

WATER AND SANITATION  
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# LATRINE CONSTRUCTION WORKSHOP

Gerihun, Sierra Leone  
28 November - 9 December 1983

WASH FIELD REPORT NO. 114

JANUARY 1984

The WASH Project is managed  
by Camp Dresser & McKee  
Incorporated. Principal  
Cooperating Institutions and  
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Prepared for:  
USAID Mission to the Republic of Sierra Leone  
Order of Technical Direction No. 166

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January 31, 1984

Mr. William Lefes  
USAID Mission  
Freetown, Sierra Leone

Dear Mr. Lefes:

On behalf of the WASH Project I am pleased to provide you with 10 (ten) copies of a report on the Latrine Construction Workshop held in Gerihun, November 28 - December 10, 1983.

This is the final report by Vernon Razak and Max Kroschel and is based on their trip to Sierra Leone from November 21 and to December 13, 1983.

This assistance is the result of a request by the Mission on March 19, 1983. The work was undertaken by the WASH Project on October 12, 1983 by means of Order of Technical Direction No. 166, authorized by the USAID Office of Health in Washington.

If you have any questions or comments regarding the findings or recommendations contained in this report we will be happy to discuss them.

Sincerely,

*Dennis B. Warner*

Dennis B. Warner, Ph.D., P.E.  
Director  
WASH Project

cc. Mr. Victor W.R. Wehman, Jr., P.E., R.S.  
AID WASH Project Manager  
S&T/H/WS

DBW:ybw

The WASH Project is managed by Camp Dresser & McKee Incorporated. Principal Cooperating Institutions and subcontractors are: International Science and Technology Institute; Research Triangle Institute; University of North Carolina at Chapel Hill; Georgia Institute of Technology—Engineering Experiment Station.

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Prepared for the USAID Mission to the Republic of Sierra Leone  
Under Order of Technical Direction No. 166

Prepared by:

Vernon Razak

and

Max Kroschel

January 1984

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## EXECUTIVE SUMMARY

WASH conducted a two week workshop on Latrine Construction Projects in Gerihun, Sierra Leone, November 28 to December 9, 1983. The workshop was co-sponsored by USAID, Peace Corps, the Ministry of Health (MOH), the Ministry of Energy and Power (MEP), the United Nations Development Project (UNDP) and CARE. The overall purpose of the workshop was to increase the participants' skills in planning and implementing latrine construction projects in villages. The array of skills included construction techniques, community mobilization, health education, and the maintenance and repair of latrines. A second purpose was to try out the recently developed WASH Training Guide on latrine construction and, as a result of the workshop, make final revisions.

There were 25 participants in the workshop. Thirteen were attached to MEP, eight to the MOH, and two to CARE. With one exception, all participants were involved in either community health or rural water supply projects.

The workshop utilized classroom and field activities to give participants a balance of theory and practice. Participants carried out such tasks as building forms and pouring concrete, installing slabs, conducting a sanitary survey, designing educational programs, building shelters, and project planning. Participants worked in construction teams of four persons each. Each construction task had a team leader who was responsible for completing a specific phase of building the latrine. This allowed participants to learn about effective team work and leadership.

The workshop was well received by the participants. The overall evaluation rating was 3.98 on a 5 point scale. The construction aspects of the workshop were cited as most valuable. Many participants felt that there should have been more time allotted to discussion of community involvement and education. All participants felt that the workshop should be made available to similar groups throughout the country.

The WASH trainers made several recommendations regarding future training. They include the following:

- Additional workshops should be held to assure appropriate implementation for Ventilated Improved Pit (VIP) latrine projects.
- Future workshops should maintain the mix of participants who attended in this workshop.
- Focus should be increased on developing skills in community organization and health education strategies.

Regarding workshop administration, the trainers recommended:

- Pre-workshop announcements should describe the purpose, goals, and "hands-on" aspect of the program.

The WASH trainers also recommended that MEP make several design changes in its standard VIP design. These included use of less cement and re-bar reinforcement.

## ACKNOWLEDGEMENTS

A project-oriented workshop requires a significant amount of logistical support and coordination. Indeed this workshop could not have happened were it not for the work of several individuals. The trainers gratefully acknowledge their contribution.

Jim Griffin of the Peace Corps assumed a lead role in the planning and conducting of the workshop. Not limited to the "administration" of such an effort, he willingly contributed his talent and labor to the preparation of the latrine sites. His help and leadership are gratefully acknowledged as the "king pin" of this effort.

Keith Patterson, Training Site Administrator, and Francis Abu, Assistant Site Administrator, provided generously for the trainers' living arrangements and patiently and tirelessly responded to on-site requests for materials and coordination of labor. Kudos to their entire staff for making the stay in Gerihun comfortable, fulfilling, and successful.

Mr. William Lefes, AID Affairs Officer, was instrumental in supporting this effort. Damion Gagnon, Rural Water Advisor in the UNDP Rural Water Supply Project, was active in planning and coordination during the workshop preparation.

Appreciation is also expressed for those who contributed to the planning of the workshop:

- Mr. Alex Harleston, Deputy Chief Engineer, MEP
- Ms. Marge Tsitouris, Assistant Director, CARE
- Mr. Vandi Dauda, Senior Health Supervisor, MOH, Bo
- Mr. Bob Friedman, Chief Technical Advisor, UNDP, Rural Water Supply Project
- Mr. Alieu Musa, APCD Training, Peace Corps
- Dr. Conteh, Coordinator, Environmental Health Education, Rural Water Supply Program

Everything has a beginning. Apparently Gail Morrow, APCD Sierra Leone, started the ball rolling. Craig Hafner acted as a similar impetus in WASH.

The WASH trainers were ably assisted by Mr. R.C. Davies, Engineer MEP, and A.B. Manseray, PHI. The trainers' praises were echoed by the participants who noted their contributions to the technical and programmatic success of the workshop.

Finally, many thanks to the people of Gerihun who treated us warmly and gave their time and labor to insure a successful project.



One of six latrines completed  
by participants.

## Chapter 1

### BACKGROUND AND INTRODUCTION

#### 1.1 Background

The Ministry of Health (MOH) and the Ministry of Energy and Power (MEP) with support from CARE, the United Nations Development Program (UNDP), and the U.S. Peace Corps (PC) have programs directed toward improving the general health of the people of Sierra Leone. Two programs, Community Health (MOH/PC) and the Rural Water Supply (RWS) Project (MEP/UNDP), are directed towards improving sanitation, primary health care, and water sources throughout the country. The Peace Corps Volunteers (PCV), Public Health Inspectors (PHI), and Chief Health Overseers (CHO) involved in these program plan and implement a variety of projects including establishing health centers, conducting clinics, delivering educational programs on health and sanitation topics, constructing wells, and improving sanitation systems and practices.

As a part of the efforts of the MOH and MEP there has been an increased focus on the need for sanitary disposal of excreta. Workers in the Community Health Project have been constructing pit privies in several villages. The RWS Project, in addition to developing wells, is also charged with providing latrines to communities. Current MEP plans under the RWS project call for the introduction of 33 ventilated improved pit (VIP) latrines in each of three provinces. Community health workers and CARE have already completed dozens of VIP latrines for use by individuals and institutions. It is from these efforts that the need for further training in the area of planning and implementing latrine projects became apparent.

#### 1.2 Introduction

In March 1983 the U.S. Agency for International Development (USAID) formally requested technical assistance from the Water and Sanitation for Health Project (WASH) to develop and conduct a workshop on latrine construction.

This request capped several months of coordinated effort between local and donor agencies. Initial discussions followed a visit by Craig Hafner of the WASH Project to Sierra Leone in January, 1983. In discussions with Gail Morrow, Associate Peace Corps Director, the general idea of a workshop was developed. While two workshops were initially envisioned scheduling, difficulties reduced the request to one. Correspondence between WASH and Sierra Leone led to a more specific request for a workshop addressing the construction of VIP latrines. The request also stipulated an emphasis on community involvement and health education skills.

Order of Technical Direction No. 166 was issued on October 12, 1983 for one workshop to be conducted in Sierra Leone from 28 November to 9 December 1983. To implement the workshop two WASH consultants were identified. The Training Specialist was to be Vernon Razak, a private consultant in training program design with extensive experience in the developing world. The Technical Specialist identified was Max Kroschel, a civil engineer with background in the use of appropriate technology for the design and installation of a variety of construction projects.

This report is a summary of the activities undertaken in the planning and conduct of the workshop. In addition to a description of the workshop content and methodology, a summary of the workshop evaluations is also included. Final chapters list recommendations for future training and describe the construction techniques used in the workshop.

## Chapter 2

### PLANNING THE WORKSHOP

The preparation and planning for the workshop were shared by the donor and host agencies, WASH, and the village of Gerihun.

#### 2.1 Initial Request

The initial request for this workshop came from Peace Corps to USAID. The scope of services requested was as follows:

- A. To plan and conduct a two-week workshop covering the following:
  - Mobilizing the Community for a Sanitation Project
  - Conducting a Technical Assessment
  - Methods of Waste Disposal
  - Local Beliefs and Customs
  - Strategies for Gaining Community Acceptance
  - Formation of a Project Team
  - Planning a Project
  - Site Evaluation
  - Latrine Construction Practicals
  - Operation and Maintenance of Latrines
  - Health Education Strategies
  - Project Development and Planning Skills
- B. To develop all necessary training materials.
- C. To provide a list of all logistic requirements.
- D. To train 25 Ministry of Energy and Power staff, Ministry of Health staff, and PCV's in improved sanitation methods.
- E. To provide a trainer's guide for a two week workshop.
- F. To submit a final report including a summary of planning activities, workshop content, results, and recommendations.

A subsequent request from Peace Corps reaffirmed the need for emphasis on community organization and health education techniques. Also added was a request to utilize two Sierra Leonean co-trainers in order to introduce them to experiential training techniques.

#### 2.2 Planning

The program was a joint activity of the Peace Corps, the Ministry of Energy and Power (MEP), the United Nations Development Program (UNDP), and the Ministry of Health (MOH). Each organization carried out a different role in support of the workshop. Peace Corps provided overall coordination of the program including supplying WASH with country and program specific data regarding the purpose and application of the workshop. Peace Corps was also responsible for the provision of the training site (including meals and lodging), payment of laborers, and transport costs of PCVs and counterparts.

UNDP provided all construction equipment and tools as well as transport for MEP participants. MOH loaned tools and construction materials and provided transport for MOH participants. Each organization was involved in the development of the request for the workshop and in planning meetings prior to the arrival of WASH consultants.

As a result of several personal, telephone, and telegraphic communications it was determined that six VIP latrines would be constructed in the village of Gerihun. As nearly as possible these latrines were intended to conform to MEP specifications which allow for single slab ventilated latrines with a shelter built of locally available materials. For demonstration purposes three shelters were to be built of clay blocks and three of mud and wattle. One block latrine would be fitted with a tin roof while the remaining five were to be palm thatch roof.

### 2.3 Training Staff

The training staff consisted of two WASH consultants and two Sierra Leoneans. As previously stated, the WASH team was composed of one engineer who was a specialist in the construction of latrines using appropriate technology, and a trainer skilled in workshop design and training delivery. The two Sierra Leonean trainers complemented the skills of the WASH team. One was an MEP civil engineer with experience in the design and construction of VIP latrines. The second was a Public Health Inspector with extensive experience in health education and community organization. Though both local trainers had limited training experience, they assumed a key role in the workshop sessions and assisted in the construction process.

