



# THE CONSTRUCTION OF RURAL HEALTH FACILITIES

TEMOTU AND MAKIRA  
ULAWA PROVINCES

SOLOMON ISLANDS

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RURAL PRIMARY HEALTH CARE PROJECT, SOLOMON ISLANDS

THE CONSTRUCTION OF RURAL HEALTH FACILITIES AND THE PROVISION OF  
FURNITURE AND EQUIPMENT IN TEMOTU AND MAKIRA ULAWA PROVINCES,  
SOLOMON ISLANDS

GOVERNMENT EXECUTING AGENCY: THE PLANNING UNIT, MINISTRY OF  
HEALTH AND MEDICAL SERVICES, SOLOMON ISLANDS GOVERNMENT

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BRITISH GOVERNMENT

IMPLEMENTATION REPORT

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## INTRODUCTION

Solomon Islands has one of the highest population growths in the world and a very large percentage of the population are children under the age of 15. The number of children and women of child bearing age is increasing rapidly and thus the pressure on health facilities and human and financial resources, which is already very great, is increasing all the time.

The UK/SIG Rural Health Facilities Project tried to address some of these problems in Temotu and Makira Ulawa Provinces. All existing rural health facilities were renovated or replaced, additional nurse-aide posts, clinics and nurses quarters were built and radiotransceivers, medical equipment, furniture and canoes were supplied. The construction of houses for nurses was intended to make it easier for female nurses to be posted to the rural areas where they could play a fuller role than at present in the delivery of health care. All these inputs were intended to ensure that the rural population of both provinces will have greater access to better health care.

The project can be counted a success in that all of the main project objectives were achieved within the project budget and time frame. In fact more new facilities were eventually constructed than were initially budgeted for.

That this is so is due largely to the support, encouragement and assistance that project staff received from both the Ministry of Health and Medical Services in Honiara and the provinces, and from the staff of the Aid Management Office of the British High Commission in Honiara. Particular thanks go to the two VSOs, Mark Bozier and Seamus Gleeson and their teams who worked in Temotu and Makira Ulawa Provinces and Michael Bacon, the VSO who worked in Rennell and Bellona, without whom the project would not have been a success.

