plant					
Sl. No.	Item	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1	2	3	4	5	6
1.	Earth work in excavation over areas (exceeding 30 cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m; disposed earth to be leveled and neatly dressed all kinds of soil				
	i) Depth upto 1.50 m below G.L.	m ³	44.22	103.40	4,572
	ii) Depth from 1.50 m to 3.0 m below G.L.	m ³	33.12	122.30	4,051
2	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	m ³	4.83	2,449.00	11,829
3.	Providing and laying in position cement concrete of specified grade including the cost of centring and shuttering all work upto plinth level 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	m ³	3.23	3,257.45	10,522
4.	Brick masonry with bricks of class designation 75 in foundations and plinth in cement mortar 1:4 (1 cement : 4 coarse sand)	m ³	20.18	2,121.75	42,817
5	12 mm cement plaster 1:3 (1 cement : 3 fine sand) finished with a floating coat of neat cement	m ²	103.32	122.50	12,657

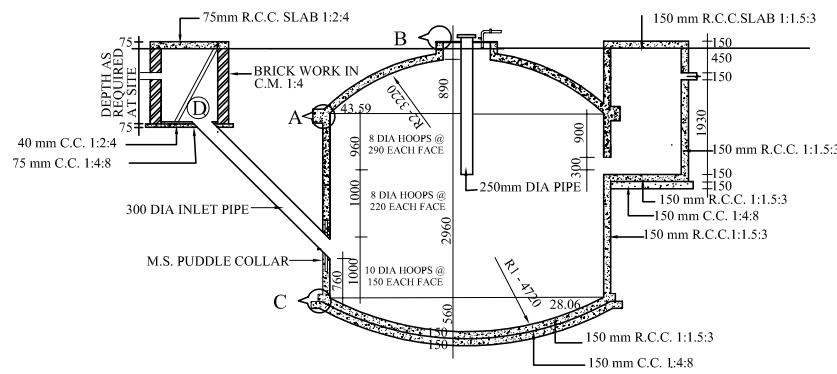
1	2	3	4	5	6
6	Reinforced cement concrete work in beams, suspended floors, roofs having slope upto 15°, landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases upto floor five level including the cost of centring, shu	m ³	3.03	3,667.85	11,114
7	Reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding cold twisted bars	Kg.	238.45	42.70	10,182
8	Centering and shuttering including strutting, propping etc and removal of form				
	(i) Suspended floors, roofs, landings, balconies & access platform (ii) Edges of slabs and breaks in floors and walls under 20 cms wide	m ²	20.25	187.35	3,794
		m ²		119.25	0
9	Providing M.S. foot rests including fixing in manholes with 20 x 20 x 10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) as per standard design with 20 x 20 cm square bar	Each	20	149.85	2,997
10	Providing and fixing in position precast R.C.C. manhole cover and frame of required shape and approved quality L.D. - 25 circular shape 560 mm internal diameter.	Each	7	883.25	6,183
11	Providing and fixing soil, waste and vent pipe 100 mm dia.	m	8.00	395.45	3,164
12.	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth; consolidating each deposited layer by ramming and watering, lead upto 50 m and lift upto 1.5 m	m ³	26.70	45.70	1,220
13.	Carriage of materials by Mechanical transport including loading, unloading and stacking lime, moorum, building rubbish, each, manure or sludge and excavated rocks each	m ³	50.62	63.32	3,205

Annexures

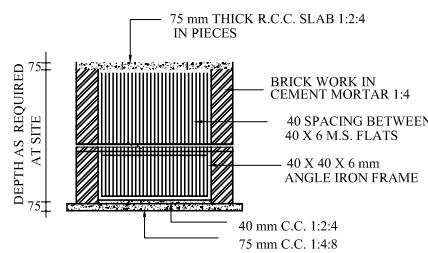
1	2		3	4	5	6
14.	Providing & fixing PVC pipe					
	(i) 110 mm dia. (ii) 150 mm dia.		m m	15.00 10.00	163.40 300.00	2,451 3,000
15.	Supply and filling with cinder		m ³	16.25	900.00	14,625
16.	Steel work welded in built up sections/framed work including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required in gratings, frames, guard bar, ladder, railings, brackets, gat		Kg	30.00	51.20	1,536
17.	Providing precast cement concrete jali 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) reinforced with 1.6 mm dia mild steel wire including centering and shuttering, roughening cleaning, fixing and finishing in cement mortar		m ²	9.60	359.20	3,448
18.	Providing and fixing on wall face unplasticised - PVC moulded fittings/accessories for unplasticised Rigid PVC rain water pipes conforming to IS : 13592 type A including jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansi		Each	6.00	260.70	1,564
				Total		154,929
					Say Rs	155,000

Annex 7A:

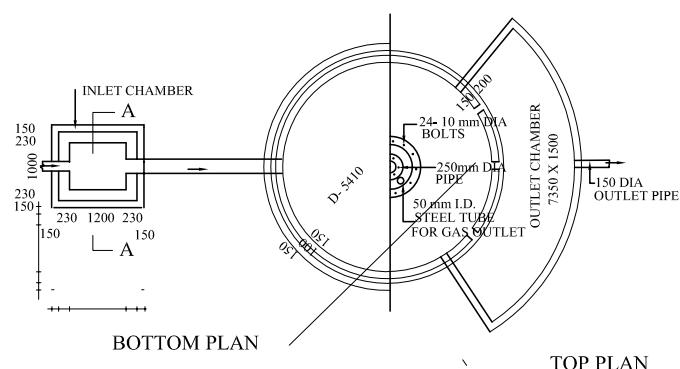
Drawings for a 9 m³ Capacity Sanitary Toilet Complex with a Biogas Plant



SECTIONAL ELEVATION

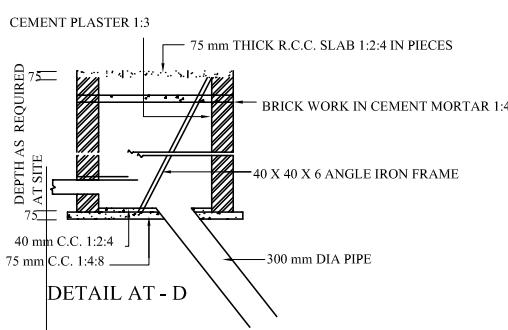


SECTION AT A-A



BOTTOM PLAN

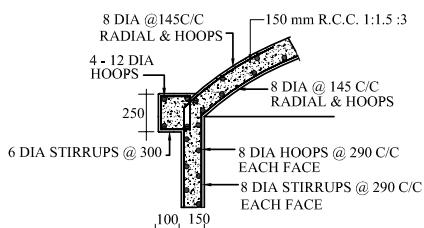
TOP PLAN



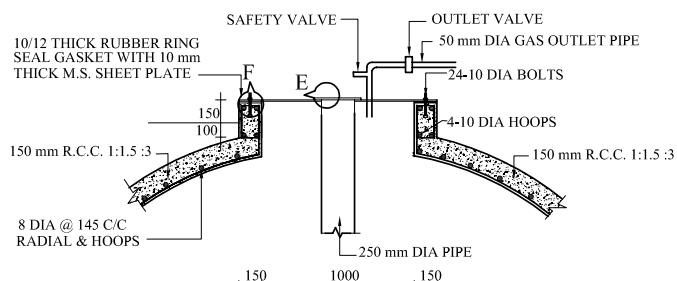
ALL DIMENSIONS IN mm

DESIGN OF 9 cum BIOGAS PLANT
CONNECTED TO 300 USERS SHAUCHALAYA
(SUB SOIL WATER LEVEL MORE THAN 3M. BELOW GROUND)

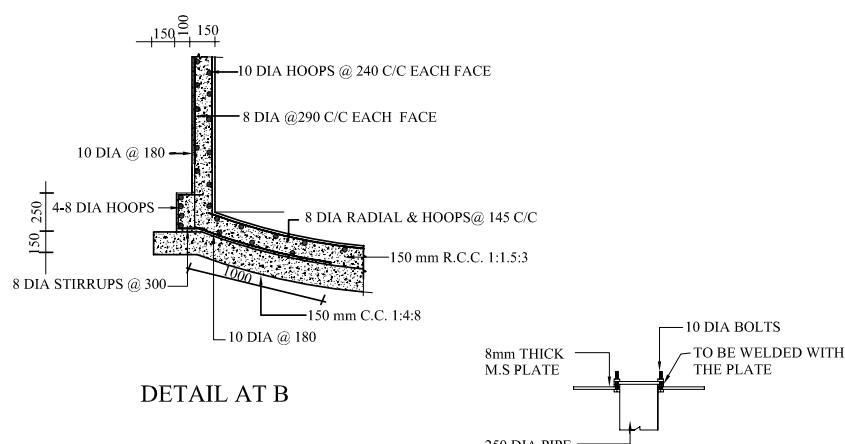
Annexures



DETAIL AT A



DETAIL AT B

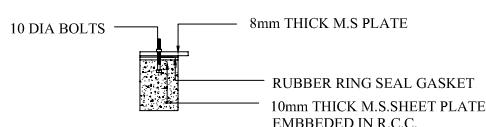


DETAIL AT B

DETAIL AT E

NOTE:

STEEL - TOR STEEL
CONCRETE - M- 200 GRADE
LAPS - 50 X DIA
COVER - 25
PAINT - INNER SURFACE WITH BITUMEN



ALL DIMENSIONS IN mm

DETAIL AT F

DESIGN OF 9 cum BIOGAS PLANT
CONNECTED TO 300 USERS SHAUCHALAYA
(SUB SOIL WATER LEVEL MORE THAN 3M. BELOW GROUND)

Annex 7B:

: Indicative Costs of a 9 m³ Capacity Sanitary Toilet Complex with a Biogas Plant