### 2.4 Workshop Site and Logistics

The workshop was held in the village of Gerihun approximately 15 kms east of Bo in the Southern Province. The village of Gerihun is indicated on Figure 1, "Map of Sierra Leone." The site had previously been used as the location for Peace Corps pre-service training and was well equipped to house the participants and support the workshop. Gerihun has approximately 200 houses and a population estimated to be 2,200. Since the community had experience with previous Peace Corps programs, the staff and participants were well received. Participants and staff were housed in a local guest house and in rooms rented from individual families. Three meals were provided each day in a centrally located dining hall. Classes were held in a thatched "bafa," an open sided thatched roof structure. In the bafa there were wooden benches and tables. Three large flip chart easels/chalkboards were used for visual aids. A second bafa and the office porch provided ample break out space for small group work and centralized construction tasks. Field work took place in six sections of the village where the latrines were constructed. Logistics and coordination of the site was provided by two site administrators and a secretary. Two vehicles were available for transport of construction materials and trips to Bo for purchasing supplies. Latrine sites were within short walking distance of the teaching bafa.



## 2.5 Site Construction Preparation

A critical factor in the success of the workshop was the extensive procurement and site preparation work that was done prior to the arrival of the WASH team. Six laborers were hired to complete a variety of tasks. Each latrine pit was dug before the workshop in order to ensure project completion. Originally pits were dug, per instruction from WASH, to a depth of 2.5 meters. At the request of the villagers and MOH these were later deepened to an average of 4 meters. Other preparations included the making of clay blocks with a Cinvaram machine cutting poles, wattle and thatch, and gathering sand, gravel, and stone. In addition, a wide assortment of tools and construction materials were purchased. See Appendix C for a list of materials and supplies assembled for the workshop.

## 2.6 WASH Consultant Preparation

For the schedule of consultant orientation and preparation, see Appendix D. The WASH team was provided a package of materials describing Sierra Leone, the Community Health and Rural Water Programs, sanitation programs, and sanitation practices in the country. During two days of briefing in Washington, D.C. the team received further briefings on the training program, reviewed cable and written correspondence, and made final preparations for workshop materials.

Upon arrival in country the team met with key Peace Corps, MEP/UNDP, and MOH staff. One result of these meetings was to learn that MEP had developed a design for the VIP latrine in Sierra Leone. While the design was quite specific about dimensions and construction of the slab and vent pipe, it allowed for flexibility in the materials used for the shelter. Further meetings were held with the engineer who developed the design (and who was also the Sierra Leonean co-trainer). During these meetings, as well as and with the MEP Chief Engineer, the WASH team was asked to recommend any changes which would enhance the design and reduce its cost.

As the end of the first week in-country the team visited several latrine projects. These site visits were of great value in orienting the WASH team to local construction methods, soil conditions, and materials availability.

Based on the Freetown meetings and the site visits, the design of the latrine included in the WASH workshop was modified to account for MEP requirements and local conditions in country. The latrine design is discussed in detail in Chapter 5.

## Chapter 3

### IMPLEMENTATION

#### 3.1 Participants

There were 25 participants in the workshop. However, by prior arrangement two participants attended only selected sessions. Of the total group, eight were PCVs working with the Community Health or the Wells project. Six were Sierra Leonean Public Health Inspectors or Chief Health Overseers (CHOs) currently assigned as counterparts to PCVs. Seven were with the UNPD wells program. Three attended from other assignments including CARE and the International Labour Organization (ILO). A list of participants and their assignments is attached as Appendix A. The Chief Health Overseer from Gerihun attended by special request even though he is not involved in the Community Health or Rural Water Supply Programs.

The participants' skills represented the full array of those needed to implement a latrine construction project. There were health educators, masons, one carpenter, and several sanitation specialists. Several had experience building pit privies. Most were experienced in organizing communities. However, most of the participants lacked experience in one or more of the skills required. Some were using a hammer for the first time while others had no experience carrying out an education program. A 'Participant Experience Survey' (Appendix B) was completed at the beginning of the workshop. This survey was used to form construction teams which represented the various skills required to implement a latrine project and to orient the trainers to the participants' background.

#### 3.2 Workshop Content and Schedule

The trainers used the WASH training guide on latrine construction as the basis for the workshop. The guide included both the technical construction skills needed to build latrines and the communication and education skills needed to mobilize and inform the community.

Figure 2, "Latrine Construction Workshop," describes the overall purpose of the workshop and lists the major goals of the program.

#### 3.3 Methodology

The workshop focused on practical activities with active participation stressed throughout and the methodology was based on experiential learning techniques. Specific activities included field work, small and large group discussions, problem-solving, case studies, role plays, short lectures, and reading. While lectures were kept to a minimum each learning objective was supported by detailed handouts.

Participants worked in teams of four or five to do the field work in one section of the village. The role of team leader was rotated for each of the major planning and construction tasks. Discussions were held at the end of each phase regarding teamwork, leadership, and construction techniques.

## Figure 2. Latrine Construction Workshop

PURPOSE: To increase participants' ability to assist communities to organize, implement, and maintain sanitary waste disposal projects.

THEME: Planning, constructing, and maintaining appropriate and economical latrines with active community involvement.

GOALS: At the end of the training, participants will be able to:

- define sanitation and recognize the impact of latrines
- understand the relationship between sanitary waste disposal and the spread of disease
- understand and identify critical steps necessary to mobilize a community for any latrine project.
- identify community factors related to the construction, acceptance, and use of latrines
- assess local physical conditions relating to improved sanitation
- identify human and material resources and their availability for constructing a latrine
- develop strategies to help the community make an appropriate choice from among alternative types of latrines
- develop a plan for a latrine project
- construct a latrine appropriate for the village
- identify strategies for the continued operation, maintenance, repair, and replacement of latrines
- develop a plan to implement a latrine project for "back home" application
- apply the workshop experience to other types of sanitation projects.

Figure 3. "Sierra Leone Latrine Workshop Design," shows the schedule of sessions as they were actually held.

The workshop day was divided into morning and afternoon sessions. The hours were:

AM Session	8:00 - 1:00 p.m.
LUNCH	1:00 - 2:30
PM Session	2:30 - 6:00
Dinner	6:00 - 7:00

One evening session was held on Day Three for about one hour after dinner. There were no sessions on the afternoon of Day Six or on Day Seven.

Teams were also responsible for involving the community in the construction of the latrine. In addition, each team prepared an orientation program for the community to educate them in the maintenance of the VIP latrine. Each team was assisted by at least one laborer. A total of 12 laborers were available during the construction phases. The training staff worked as technical advisors to the construction teams and coordinated the distribution of labor and materials.

#### 3.4 Results

Soil conditions, availability of equipment and rain forced a change in the types of latrines constructed. Rather than three clay block shelters and three mud and wattle shelters, all six structures were built of mud and wattle. Two shelters were given zinc pan roof and the other four palm thatch roofs. No latrines were lined since the soil was hard.

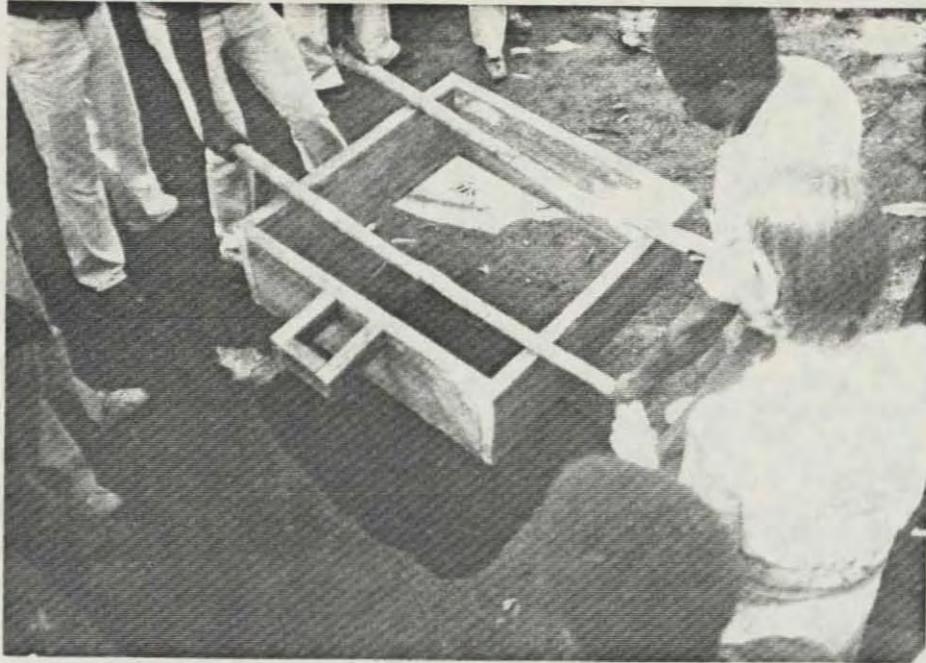
In addition to constructing six latrines, the following were developed by the participants:

- designs for five twenty-minute sessions on a variety of sanitation topics including control of rats, use of latrines, rehydration therapy, cleaning the house, and keeping the compound clean.
- Strategies for involving the community in the decision-making, planning, and implementing of a latrine project.
- Approaches to educating the community on the advantages of the VIP latrine as well as how to maintain and repair it.

Figure 3. Sierra Leone Latrine Workshop Design

Day One	Day Two	Day Three	Day Four	Day Five	Day Six
o Introduction to Workshop	o Community Mobilization and Information Gathering	o Planning a Latrine Construction Project	o Concrete Slab Construction <u>Field Work</u>	o Lining the Pit o Community Decision-Making	o Project Information and Development Strategies
-----LUNCH-----					
o Sanitation Latrines and Health	o Conducting a Sanitary Survey  o Types and Selection of Latrines	o Site Selection Base and Pit Construction  <u>Field Work</u>	<u>Field Work</u>	o Community Decision Making (Cont'd)	
-----LUNCH-----					
Day Eight	Day Nine	Day Ten	Day Eleven	Day Twelve	
o Improving Traditional Latrines	o Latrine Shelter Construction	o Latrine Shelter Construction	o Latrine Completion	o Planning your Latrine Project	
o Repair and Maintenance of Latrines	<u>Field Work</u>	<u>Field Work</u>	<u>Field Work</u>	o Workshop Evaluation and Closure	
-----LUNCH-----					
o Installation of Latrine slabs o Latrine Shelter Construction	<u>Field Work</u>	<u>Field Work</u>	<u>Field Work</u>  o Project Review Comm.  o Project Planning		

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Placing the form for the base.



Placing rebar in the slab.

## Chapter 4

### ASSESSMENT OF THE WORKSHOP

#### 4.1 Participant Evaluation

At the end of the workshop, participants were asked to complete a three part evaluation form (Appendix E). First, they rated the attainment of the thirteen learning objectives presented in the first session of the workshop on a scale of one (low) to five (high). In the remaining two sections they were asked to comment on various aspects of the workshop. Following is a summary of the participant evaluations.