Nigel Wakeham  
Project Manager

November 1995

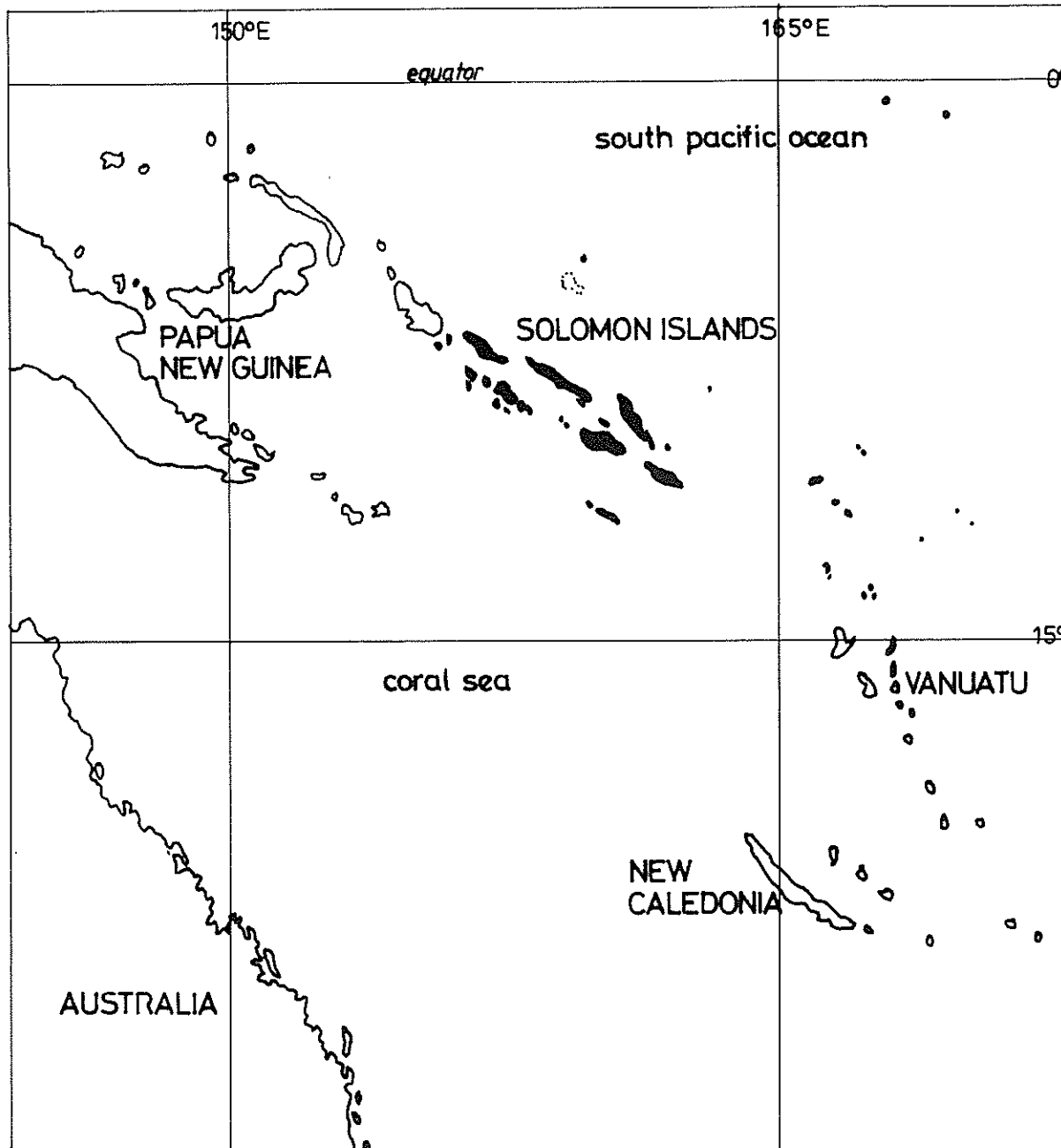


FIGURE 1: SOLOMON ISLANDS: LOCATION MAP

## 1. SOLOMON ISLANDS: LOCAL CONDITIONS

### A. LOCATION

Solomon Islands lies between latitudes 5°10' and 12°45' south and longitudes 155°30' and 170°3' east and is one of the principal island groups of Melanesia in the Western Pacific. The islands are located east of Papua New Guinea and 1600 kilometres north-east of Australia. A scattered archipelago of some 992 mountainous islands, low-lying coral atolls and cays, they extend over 1500 kilometres from the Shortlands group in the north-west to the Santa Cruz group in the south-east. See Figure 1.

The archipelago, comprising ten main islands or island groups, covers an area of approximately 647,500 sq km, only 29,800 sq km of which is land. The main islands are arranged in a double chain; a north-east chain consisting of Choiseul, Santa Isabel and Malaita; and a south-west chain of the Shortlands, New Georgia, the Russells, Guadalcanal and San Cristobal (Makira). The Florida Islands lie between Malaita and Guadalcanal and the Santa Cruz group is situated 290 km east of Makira. See Figure 2.

### B. CLIMATE

The climate is equatorial, modified by the surrounding ocean, with slight variations from island to island. There are no seasons as such. From the end of April until November, the south-east trade winds blow almost continuously but with varying intensity. Between November and April the weather is more uncertain, most of the winds coming from the west or north-east. In this season there are long periods of calm, punctuated by more or less severe squalls and the build-up of cyclones. Rainfall is often heavy, particularly in the inland mountainous areas and on the windward side of the main islands. In some areas rainfall may reach as much as 7,620mm but the average is 3,048 to 3,556 mm a year. Noon temperatures are around 30-35°C with a high level of humidity, but the evenings and nights can be cool with temperatures dropping to an average of 22°C.