**Estimate of Fixed Dome Bio-gas Digester with Displacement Chamber Capacity 9 cum
(Rates Based on D.S.R. 2007)**

Sl. No.	Item	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1	2	3	4	5	6
1	Earth work in excavation over areas (exceeding 30 cm in depth, 1.50 m in width as well as 10 sqm on plan) including disposal of excavated earth lead upto 50 m and lift upto 1.5 m, disposed earth to be levelled and neatly dressed soft/loose soil				
	a) From 0.00 m to 1.50 m below G.L.	47.02	m ³	103.40	4,861.87
	b) From 1.50 m to 3.0 m below G.L.	42.14	m ³	122.30	5,153.72
	c) From 3.00 m to 4.50 below G.L.	29.11	m ³	141.20	4,110.33
	d) From 4.50 m to 6.0 m below G.L.	5.63	m ³	160.10	901.36
2	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	6.46	m ³	2,449.00	15,820.54
3(a)	Reinforced cement concrete work in arches, archribs, domes and vaults upto floor two level excluding cost of centering, shuttering and reinforcement with 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	5.75	m ³	4,092.35	23,531.01
b)	Reinforced cement concrete work in lintels, beams, plinth beams and bressumers upto floor two level excluding cost of centering, shuttering & reinforcement 1:1.5:3 (1 cement :1.5 coarse sand: 3 graded stone aggregate 20 mm nominal size)	1.98	m ³	4,092.35	8,102.85

Annexures

1	2	3	4	5	6
c)	Reinforced cement concrete work in walls (any thick-ness) including attached pilasters, fillets etc. upto floor two level excluding cost of centering, shuttering & reinforce-ment 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	9.21	m ³	4,092.35	37,690.54
d)	Reinforced cement concrete work upto plinth level excluding cost of centering, shuttering and rein-forcement with 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	1.26	m ³	4,092.35	5,156.36
e)	Reinforced cement concrete work in suspended floors, roofs, land-ings and balconies upto floor two level excluding the cost of centering, shuttering, finishing and reinforcement 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	1.41	m ³	4,092.35	5,770.21
f)	Providing, hoisting and fixing upto floor five level precast reinforced cement concrete in string courses, bands, copings, bed plates, anchor blocks, plain in window sills and the like including the cost of centering, shuttering, finishing but excluding the cost of reinforcement with 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	0.18	m3	4,092.35	736.62
4	Centering and shuttering including strutting, propping etc. & removal of form for : a) Ring Beams b) Circular walls (any thickness) including attached pilasters, but-tresses plinth and string courses etc. c) Arches, domes vaults upto 6 m span d) Suspended floor	11.56 127.55 17.22 9.43	m ² m ² m ² m ²	180.40 180.40 514.70 187.35	2,085.42 23,010.02 8,863.13 1,766.71
5	Reinforcement for R.C.C. work including bending, binding and placing in position complete cold twisted bars	21.85	Kg.	2,580.00	56,373.00

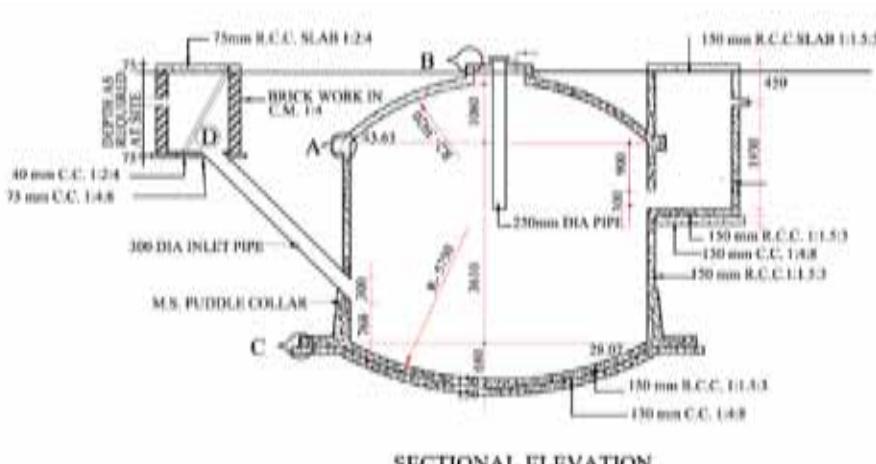
1	2	3	4	5	6
6	Brick work with bricks of class designation 75 in foundation and plinth in 1:4 cement work	1.43	m ³	2,529.05	3,616.54
7	12 mm cement plaster 1:3 (1 cement : 3 coarse sand) providing and mixing water proofing material in proportion recommended by the manufacturers, finished with a float coat of neat cement	7.84	m ²	112.80	884.35
8	Providing and laying S&S centri-fugally cast (spun) iron pipes (class LA) 300 mm dia.	3.8	m	2,800.00	10,640.00
9	Cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate) finished with a floating coat of neat cement including cement slurry, rounding off edges and strips etc. but excluding the cost of nosing of steps etc. complete, 40 mm thick	1.2	m ²	192.95	231.54
10	Providing & fixing PVC pipe 3.0 m long 250 mm dia. with flange and 0.50 m long 50 mm I.D. steel tube complete	1	Set	15,000.00	15,000.00
11	Steel work in bolted section for mild steel plates including cutting, hoisting, fixing in position and applying, a priming coat of approved primer	125.89	Kg.	46.35	5,835.00
12	Providing and fixing 10/12 mm thick rubber ring seal gasket under M.S. plate	1.33	m ²	2,000.00	2,660.00
13	Providing & fixing bolts and nuts upto 300 mm in length including nuts and washer plates				
a)	10 mm dia	7	Kg.	62.75	439.25
b)	20 mm dia.				
14	Providing & fixing 50 mm dia G.I. pipes complete with G.I. fittings including trenching and refilling (external work)	10	m	280.10	2,801.00