##### 4.1.1 Goal Attainment

The overall rating was 3.98 with a high of 4.31 on a specific question and a low of 3.48. The questions relating to latrine construction, maintenance, and planning (#4, 5, 7, 8, 9) were all above 4. Two questions (Nos. 3 and 6) regarding mobilizing the community and identifying human and material resources were given relatively low ratings (3.54 and 3.59). It is interesting to note that these two essential elements were discussed theoretically but, in effect, not practiced due to time constraints (i.e., the community had been mobilized by Peace Corps, persons identified and contacted, and materials estimated and arranged for prior to the workshop). Average ratings for each of the workshop goals is included with the Evaluation Form in Appendix C.

##### 4.1.2 Specific Comments on the Workshop

###### 1. What have been the most positive things about this workshop?

Most participants felt that learning about the VIP latrine and its construction were the most positive aspects. Several participants specifically listed hands-on experience as being valuable. Several others liked the numerous hand-outs which expanded on topics discussed during the sessions. A few commented on the concrete mix used for the slab.

###### 2. What have been the most negative things about this workshop?

Several participants wanted more construction time. There were three responses about lack of team work and cooperation. One person thought the workshop was too trouble free and therefore unrealistic. About 25 percent of the participants had no negative comments to make.

###### 3. What stands out as important to you in this workshop?

The majority of the participants commented about learning how to build a VIP latrine, hands-on experience, and particular technical details of construction. There was one comment about the importance of the initial contact with the village. Several participants commented on building the foundation and the

slab with one bag of cement and what a cost savings that represented. One participant commented on the scheduling and another on the importance of teaching methods for health education.

4. What things have you learned that you did not know before?

The majority (80 percent) responded about learning how to build a VIP latrine. There were several responses about particular construction skills like calculating and measuring board lengths for framework. Some participants cited the project cycle, steps in giving a workshop and estimating project costs.

4.1.3 Workshop Organization and Training

1. What comments do you have about the way the workshop was planned and organized?

Most participants felt the workshop was extremely well planned and organized. Those who felt strongly that it was not well planned cited the lack of per diem as the reason. Others suggested that the workshop would have been improved if (1) cross-cultural issues in the group had been addressed, (2) the training area had been less noisy, and (3) laborers had been better organized. Several participants commented on the effective pace of the sessions and the trainers' responsiveness to participants' needs.

2. What can be done in the future to improve a workshop like this?

Over half of the participants recommended the payment of per diem or supply of soap, kerosene, and bedding. Several felt that the community should be more actively involved in the training. Some asked that health education and community involvement be more thoroughly addressed. Individual suggestions included more recreation time, a less crowded training site, and more time for problem-solving. Several participants recommended no change in the program.

3. What specific steps in developing a latrine project do you feel you will need to learn more about in order to successfully promote and develop a project in the future?

Six of the participants responded that they needed to know more about funding sources and access to materials and funds. Six felt their training was adequate and they needed to study their notes and printed materials. Five left the question blank. Three participants felt they needed more experience in community mobilization and construction skills. One participant felt he/she needed to know Mendé (the prominent tribal language in the area).

4. What comments do you have about the trainers?

Participants' response to the question on trainers was quite positive. They commended the trainers for presentation skills, technical knowledge, responsiveness, and adaptability. Special mention was made of the two Sierra Leonean co-trainers, one for his facilitation skills and encouragement, the other for his technical expertise and helpfulness during the hands-on sessions.

## 4.2 Trainer Assessment

The trainers felt that the workshop was successful in achieving its goals. Given the plans for introduction of VIP latrines into many locations, this workshop seemed to be an important step for Sierra Leone. The participants were eager to learn the entire range of skills required to plan and implement a latrine project, although it should be noted their main interest was in learning about VIP latrines and how to build them. This interest is easily understandable since the PCVs, PHIs, and most of the CHOs were already conversant in the techniques of community mobilization and health education.

As reflected in the participant evaluations, the WASH trainers' guide on latrine construction served as an excellent basis for the workshop. The original training design withstood modifications in the sequence and detail of some sessions. These modifications, however, did not detract from the purposes or goals of the program. Rather they responded to the trainers' sense given specific needs in Sierra Leone of what was required for the participants to achieve a satisfactory capability in each of the skill areas. Some resequencing was also necessary to account for completion of field work.

The combination of two trainers with complementary training and technical skills and styles was an important factor in maintaining a balance of community organization and education aspects and construction.

Since the arrangements with the community and procurement of labor and materials had already been completed prior to the workshop, participants had little opportunity to practice those skills. However, it seems that this is a necessary sacrifice in favor of other objectives and with deference to a 12-day program.

For future workshops it should be emphasized that the arrangements for materials, the digging of pits, and the hiring of laborers is pivotal to the uses of the workshop. This requires that decisions be made early and wisely. In particular the number and placement of latrines must be designated. The types of shelters to be constructed must be determined so that the time-consuming job of gathering building materials may be completed. Had these decisions and arrangements not been so well coordinated, it would have been impossible to complete the latrines by the end of the workshop.

Additional advice for conducting a workshop on latrine construction using the WASH Trainers' Guide is the following:

1. The development of examples and demonstrations of effective methods for community involvement and for easily replicable health education materials.
2. An earlier emphasis (i.e., Day Two) of getting the community active in the construction activities and beginning the education process.
3. Begin the activities requiring teamwork with a brief discussion on how the Americans and Sierra Leoneans view leadership and teamwork. Use this discussion to identify potential problems and strategies for dealing with them.

4. During the construction phase of the program, introduce new techniques in a step-by-step fashion. Explain one procedure. Then ask participants to complete it before going to the next. Support each task with clearly written instructions and appropriate demonstrations.

As in any workshop, the participants are the key factor in the success of the effort. Individual and collective characteristics both helped and hindered goal accomplishment. Achievement of the goals was assisted by the wide range of experience represented in the group. This diversity also accounted for the varying interests of group members. Some participants were familiar with experiential training. Others were used to traditional, rote teaching methods, and needed more encouragement. Participation of two or three individuals was limited by their inability to read or write. These same persons also had difficulty understanding "American" English. In response to the latter, part of the small group work was done in Krio, as were several large group presentations.

Overall, the watchword for conducting this workshop was adaptability. The WASH workshop design was sound although specific modifications were necessary to adapt it to local conditions and participant needs.

## Chapter 5

### LATRINE DESIGN AND CONSTRUCTION

#### 5.1 Evaluation of the MEP Design

Prior to the workshop a local version of the VIP latrine design was developed by MEP for installation at schools and health clinics. The superstructure (latrine shelter) was built of cinvarm blocks with a zinc pan roof over a lumber frame. While appropriate to institutional applications which were government funded, it was felt that this type of construction was too costly for general village use.

The technical specialist, after discussions with MEP, recommended keeping the innovative aspects of the MEP design (the vent structure) along with the general layout and flow plan. For this workshop local indigenous building materials and construction methods were chosen for the latrine shelters to be built in the workshop. Bush sticks, mud, palm thatch and bush rope were used for wattle and daub construction to build the shelters.

#### 5.2 Innovative Vent Design

The local design for the vent has been developed by Mr. R.C. Davies, a Civil Engineer with the MEP wells program. The WASH team visited the pilot project in Moyamba and was able to borrow a set of vent block molds for use in the workshop.

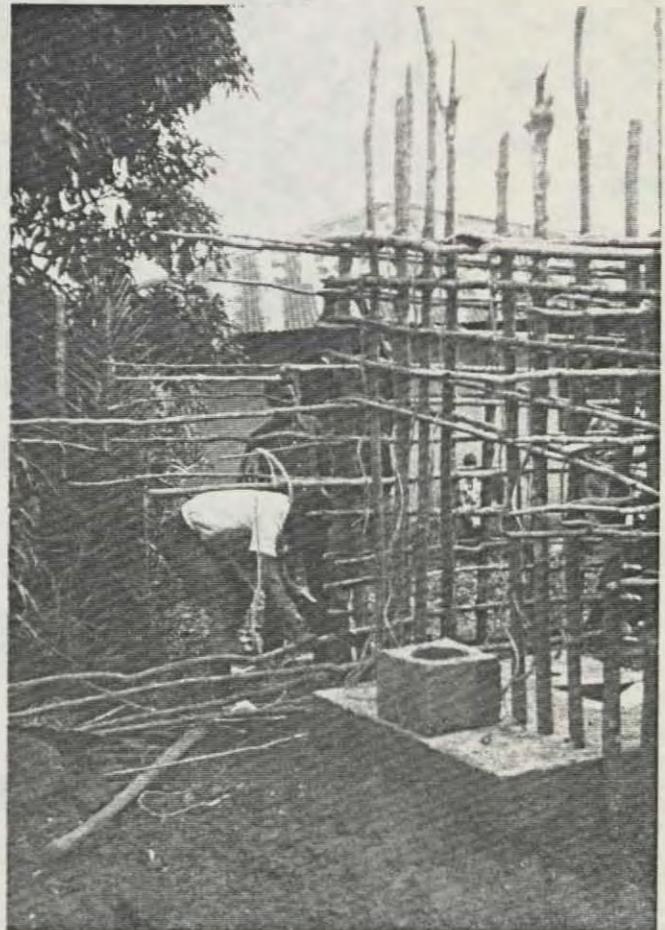
The vent is a chimney of specially designed soil cement blocks mortared together. The blocks are 12" x 9" high with an 8" hole in the center. The mold consists of a 12" square wooden box outer form with an 8" steel pipe section inner form. A relatively dry mix of one part cement, two parts sand and six to eight parts silty clay sub soil (approximately 35 percent clay) is pressed into the wet mold. A team of two laborers can mix and form the ten blocks needed for an eight foot vent in approximately one hour. Other than the forms, no special equipment is needed. One half bag of cement (25 kg) is used to make the ten blocks and the mortar needed to set them. Figure 4: Vent Block Forms, is a diagram of the block mold.

#### 5.3 Zimbabwe Design Vent

A second vent design was used for one latrine. It was patterned after the Zimbabwe latrine vent. A mat of small diameter bush stick (3/4" to 1-1/4" (or 2 to 3 cm) was wired together to a width of one meter. Green branches were twisted and woven into hoops approximately 12" in diameter (30 cm). The hoops were tied to the latrine superstructure and the mat of poles tied around these to form a tube directly over the vent hole in the slab. Cement and mud plaster (1 cement to 10 soil) was packed around this frame. A richer cement sand soil plaster was used as a finish coat. Although less cement was used for this



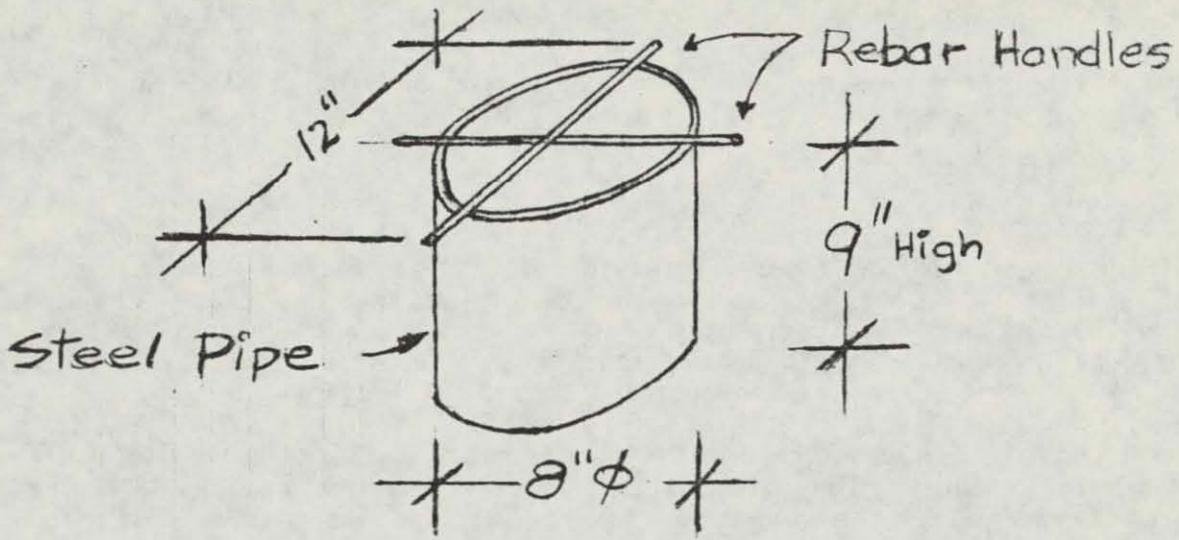
Completed latrine with innovative vent design.