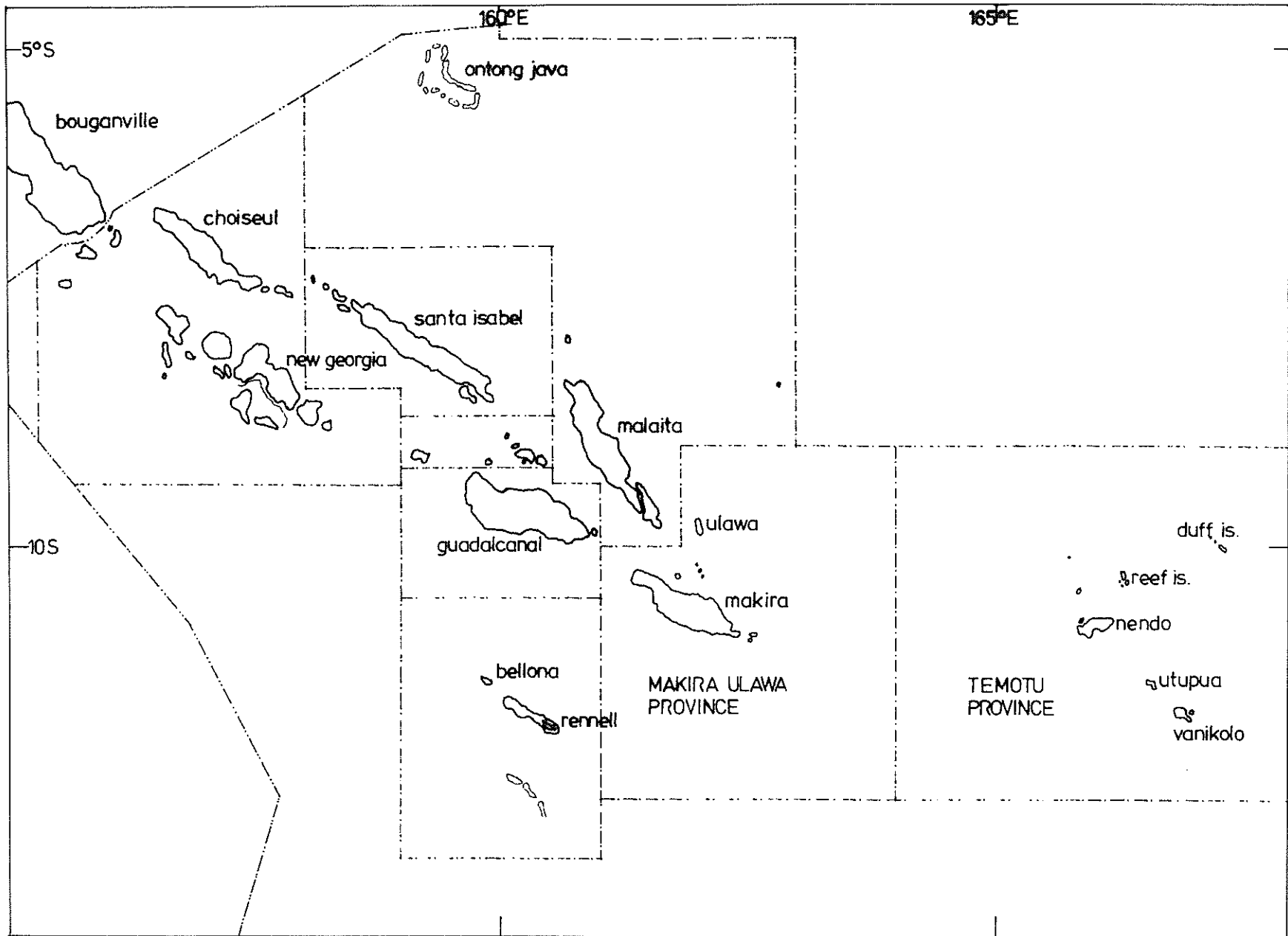


FIGURE 2: MAP OF SOLOMON ISLANDS



### C. POPULATION

The population is estimated at around 390,000 (1995) of whom approximately 93% are Melanesian and 4% Polynesian, most of the latter living on the coral outliers. The remainder of the population consist of Micronesians, Asians from various countries and Europeans. About 90 per cent of the population live in the rural areas and the distribution of the population is extremely scattered (the average size of population centre is estimated at 39), the majority of people living in small, coastal villages. The traditional village community structure is still strong and most of the total land area is held under traditional communal tenure, preventing the government or non-Solomon Islanders from having an interest in it and creating problems for agricultural, forestry and other development projects. Approximately 70 local languages are spoken but Pidgin is developing as the lingua franca while English is the language of administration.

### D. ADMINISTRATION

The country has a ministerial type of government with a cabinet answerable to a single legislature. The country is a member of the Commonwealth and the Queen is Head of State. She is represented by a Governor General, elected by Parliament. Extensive governmental powers have been devolved to the elected provincial governments. There are now nine provinces; Choiseul, Western, Isabel, Malaita, Central, Guadalcanal, Rennell and Bellona, Makira Ulawa and Temotu. Honiara, the capital situated on Guadalcanal, has it's own city council administration.