Annexures

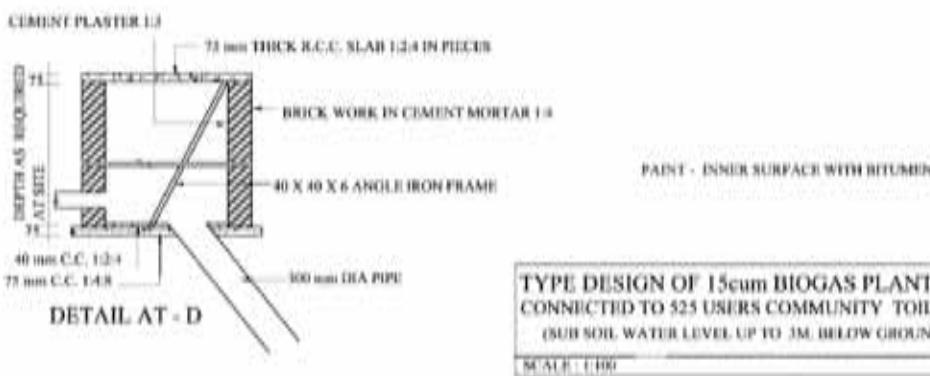
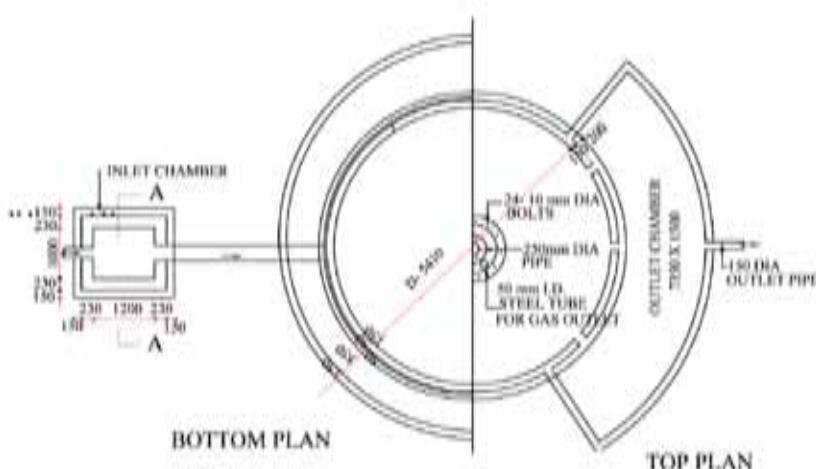
1	2	3	4	5	6
15	Providing and fixing safety valve of 50 mm dia.	1	Each	3,500.00	3,500.00
16	Providing & fixing brass stop cock of approved quality for gas outlet	1	Each	578.20	578.20
17	Steel work welded in built up sections, trusses and framed work including cutting, hoisting, fixing in position & applying a priming coat of approved steel primer in tees, angles, flats and channels	75	Kg.	61.50	4,612.50
18	Disposal of surplus earth by mechanical transport including loading, unloading upto 3 km	106.18	m ³	63.32	6,723.32
19	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in earth consolidating each depo-sited layer by ramming and watering, lead upto 50 m and lift upto 1.50 m	17.72	m ³	45.70	809.80
20	Supplying & applying bitumenous solution primer on roofs and/or wall surface at 0.24 lit. per sqm	117.12	m ²	14.65	1,715.81
21	Installation of well point equipment for lowering sub-soil water to required level by pumping during construction including removal of slips and mud etc. and removal of equipment after completion	Job	L.S.	-	5,000.00
22	Sheet piling work	Job	L.S.	-	5,000.00
23	Epoxy painting on concrete work on the inner surface of the digester & displacement chamber	117.12	m ²	77.75	9,106.08
24	Site clearance before and after completion	Job	L.S.	L.S.	5,000.00
				Total	288,087.11
	Add 26 % enhancement excluding items 10,12,15,24				59911.04
				Total	347,998.04
				Say Rs	348,000.00

Annex 8A:

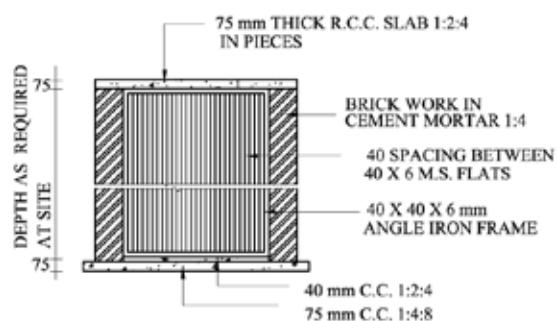
Drawings of a 15 m³ Capacity Biogas Plant Attached to a Sanitary Toilet Complex