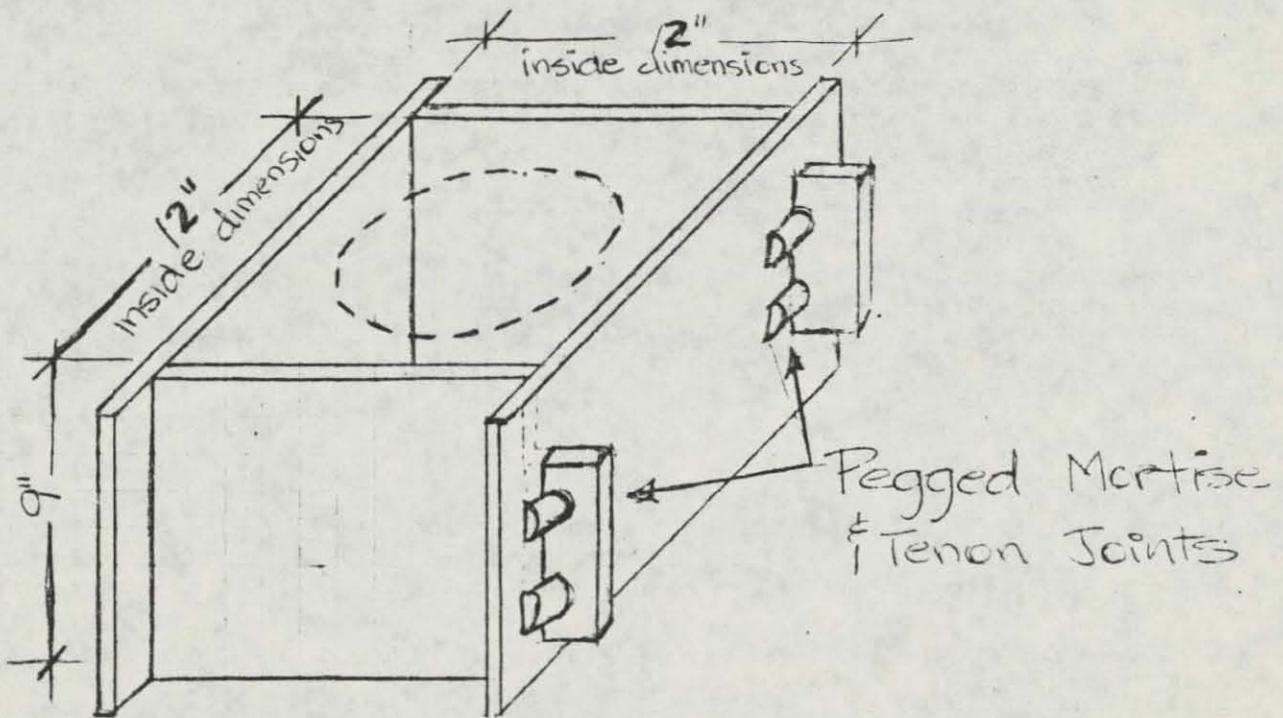
Base block for innovative vent design.

Figure 4

# VENT BLOCK FORMS



INSIDE FORM



OUTSIDE FORM

vent, considerable wire was needed and therefore the cost was approximately the same as the block vent. It was considerably more difficult to build, however, and the consensus of the participants and technical trainers was that the block vent design was easier to build and more durable for the same cost and therefore preferable.

#### 5.4 Concrete Slab

The MEP design called for a heavily reinforced, four-inch thick concrete slab which required 1-1/2 bags of cement to make. It was decided that a thinner less costly slab would be more appropriate for village application. However, tighter quality control would be necessary in the construction of a lighter slab. These instructions were incorporated into the training materials.

A common construction practice for mixing concrete in Sierra Leone is to mix sand and cement dry, cover with laterite gravel and then pour excessive amounts of water over the mix in an effort to flush out sticks, dirt, and organic matter from the gravel. This practice also washes out some cement and results in a very watery concrete mix of low quality and strength (high water: cement ratio and incomplete mixing). Modern theory contends that low water: cement ratio is the single most important factor in concrete strength followed by careful sequential mixing of concrete components and selection of clean aggregates.

A lighter weight, less expensive slab was therefore designed to use four-fifths of a bag of cement and one standard length of rebar (30 feet long in Sierra Leone). The importance of using clean aggregates was stressed and the silt test was demonstrated and practiced by the workshop participants. A method of mixing a relatively dry concrete mix that used less cement was demonstrated and practiced along with a technique for packing the dry mix to avoid air pockets and to insure a tight, dense, strong end product.

The remaining one-fifth of the bag of cement was used to construct a concrete base for the latrine. This base supported the weight of the vent stack (approximately 450 lbs.) which further reduced the structural requirements of the latrine slab.

#### 5.5 Latrine Shelter Construction

It was decided to use mud and wattle construction for the village latrine shelters as the most appropriate low cost option. Each construction team had at least one member familiar with this indigenous method.

The shelter built at the local school was planned to be constructed of cinvaram blocks as per the MEP design. However, unseasonal rains ruined one batch of cinvaram blocks and prevented a second batch from drying adequately. Therefore, since there were no blocks available at the time of construction, mud and wattle were used to construct all six latrines. The remainder of the second bag of cement for the vent blocks was used to make a cement plaster to protect the mud and wattle structure.



Completed Zimbabwe vent pipe.



Zimbabwe vent pipe during construction.

## 5.6 Latrine Cost

The final design for family latrines uses local materials for the shelter and locally gathered aggregates for the concrete. Two bags of cement were used for the slab, foundation, vent stack, and finish plaster. One rebar (30' long x 3/8' in diameter) was used for the slab. One square foot of wire screen or mosquito netting was needed for the fly proofing of the vent.

<u>Material</u>		<u>Total Costs</u>
2 bags cement @ Le25.00*	=	Le50.00
1 rebar @ Le15.00	=	15.00
1 #2 screen @ Le5.00	=	5.00
		<hr/>
		Le70.00

It should be noted that building 10 or 20 latrines at a time would substantially lower the per latrine cost.

The construction of a single hole mud and wattle thatched roof latrine is estimated to require 20 person days. Material and labor costs would be raised with the substitution of block and corrugated iron sheet for native materials.

Appendix D contains samples of the plans used for the latrines in Gerihun. Also included are copies of the current MEP design.

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\* 2 Leones = \$1

## Chapter 6

### RECOMMENDATIONS

The following recommendations are provided for consideration regarding future training and latrine construction efforts. Suggestions are included regarding training, administration, and latrine design.

#### 6.1 Training

6.1.1 Considering the increased focus on building VIP latrines in both PC/MOH and MEP/UNDP programs, training in such projects seems necessary. Subsequent workshops should consider the past training and experience of participants in determining the content of the workshop. However, the focus of the workshops should continue to address the array of skills required for implementing a village level latrine project. Key topics include:

- Mobilizing the community
- Educating the community in proper use of the latrines
- Planning for and constructing latrines
- Developing community capability to maintain, repair, and replace the latrines

These workshops should be attended by participants with varied assignments, experience, and skills to facilitate sharing of skills between participants.

6.1.2 The Peace Corps Health Training Program has the opportunity to address these topics in a more comprehensive manner. The use of a community latrine project during pre-service training would enhance the volunteers' ability to mobilize and involve the community in their areas. Using the WASH training guide as a basis, the community organization and education aspects would be more thoroughly explored and practiced.

6.1.3 The trainers, upon advice from the participants, also recommend that a follow-up survey of the results from this workshop be conducted. This should take place six months from the end of the workshop and should assess the following:

- Results, i.e. projects initiated as a result of the training.
- Problems encountered in the planning and implementation of the projects.
- Recommendation for improving the workshop (based on field experience).
- Recommendations for additional training and support.

The results of this survey could be used to evaluate the workshop and plan for future workshops.

## 6.2 Administration

The pre-workshop information sent to participants should describe the "hands-on" and "get dirty" aspects of the workshop. The purpose and major goals should also be outlined. Participants should also be informed of what they are expected to bring in the way of bedding and personal items.

The issue of per diem was the "dancing devil" of this workshop. Each agency has a different policy regarding per diem. Some participants arrived with the expectation of per diem or at least pocket money, based on their understanding of normal procedures. The amount of per diem/pocket money should be determined before the workshop and participants should be told how much in the pre-workshop information. Based on our experience, it seems reasonable to provide pocket money even if all meals and lodging are being provided. This money could be used for soap, kerosene, or other incidentals expenses incurred.

## 6.3 Latrine Design

The current MEP design should be modified to incorporate the changes developed in the workshop. These changes are described in Chapter 5. This would give MEP and others involved in latrine construction a standard design for an affordable latrine for village application.

## APPENDIX A

### Participant List

Latrine Construction Workshop  
Gerihun Sierra Leone

28 November - 9 December 1983

Name	Assignment
Gen Steward	PCV, Health
Francis S. Bull	PHI, Counterpart
Samba Mansaray	CARE, Moyamba, Wells
Joseph K. Mezikpih	PC, Wells, ILO, Kambia
David S. Kabbia	CHO, Counterpart
E.G. Abu	CHO, Counterpart
Aylene Bleuchel	PCV, Moyamba, Wells
Eddi Montgomery	PCV, Health
Thomas Sheku Kenah	PHI, Counterpart
Ed Godfreed	PCV, Health
Ben S. Kamanda Koiwa	CHO, Counterpart
Phyllis Rochelle Crawford	PCV, Health
A.B.M. Kabba	CHO, Counterpart
M.T. Kargbo	IADP, Wells
Abdul Conteh	ILO, Wells, Kambia
Dauda S. Kamara	MIADP, Wells
Rexon Lahai keingo	CARE, Moyamba, Wells
Sakati A. Conteh	KIADP, Wells
Alusine Bangura	KIADP, Wells
Sumaila B. Marah	KIADP, Wells
Kondowulay Mansaray	KIADP, Wells
Kathie Fazekas	PCV, Health
Joseph S. Hotggua	CHO
Martin Jacks*	PCV, Wells, EIADP
Abu Swaneh*	PHI, Counterpart, EIADP

\* Limited Attendance - No certificate presented.