### E. ECONOMY

The principal economic activities are agriculture (mainly copra and palm oil), forestry and fishing. Minerals discovered include bauxite, nickel, gold and silver but to date, exploitation has only been on a small scale. There is also a small manufacturing sector, involving mainly the processing of primary products (fish canning, saw mills, etc).

## F. HEALTH

The health sector is predominantly public funded and the great majority of health services are provided free at the point of delivery. The responsible ministry is the Ministry of Health and Medical Services (MHMS).

Since 1982, the political system has operated at two levels, that of central government and that of provincial government and responsibility for providing provincial health services has changed between the two several times. In 1993, provincial health services were again re-centralised. However, in spite of these changes in responsibility, the actual provision of health services within the MHMS has continued to operate at two levels, the central ministry level and the provincial level.

At the central level, MHMS is responsible for: the overall planning, development, co-ordination and evaluation of health services; setting standards of care; deployment of the workforce; implementation of national health infrastructure projects; and running the national referral hospital.

At the provincial level, health services are run by the provincial directors of health services, in co-operation with the provincial executives. They are responsible for: the implementation of provincial health service programmes; planning co-ordinating and evaluating health service delivery at the provincial level; and contributing to the overall planning and development of the health services of the country.

The ministry is headed by a minister of cabinet rank and the chief executive officer is the Permanent Secretary. Reporting directly to the PS are two technical under secretaries, the Under Secretary (Health Care) responsible for curative health services, development and planning and the Under Secretary (Health Improvement) responsible for health promotion and preventative programmes. The Chief Accountant, the Under Secretary (Admin) and the Director of Nursing also report directly to the PS.

With an estimated population of 379,205 in 1994 and an annual growth rate of 3.5%, Solomon Islands has one of the highest population growth rates in the world. The population is characterised by a young age structure with 47% of the population under 15 years of age and 18% under 5 years. The health services are presently utilized mainly by women and children and it is estimated that number of children under 5 years of age and of women in the reproductive age group will rise from about 50,000 and 60,000 respectively in 1986 to 80,000 and 137,000 respectively by the year 2010. The infant mortality rate has dropped to 38/1000 live births, the crude death rate has dropped to less than 9 per 1000 population and life expectancy has increased to 59.4 years for men and 61.4 years for women. All these factors will obviously put more pressure on the health system and lead to increased demand for facilities and an increase in the financial and human resources required to deliver health care services.

The major objective of succeeding governments has been to achieve an equitable distribution of health facilities and universal access to health services. This has been achieved through a referral system consisting of six levels of health care. The lowest level is the Village Health Worker Posts (VHWP). These give very basic treatment and refer patients to the next level. This is the Nurse-Aide Post (NAP), staffed by a nurse-aide who provides basic curative and preventative services. The third level is the Rural Health Clinic (RHC), with a catchment population of 1000 or more, which should be staffed by one or two registered nurses plus a nurse-aide. The RHC usually has a few beds for deliveries and acute admissions. The fourth level is the Area Health Centre (AHC) which provides the link between the RHC and the provincial hospital. The centre will usually have between 10 and 20 inpatient beds and will be staffed by nurses and paramedics, headed by a nursing officer. The AHC usually has a catchment population of 5000 or over. The fifth level is the provincial hospital of which there are currently five, together with two mission hospitals and the sixth level is the National Referral Hospital in Honiara. See Figure 3.

<u>Facility</u>	<u>O/I/C</u>	<u>Staff Mix</u>	<u>Services Provided</u>
VHW Post	VHW	VHW	-Basic First Aid -Dressings -May give Chloroquine and Aspirin
Aide Post	Nurse-Aide	Nurse-Aide	-Treat Minor Conditions -Referral to Clinic/HC -Ante Natal/FP Services -Occasional normal deliveries -Dispense limited drugs excluding injections (e.g. aspirin, penicillin, sulphas) -Community Health Services -Health Promotion -Malaria Treatment
Clinic	R/Nurse	R/Nurse Nurse Aide	-All functions of Aide Post -Outpatient Services -Admit/Treat Mild/Mod Conditions -Prescribe/Dispense larger selection of drugs -Give injections -MCH Services including Midwifery -Community Health Services -Health Promotion -Satellite Clinics
Health Centre	Nursing Officer	Nursing Officer R/Nurse Nurse Aide Dental Therapist M. Microscopist	-All functions of Clinics -Inpatient Treatment -Malaria Diagnosis and Treatment -Prescribe/Dispense same range of drugs as Clinics
Provincial Hospital	Medical Officer (DMS)	Medical Officer Nursing Officer R/Nurse Nurse Aide Radiographer Lab Technician Pharmacy Staff Health Inspector Health Educator Malaria Officer	-Outpatient Services -Inpatient Services -Midwifery Services -Operating Theatre Services -Diagnostic Services -Pharmacy Services -Public Health Services -MCH services -Community Health -Health Inspectorate -Health Education and Promotion -Anti-Malarial Services -Monthly tours by Health Team