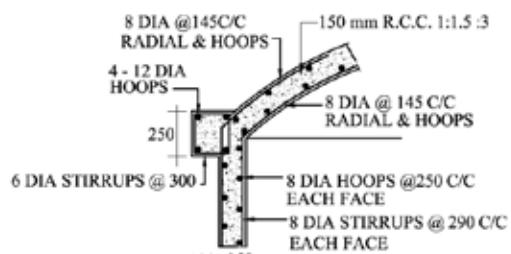
SECTIONAL ELEVATION



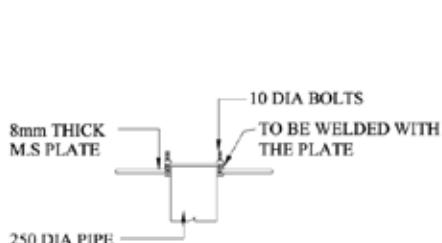
Annexures



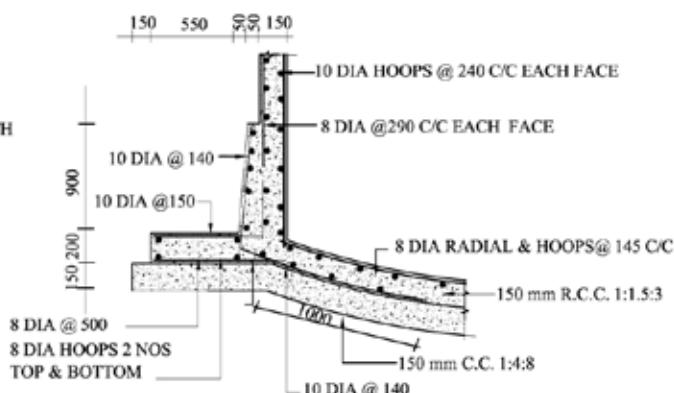
SECTION AT A-A



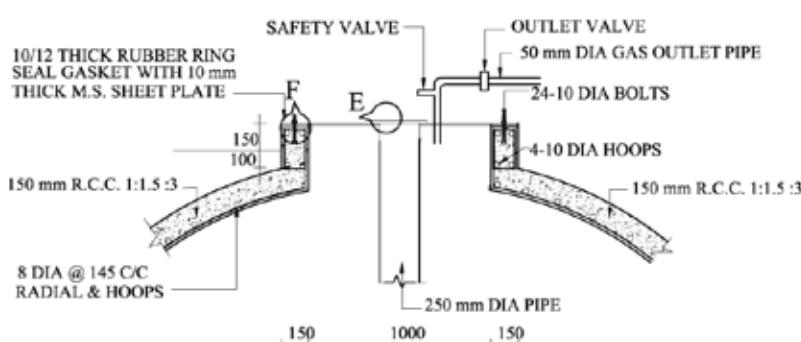
DETAIL AT A



DETAIL AT E



DETAIL AT B

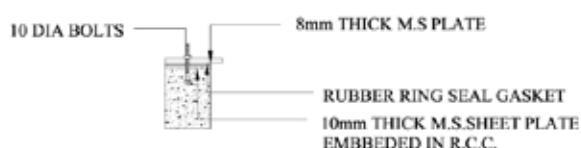


NOTE:

STEEL - TOR STEEL
CONCRETE - M- 200 GRADE
LAPS - 50 X DIA
COVER - 25
PAINT - INNER SURFACE WITH BITUMEN

DETAIL AT B

PAINT - INNER SURFACE WITH BITUMEN



DETAIL AT F

TYPE DESIGN OF 15cum BIOGAS PLANT CONNECTED TO 525 USERS COMMUNITY TOILET (SUB SOIL WATER LEVEL UP TO 3M. BELOW GROUND)

SCALE : 1:100

Annex 8B:

Indicative Costs for a 15 m³ Capacity Biogas Plant Attached to a Sanitary Toilet Complex

Estimate of Fixed Dome Bio-gas Digester with Displacement Chamber Capacity 15 cum FOR 525 Users (Rates Based on D.S.R. 2007)						
Sl. No.	Item	Qty.	Unit	Rate (Rs.)	Amount (Rs.)	
1	2	3	4	5	6	
1	Earth work in excavation over areas (exceeding 30 cm in depth, 1.50 m in width as well as 10 sqm on plan) including disposal of excavated earth lead upto 50 m and lift upto 1.5 m, disposed earth to be levelled and neatly dressed soft/loose soil					
a)	From 0.00 m to 1.50 m below G.L.	76.67	m ³	103.40	7,927.68	
b)	From 1.50 m to 3.0 m below G.L.	73.52	m ³	122.30	8,991.50	
c)	From 3.00 m to 4.50 below G.L.	62.95	m ³	141.20	8,888.54	
d)	From 4.50 m to 6.0 m below G.L.	38.68	m ³	160.10	6,192.67	
2	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering all work upto plinth level 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size)	10.29	m ³	2,449.00	25,200.21	
3(a)	Reinforced cement concrete work in arches, archribs, domes and vaults upto floor two level excluding cost of centering, shuttering and reinforcement with 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	8.37	m ³	4,092.35	34,252.97	
b)	Reinforced cement concrete work in lintels, beams, plinth beams and bressumers upto floor two level excluding cost of centering, shuttering & reinforcement 1:1.5:3 (1 cement : 1.5 coarse sand: 3 graded stone aggregate 20 mm nominal size)	4.37	m ³	4,092.35	17,883.57	