APPENDIX B

Participant Experience Survey

Write "Yes" or "No" in each column to indicate your experience for the stated activity.

		Have you ever laid Blocks or Bricks?	Have you ever built a struc- ture w/ wattle & mud?	Have you ever mixed & poured concrete?	Have you ever dev. & imple- mented a Community Program?	Have you ever led a commun- ity Health Workshop?	Have you ever construc- ted a Pit Latrine?
1.	HCN	Yes	No	Yes	Yes	No	Yes
2.	HCN	Yes	Yes	Yes	Yes	Yes	Yes
3.	HCN	No	Yes	Yes	Yes	Yes	Yes
4.	PCV	Yes	Yes	Yes	Yes	Yes	No
5.	PCV	No	No	No	No	No	No
6.	HCN	Yes	Yes	Yes	No	No	No
7.	HCN	No	No	Yes	Yes	No	Yes
8.	HCN	No	Yes	Yes	Yes	No	Yes
9.	HCN	No	Yes	Yes	Yes	No	Yes
10.	HCN	No	Yes	No	Yes	No	No
11.	PCV	No	No	Small	Yes	No	No
12.	PCV	No	No	No	Yes	No	No
13.	PCV	No	Helped	No	Yes	No	No
14.	HCN	Yes	Yes	Yes	Helped	No	No
15.	HCN	Yes	Yes	Yes	Yes	No	No
16.	PCV	Yes	Small	Yes	No	No	No
17.	HCN	No	Yes	No	Yes	No	No
18.	HCN	No	Yes	Yes	Yes	No	No
19.	HCN	No	Yes	Small	Yes	Yes	Yes
20.	PCV	Yes	Yes	Yes	Yes	Yes	Yes
21.	HCN	No	No	Yes	Yes	Yes	Yes
22.	HCN	No	No	Yes	Yes	Yes	Yes
23.	NCH	Yes	Yes	Yes	No	No	Yes
24.	HCN	Yes	Yes	Yes	No	No	Yes
25.	PCV	Yes	Yes	Yes	Yes	Yes	Yes

## APPENDIX C

### List of Tools and Materials Used in the Construction of Six VIP Latrines

6 hammers  
12 shovels  
12 buckets  
2 55 gal drums  
6 cutlasses  
6 saws  
3 pliers  
6 masons trowels  
1 plasterer's trowel  
3 levels  
2 wheel barrows  
6 tape measures  
1 rope  
4 head pans  
1 landrover P/U

#### EXPENDABLE SUPPLIES

lumber for school roof	(four 1 x 4 x 12')
lumber for concrete form construction	(eight 2 x 4 x 12')
nails (20 lbs.)	(eight 2 x 10 x 12')
nails (20 lbs.)	
wire (50 yds)	
1 yard of screen	
20 bags of cement	
9 30' pieces of 3/8" rebar	
600 bush poles	
800 wattle poles	
4 bundles palm thatch (one bundle covers a 10' x 10' surface)	
18 sheets zinc plate corrugated roofing	
5 lbs. roofing nails	

## APPENDIX D

### Calendar of Consultant Preparation

NOVEMBER 1	Country Information Packages and Trainers Guide received by Consultants for review prior to orientation in Washington, D.C.
NOVEMBER 17 - 18	Pre-departure briefing at WASH headquarters in Washington.
NOVEMBER 20	Consultants arrive in Freetown
NOVEMBER 21	Meeting with Peace Corps, USAID, MEP, and MOH Officials to review workshop agenda and preparations.
NOVEMBER 22-24	Meetings with Sierra Leone co-trainers. Revise design based on informaton to date.
NOVEMBER 25	Site Visit to Moyamba CARE School Latrine Project
NOVEMBER 26	Site Visit to Juhun Peace Corps Village Latrine Project. Arrive Gerihun, the Training Site.
NOVEMBER 27	Final Preparations
NOVEMBER 28 - DECEMBER 10	Workshop
DECEMBER 12	Debriefing with AID, Peace Corps, MEP, MOH, and UNDP
DECEMBER 13	Departure

## APPENDIX E

### Workshop Evaluation Form

This form was completed by the participants at the end of the workshop. Average ratings for each goal of the workshop are provided in the left margin of page one of the form. Results of the evaluation are summarized in Chapter 4-Assessment of the Workshop.

EVALUATION FORM

A. Goal Attainment: Please circle the appropriate number to indicate the degree to which the workshop goals have been achieved.

1. Define sanitation and the impact of latrines	1 Low	2	3	4	5 High
2. Understand the relationship between sanitary waste disposal and the spread of disease.	1 Low	2	3	4	5 High
3. Understand and identify critical steps necessary to mobilize a community for any latrine project.	1 Low	2	3	4	5 High
4. Identify community factors related to the construction, acceptance and use of a latrine project.	1 Low	2	3	4	5 High
5. Assess local physical conditions relating to improved sanitation.	1 Low	2	3	4	5 High
6. Identify human and material resources needed to construct the project and their availability.	1 Low	2	3	4	5 High
7. Develop strategies to help the community to make an appropriate choice from alternative types of latrines.	1 Low	2	3	4	5 High
8. Develop a plan for a latrine project.	1 Low	2	3	4	5 High
9. Be able to construct a latrine appropriate for the village.	1 Low	2	3	4	5 High
10. Identify strategies for the continued operation maintenance, repair, and replacement of latrines.	1 Low	2	3	4	5 High
11. Develop strategies for the use and maintenance of latrines.	1 Low	2	3	4	5 High
12. Develop a plan to implement a latrine project for "back home" application.	1 Low	2	3	4	5 High
13. Understand the application of learning to other types of sanitation projects.	1 Low	2	3	4	5 High

B. Workshop Feedback and Learning: Please answer the following questions as fully as possible so that the trainers can learn how effective the workshop methodology was.

1. What have been the most positive things about this workshop? Comments:

2. What have been the most negative things about this workshop? Comments:

3. What one thing stands out as important to you in this workshop? Comments:

4. What things have you learned that you did not know before? Comments:

C. Workshop Organization and Training

1. What comments do you have about the way the workshop was planned and organized?

2. What can be done in the future to improve a workshop like this?

3. What specific steps in developing a latrine project do you feel you will need to learn more about in order to successfully promote and develop a project in the future?

4. What comments do you have about the trainers?

5. Anything else you would like to say?

## APPENDIX F

### Latrine Construction Plans

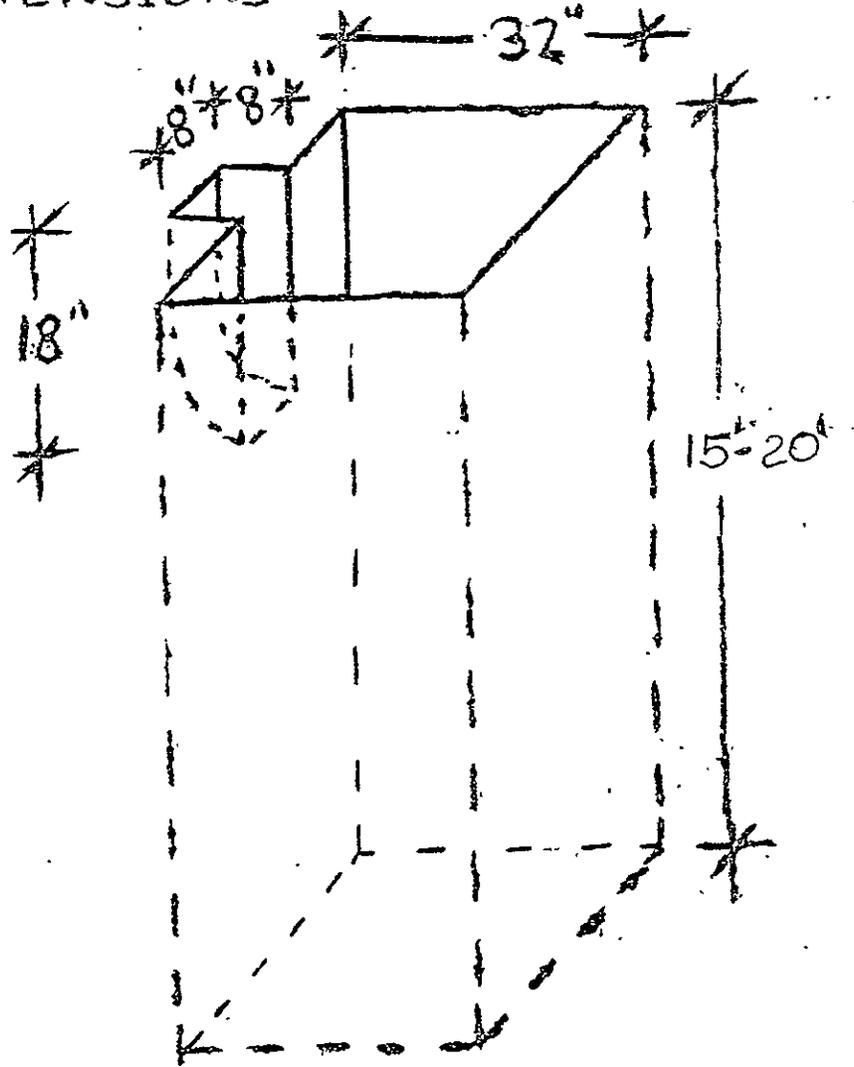
The dimensions included in the plans of this Appendix are based on the measurements and location of the pit sites in Gerihun. Future use of these designs should include appropriate changes in dimensions.

Drawings are included for:

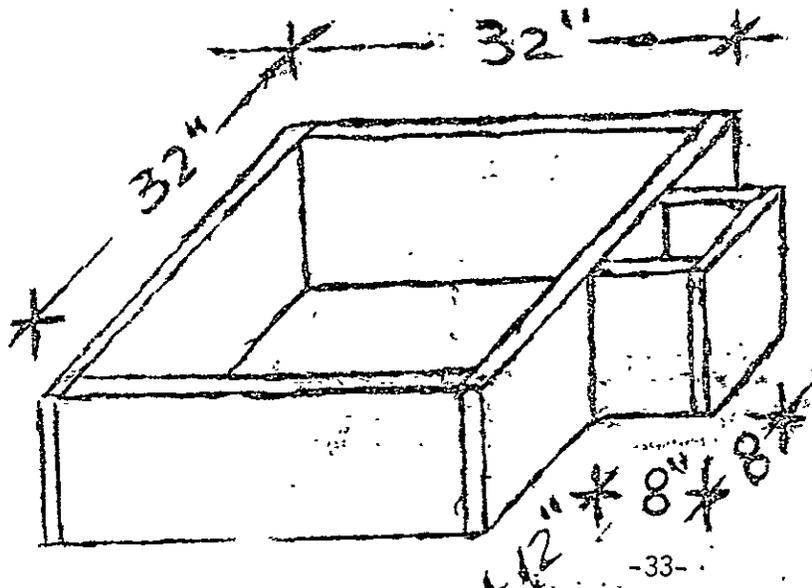
1. Pit Dimensions, Inside Foundation Form
2. Slab, Outside Foundation, Squat Hole, Vent Forms
3. Latrine Slab Reinforcement
4. Latrine Shelter Plan
5. Setting Corner Posts
6. Latrine Shelter Framing

Also included are the current MEP VIP Latrine Plans.