Source: Rodgers J.

Health Workforce PICs - A Comparative Analysis

FIGURE 3: THE PROVINCIAL HEALTH SYSTEM - SOLOMON ISLANDS

## 2. PROJECT DESCRIPTION

### A. BACKGROUND TO THE PROJECT

In 1985/86 the then government of the Solomon Islands identified the rehabilitation of existing rural health facilities as a matter of priority and approached the European Community to fund a rehabilitation project under Lome III. After consultation with the government, the EC agreed to fund a project which would encompass nurses' training, a health information system and a restricted programme of rehabilitation in selected provinces.

The British Government was then approached and asked to fund the rehabilitation of clinics in Temotu and Makira Ulawa Provinces which were not to be covered by the EC. A survey was made of existing facilities by the Directors of Medical Services in both provinces together with British aid staff and a detailed project proposal was formulated in 1989/90. This proposed the renovation of existing facilities and the provision of new clinics, nurses' houses and radio and medical equipment. The memorandum of agreement for this project was eventually signed by both the Solomon Islands and British Governments in the middle of 1992.

### B. MAKIRA ULAWA & TEMOTU PROVINCES

Makira Ulawa and Temotu Provinces are two of the most distant and poorly resourced provinces in the country. Per capita expenditure on health is running at 20% of that in Honiara and access to and around both provinces is markedly worse than in other provinces. Health services in both provinces are currently free at the point of delivery. Both provinces have a high incidence of acute respiratory infections, fever (mainly malaria but also scrub typhus on Santa Cruz), skin diseases and yaws.

Makira Ulawa Province consists of: the main island of Makira (pop. 22,781); Ulawa (3,016) east of Malaita; Ugi (975) off the north coast of Makira; and the islands of Santa Ana (2,130) and Santa Catalina (300) off the south-east of Makira. See Figure 4.