Annexures

1	2	3	4	5	6
c)	Reinforced cement concrete work in walls (any thick-ness) including attached pilasters, fillets etc. upto floor two level excluding cost of centering, shuttering & reinforce-ment 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	16.14	m ³	4,092.35	66,050.53
d)	Reinforced cement concrete work upto plinth level excluding cost of centering, shuttering and rein-for-cement with 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	1.77	m ³	4,092.35	7,243.46
e)	Reinforced cement concrete work in suspended floors, roofs, land-ings and balconies upto floor two level excluding the cost of centering, shuttering, finishing and reinforcement 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	2.03	m ³	4,092.35	8,307.47
f)	Providing, hoisting and fixing upto floor five level precast reinforced cement concrete in string courses, bands, copings, bed plates, anchor blocks, plain in window sills and the like including the cost of centering, shuttering, finishing but excluding the cost of reinforce-ment with 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	0.18	m ³	4,092.35	736.62
4	Centering and shuttering including strutting, propping etc. & removal of form for :				
a)	Ring Beams	11.37	m ²	180.40	2,051.15
b)	Circular walls (any thickness) including attached pilasters, but-tresses plinth and string courses etc.	201.73	m ²	180.40	36,392.09
c)	Arches, domes vaults upto 6 m span	25.81	m ²	514.70	13,284.41
d)	Suspended floor	14.13	m ²	187.35	2,647.26

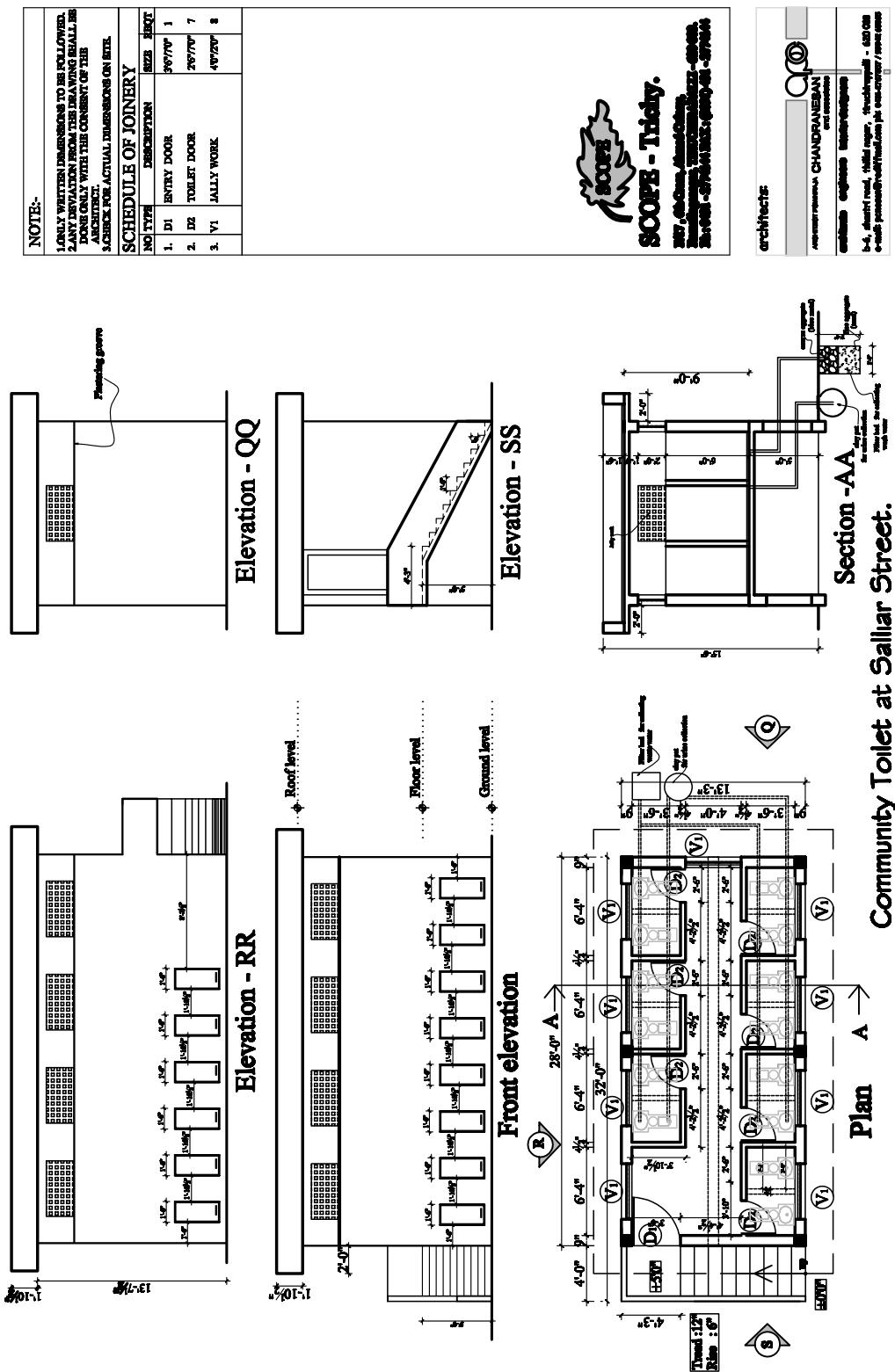
1	2	3	4	5	6
5	Reinforcement for R.C.C. work including bending, binding and placing in position complete cold twisted bars	42.70	Kg.	2,580.00	110,166.00
6	Brick work with bricks of class designation 75 in foundation and plinth in 1:4 cement work	1.43	m ³	2,529.05	3,616.54
7	12 mm cement plaster 1:3 (1 cement : 3 coarse sand) providing and mixing water proofing material in proportion recommended by the manufacturers, finished with a float coat of neat cement	6.46	m ²	112.80	728.69
8	Providing and laying S&S centri-fugally cast (spun) iron pipes (class LA) 300 mm dia.	3.95	m	2,800.00	11,060.00
9	Cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate) finished with a floating coat of neat cement including cement slurry, rounding off edges and strips etc. but excluding the cost of nosing of steps etc. complete, 40 mm thick	1.2	m ²	192.95	231.54
10	Providing & fixing PVC pipe 3.0 m long 250 mm dia. with flange and 0.50 m long 50 mm I.D. steel tube complete	1	Set	15,000.00	15,000.00
11	Steel work in bolted section for mild steel plates including cutting, hoisting, fixing in position and applying, a priming coat of approved primer	83.35	Kg.	46.35	3,863.27
12	Providing and fixing 10/12 mm thick rubber ring seal gasket under M.S. plate	1.33	m ²	2,000.00	2,660.00
13	Providing & fixing bolts and nuts upto 300 mm in length including nuts and washer plates				
a)	10 mm dia				
b)	20 mm dia.	7	Kg.	62.75	439.25
14	Providing & fixing 50 mm dia G.I. pipes complete with G.I. fittings including trenching and refilling (external work)	10	m	280.10	2,801.00