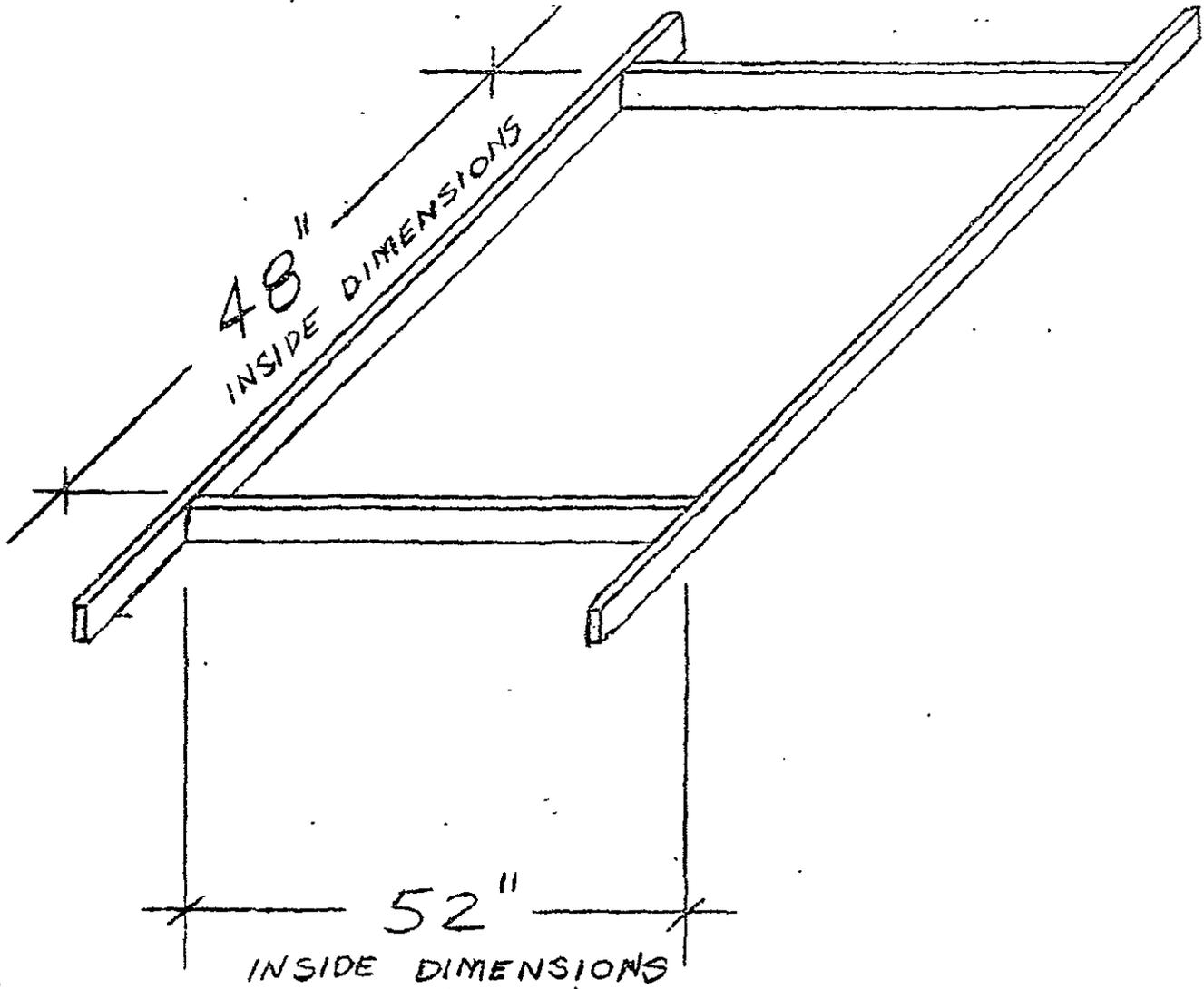
# PIT DIMENSIONS



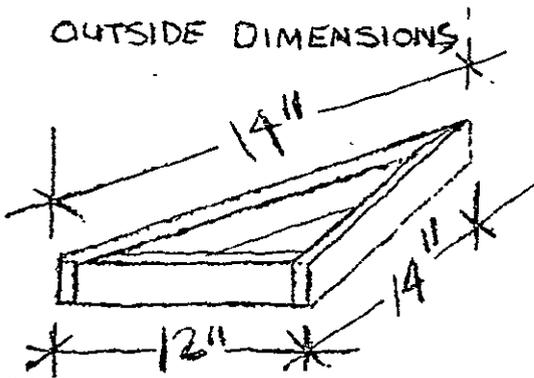
# INSIDE FOUNDATION FORM



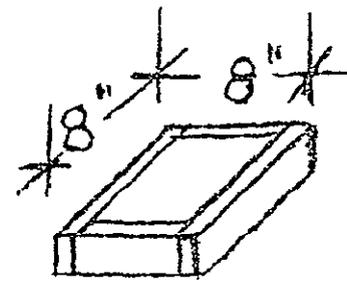
# SLAB FORM AND OUTSIDE FOUNDATION FORM



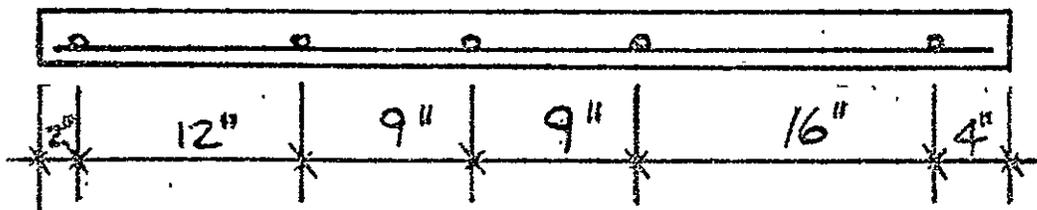
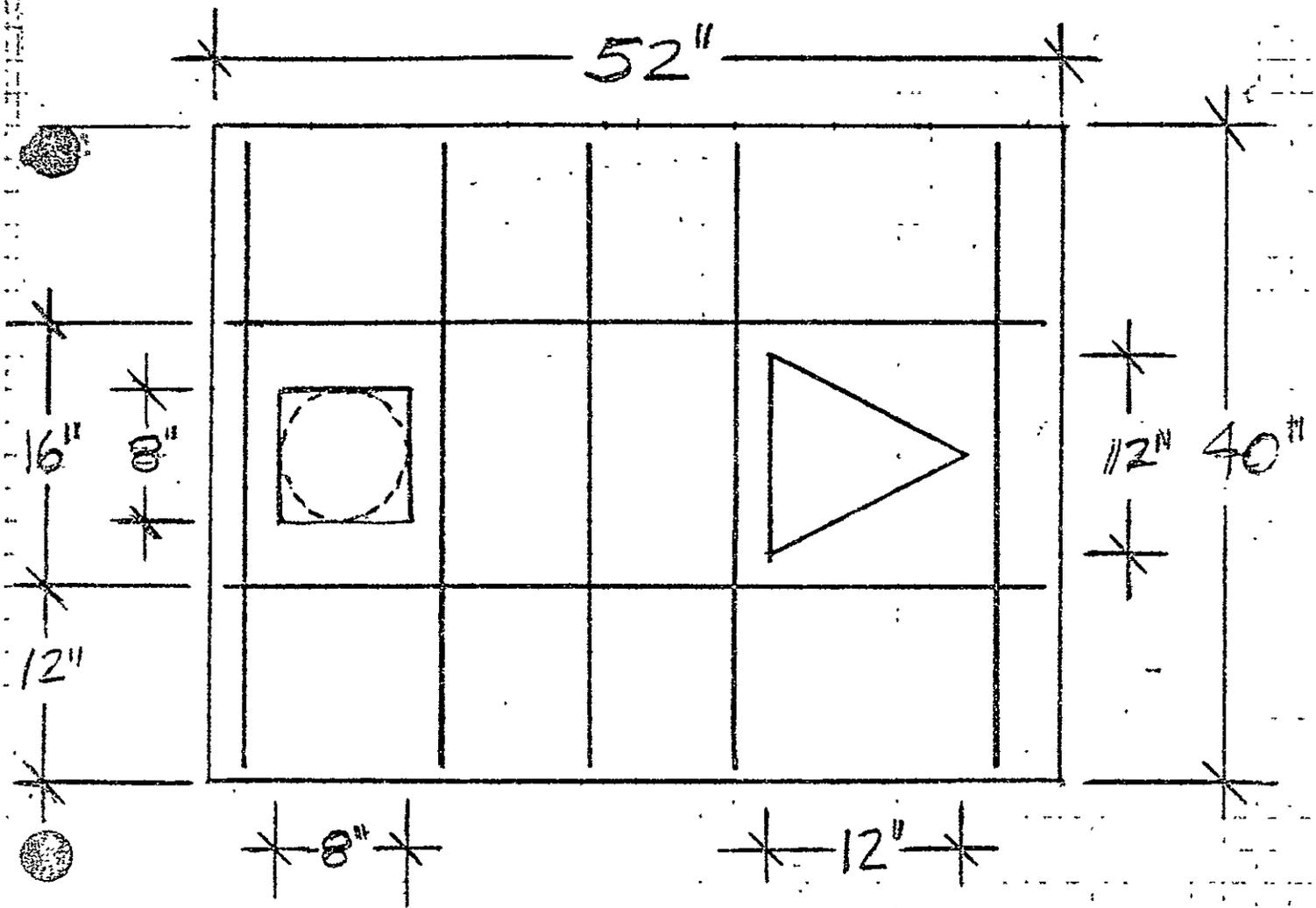
## SQUAT HOLE FORM