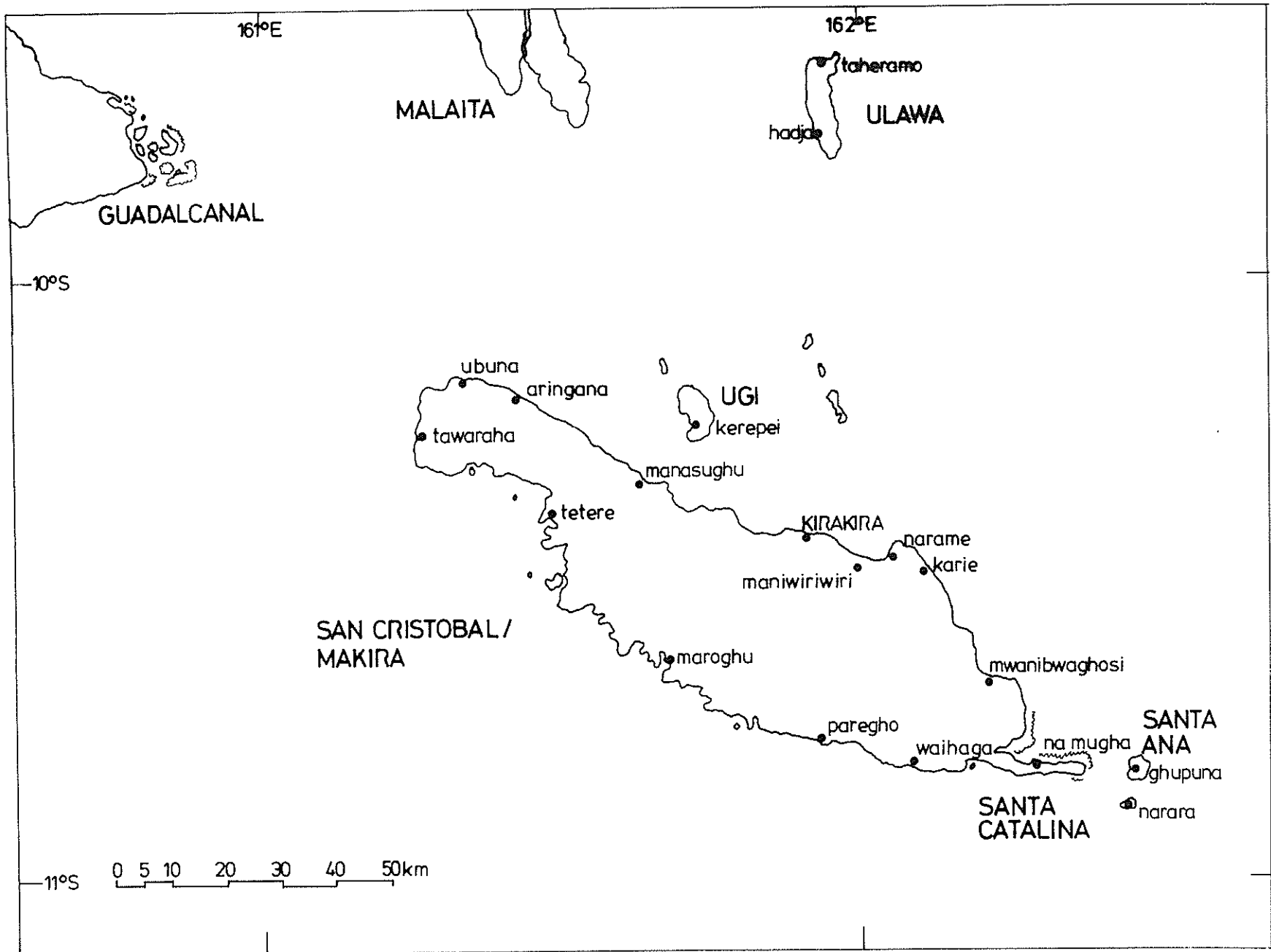


FIGURE 4: MAKIRA ULAWA PROVINCE SHOWING PROJECT SITES

The main island has a mountainous interior and virtually all settlements are along the coast but the south-west (weather) coast is very exposed making travel along it difficult and dangerous. There is a road connecting the villages along the north-east coast of the main island, an airstrip at the provincial centre, Kirakira and another one on the island of Santa Ana. The province has its own ship but commercial shipping is very limited and communications are difficult.

There is a provincial hospital with 80 beds at Kirakira, rural health centres at Na Mugha and Tawaraha on Makira Island and at Hadja on Ulawa Island and a total of 2 nurse-aide posts and 14 clinics in the province. Because of the restricted shipping services, travel between nurse-aide posts, clinics, health centres and the hospital is mainly by canoe and when the south-east trades are blowing or during cyclones this can be difficult or impossible.

Temotu Province consists of a widely dispersed archipelago at the Solomon Islands' most easterly point (its most eastern extremity, Anuta, is closer to Fiji than to Honiara). There are three island groups; the four volcanic Santa Cruz Islands, Nendo (pop. 8,420), Tinakula (uninhabited), Utupua (699) and Vanikolo (681); the coral islands of the Reef Islands (6,092); and the isolated extinct volcanoes of the Duff Islands (412), Tikopia (1,449), Anuta (161) and Fatutaka (uninhabited). The islands have a land surface of 926 sq km but are scattered over 150,000 sq km of ocean. See Figure 5. There is an airstrip at Lata, the provincial centre on Nendo, and a short length of rough road connects Lata to the interior of the island. The province has no ship of its own and visits by commercial ships (now that the Marine Department has been privatised) are very infrequent.

There is a provincial hospital with 46 beds at Lata, rural health centres at Nangu on Nendo and at Manuopo on the Reefs and there are now a total of 5 nurse-aide posts and 4 clinics on the other islands. All travel between and around islands has to be by ship or canoe and this can be difficult, dangerous or impossible.