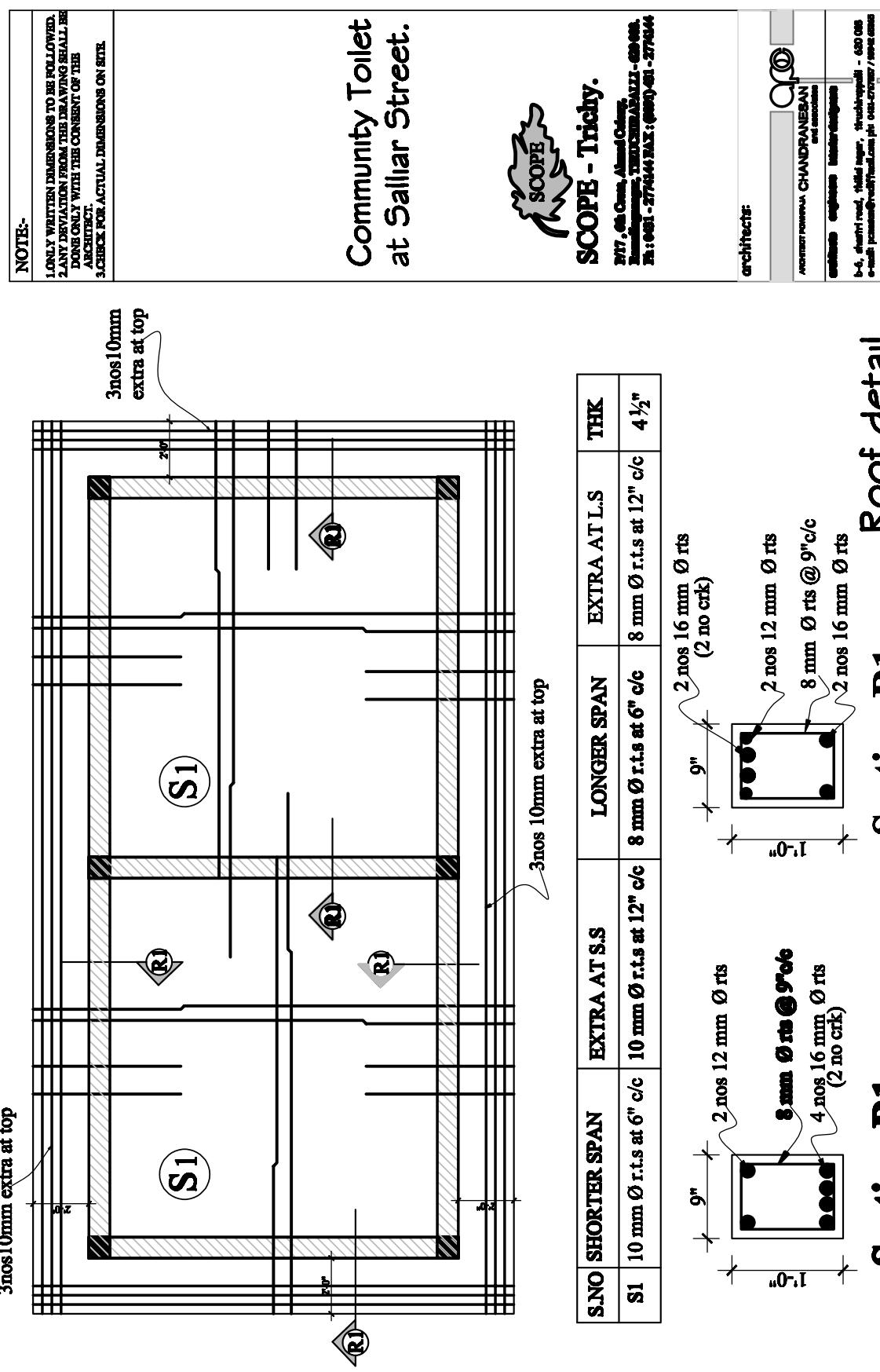
Annexures

1	2	3	4	5	6
15	Providing and fixing safety valve of 50 mm dia.	1	Each	3,500.00	3,500.00
16	Providing & fixing brass stop cock of approved quality for gas outlet	1	Each	578.20	578.20
17	Steel work welded in built up sections, trusses and framed work including cutting, hoisting, fixing in position & applying a priming coat of approved steel primer in tees, angles, flats and channels	75	Kg.	61.50	4,612.50
18	Disposal of surplus earth by mechanical transport including loading, unloading upto 3 km	185.94	m ³	63.32	11,773.72
19	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in earth consolidating each depo-sited layer by ramming and watering, lead upto 50 m and lift upto 1.50 m	65.88	m ³	45.70	3,010.72
20	Supplying & applying bitumenous solution primer on roofs and/or wall surface at 0.24 lit. per sqm	178.58	m ²	14.65	2,616.20
21	Installation of well point equipment for lowering sub-soil water to required level by pumping during construction including removal of slips and mud etc. and removal of equipment after completion	Job	L.S.	-	7,000.00
22	Sheet piling work	Job	L.S.	-	5,000.00
23	Epoxy painting on concrete work on the inner surface of the digester & displacement chamber	178.58	m ²	77.75	13,884.60
24	Site clearance before and after completion	Job	L.S.	L.S.	5,000.00
					453,592.34
	Add 26% enhancement excluding item no. 10, 12, 15 and 24 on Rs. 415,432.34				108,012.41
			Total		561,604.74
			Say		561,600.00

Annex 9A:

Detailed Drawing of a 14-seat ECOSAN Toilet





Annex 9B:**Indicative Cost of a 14-seat ECOSAN Toilet**

Estimate for the Community Ecosan Toilet at Salar Street, Musiri.
Abstract Estimate for One Block

Sl. No.	Description	Qty.	per	Rate	Amount in Rs.
1	2	3	4	5	6