## VENT HOLE FORM



# LATRINE SLAB REINFORCEMENT



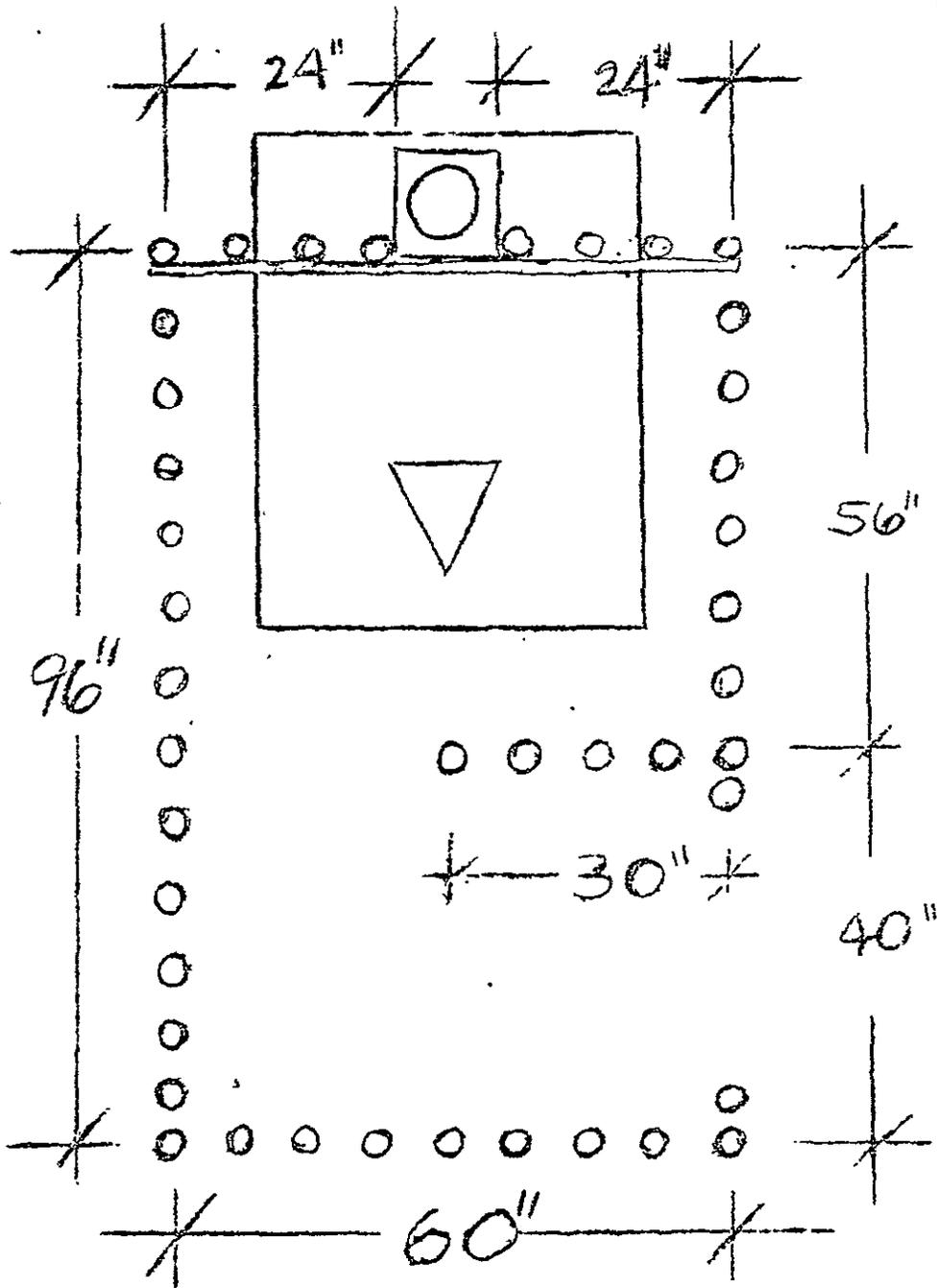
Qty

SIZE

5  $\frac{3}{8}$ "  $\phi$  Bars at 38"

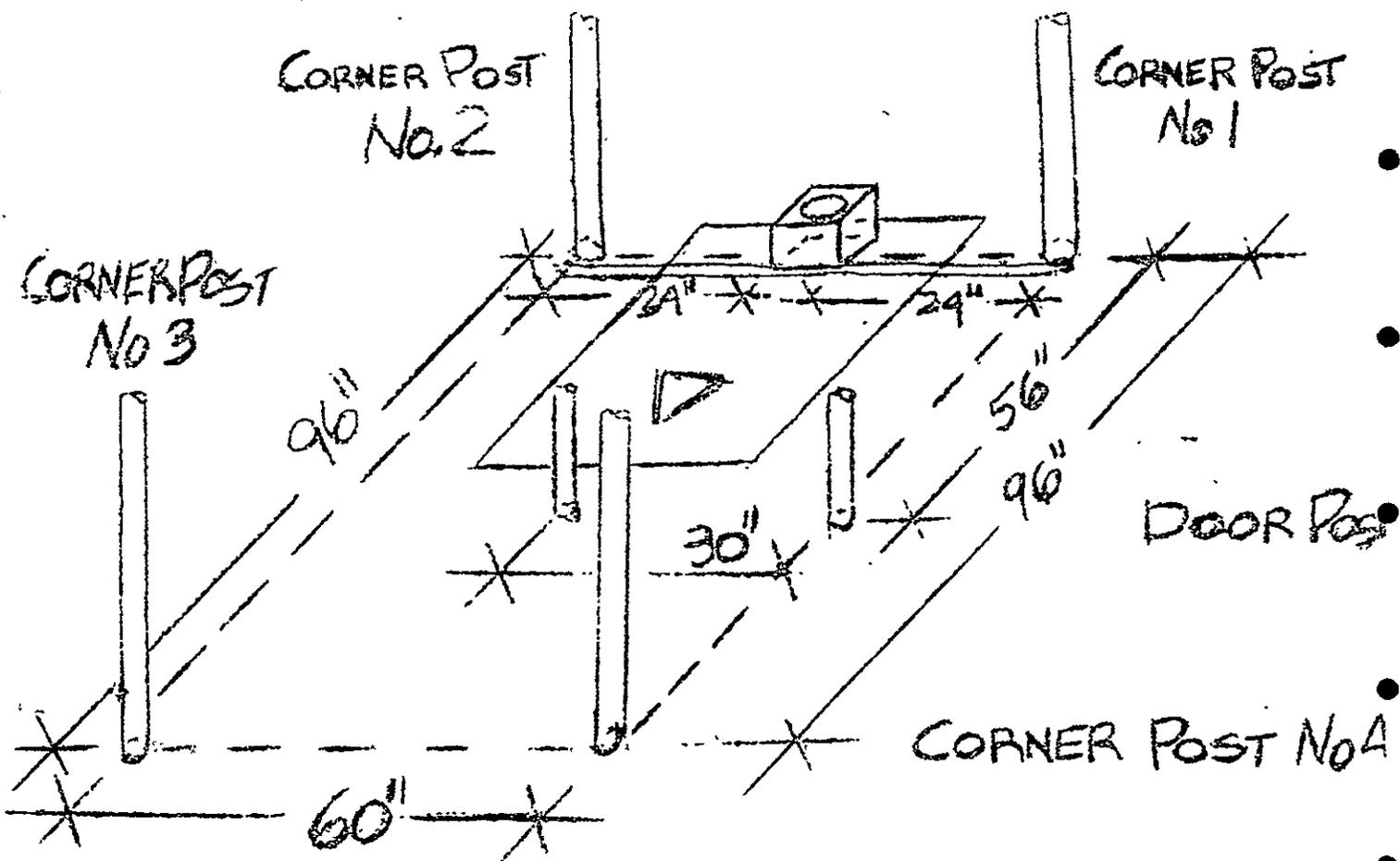
2  $\frac{3}{8}$ "  $\phi$  Bars at 50"

# LATRINE SHELTER



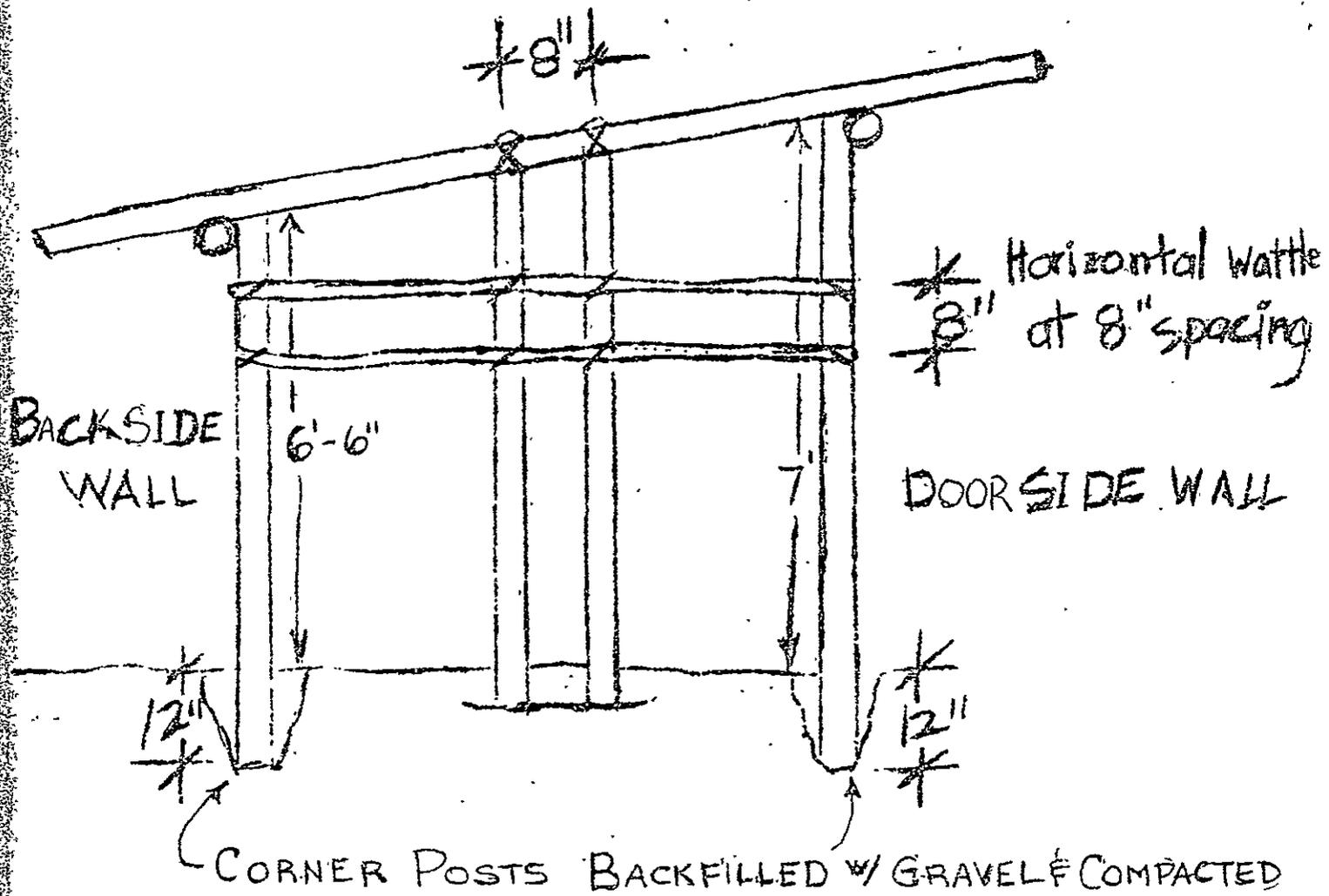
PLAN

# SETTING CORNER POSTS

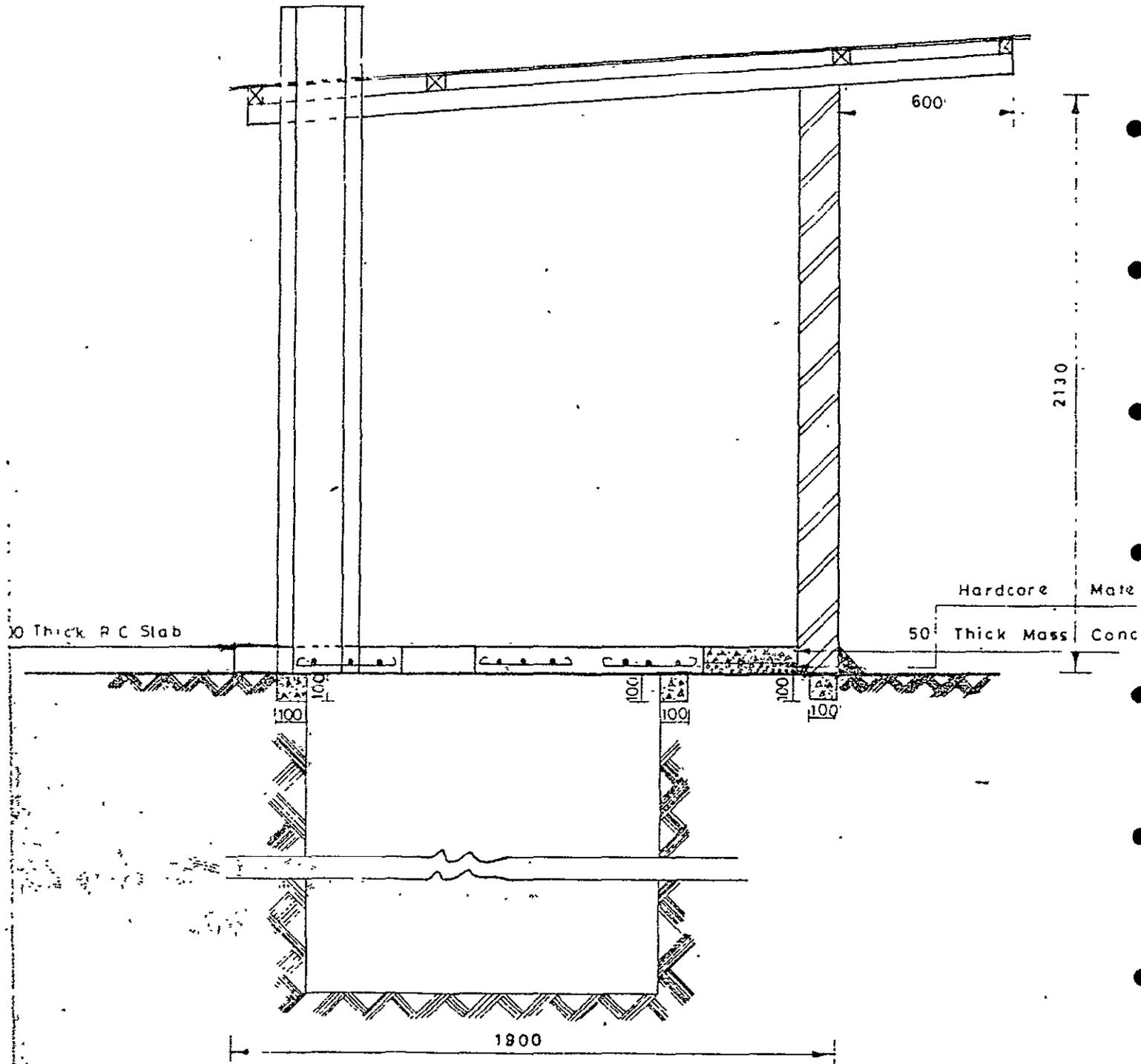


# LATRINE SHELTER FRAMING

VERTICLE BUSH POLES at 8" SPACING

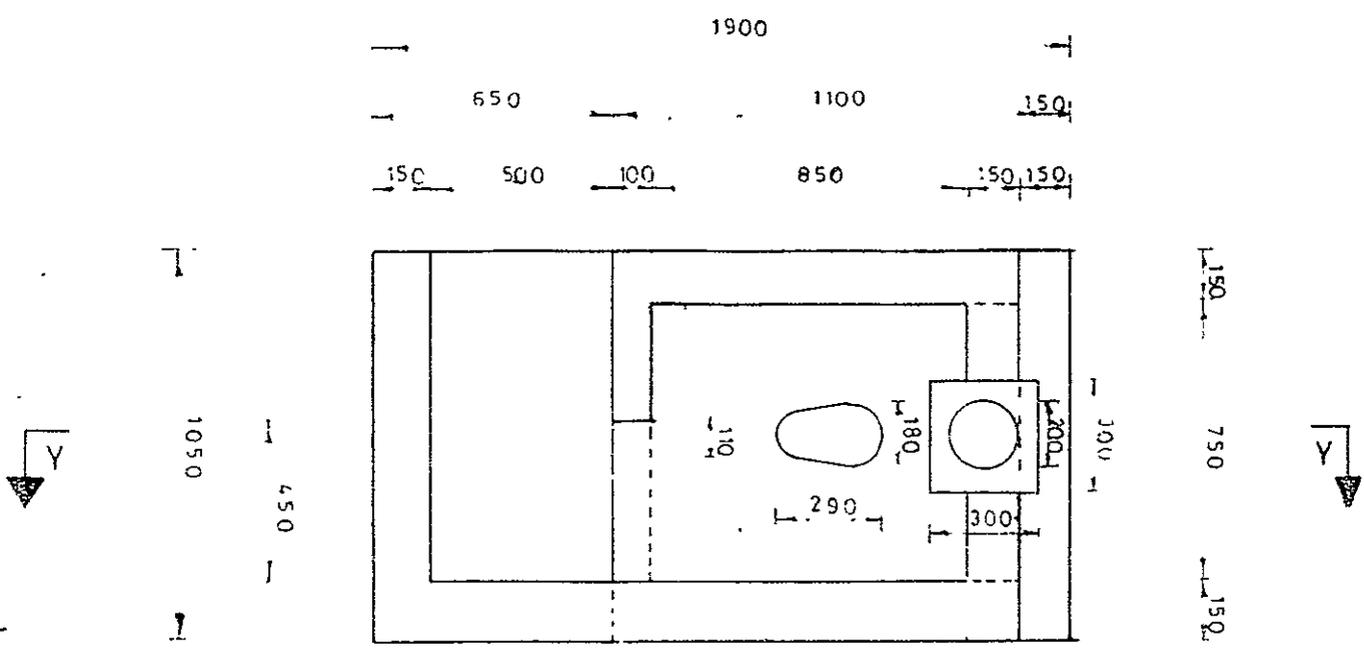


END VIEW

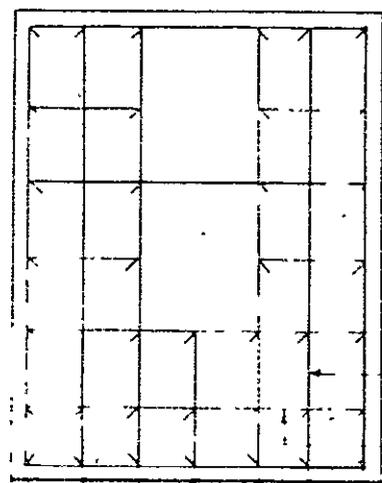


SECTION Y-Y

MINISTRY OF ENERGY & POWER	
FREE TOWN	
TITLE	VENTILATED IMPROVE. PIT LATRINES
Project Eng	R C Davies
Engineer	R. C Davies



PLAN



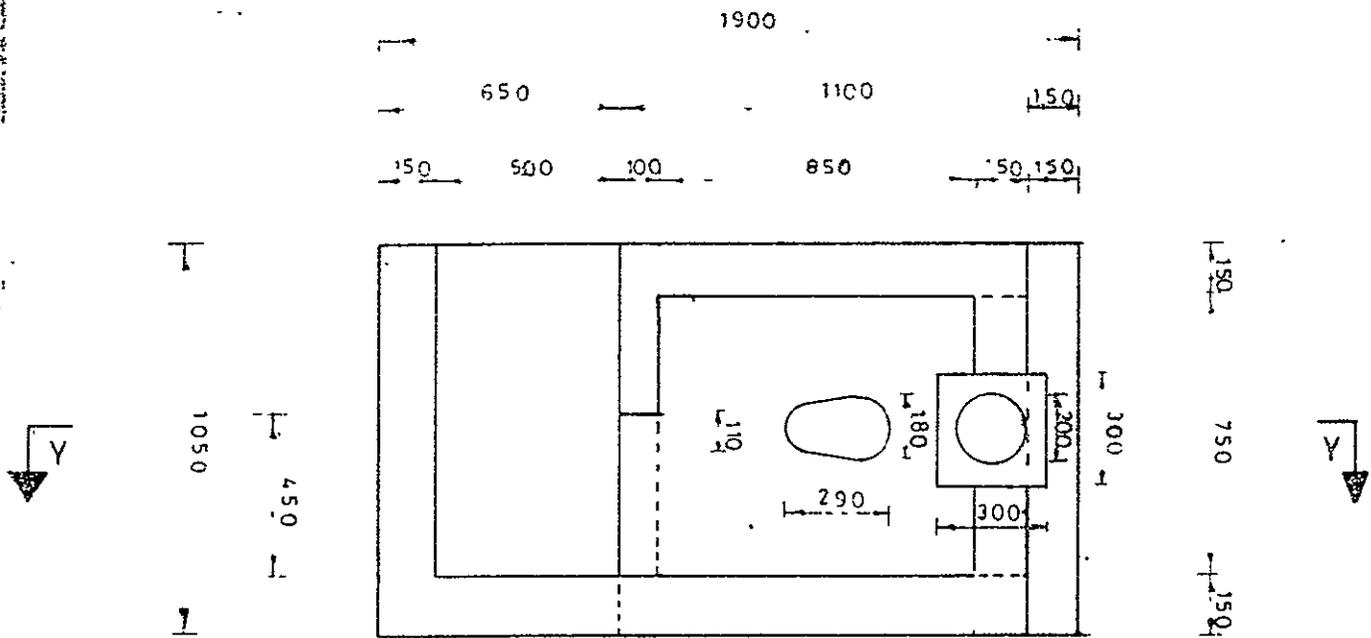
6MM  $\phi$  bars @ 150 Crs

6MM  $\phi$  bars @ 200 Crs

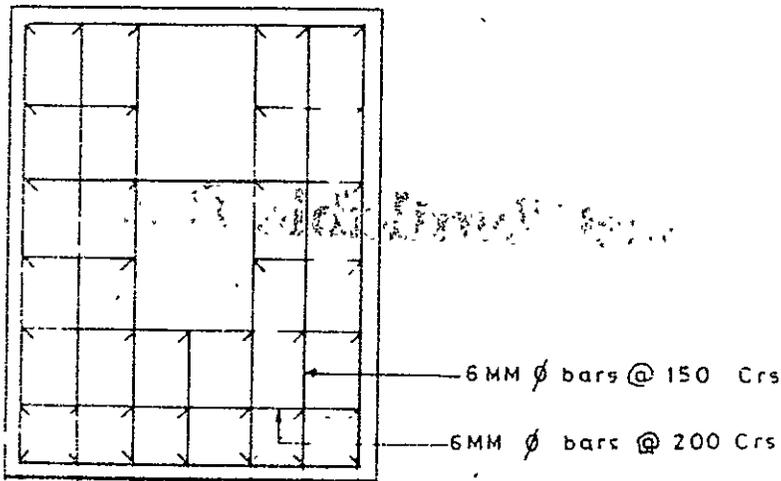
SLAB REINFORCEMENT

**Best Available Document**

MINISTRY OF ENERGY & POWER FREETOWN	
TITLE	VENTILATED IMPROVED PIT LATRINES
Project Eng	R C Davies
Ineer	R. C Davies



PLAN



SLAB REINFORCEMENT

MINISTRY OF ENERGY & POWER  
FREE TOWN

TITLE

VENTILATED IMPROVED  
PIT LATRINES

-41-

Project Eng	R C Davies
Engineer	R. C Davies