1	Earth work excavation in all kind of soils except hard rock requiring plastering etc., complete.	25.23	cum	88.00	2220.24
2	Supplying and filling the clear river sand for foundation and basement including watering and ramming and consolidating etc., complete.	7.51	cum	375.00	2816.25
3	P.C.C 1:5:10 using 40 mm size watering and curing etc. complete.	7.51	cum	1440.00	10814.4
4	Matt concrete R.C.C.1:2:4	4.08	cum	9290.00	37903.20
5	Column Concrete 1:2:4	1.91	cum	11180.00	21353.80
6	Beam Concrete 1:2:4 slit roof	3.24	cum	11180.00	36223.20
7	Roof Concrete 1:2:4	10.44	cum	7150.00	74646.00
8	Brick Work in cm1:5 mix using well burnt bricks for superstructure etc. complete	42.19	sqm	1750.00	73832.50
9	4½"Brick Work in cm1:5 mix using etc. complete	55.94	sqm	1825.00	102090.50
10	Outer wall plastering with c.m. 1:5 mix using 12mm thick	117.87	sqm	62.00	7307.94
	Inner wall plastering	251.87	sqm	62.00	15615.94
11	Ceiling Plastering	70.25	sqm	64.00	4496.00

Annexures

1	2	3	4	5	6
12	Weathering Course Tiles	51.30	sqm	325.00	16672.50
13	Precast jally fixing	6.32	sqm	340.00	2148.80
14	Main doors & others	13.34	sqm	1400.00	18676.00
15	Painting Area	322.12	sqm	70.00	22548.40
16	Wall tiles	61.94	sqm	350.00	21679.00
17	Plumbing works		L.S.		14000.00
18	Water tank		L.S.		5000.00
19	Closets	7	nos	600.00	4200.00
20	Urinals collection & waste water		L.S.		5000.00
21	Electrical for lighting	15	Nos.	600.00	9000.00
	TOTAL				508244.67
	Abstract for the Complex				
	Estimate for Two blocks				1,016,489.34
	Counter				10,000.00
	Borewell				8,000.00
	Pump for borewell including all fittings				7,000.00
	Electrical Service Connection with deposit				10,000.00
					1,051,489.34
				say	1,050,000.00





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सत्यमेव जयते



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