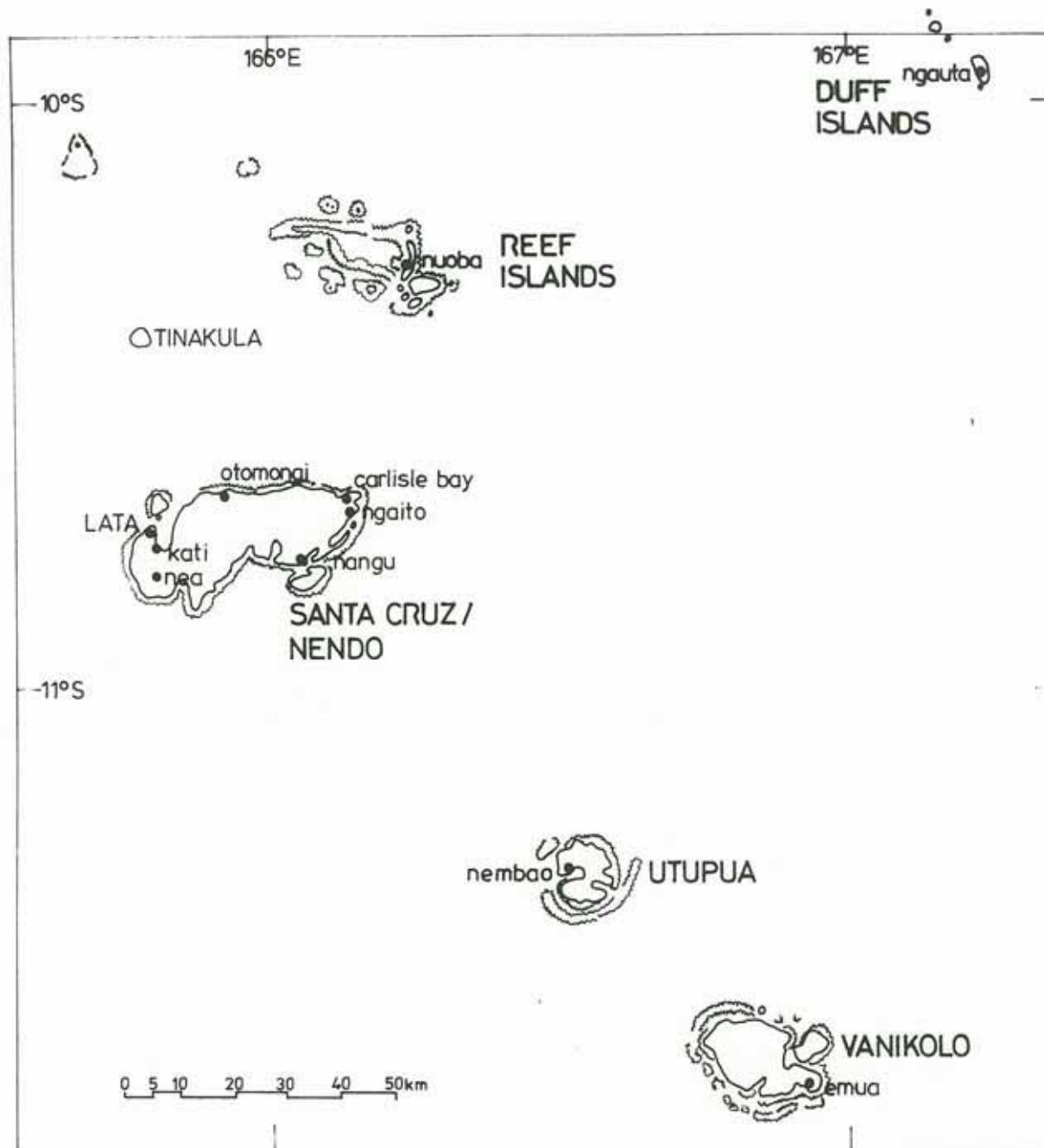


FIGURE 5: TEMOTU PROVINCE SHOWING PROJECT SITES



### C. PROJECT OBJECTIVES

The project was an infrastructure component of the Solomon Islands rural health care programme which aims to improve the health of the population through better delivery of primary health care.

The primary objectives of the project were to:

1. Improve through repair or replacement the buildings which house health care activities and nurses quarters, with the aim of providing adequate accommodation for the delivery of primary health care.
2. Facilitate the transfer of health care advice and good practice through an appropriate radio communication network.
3. Facilitate out-reach activities through the provision of canoes and outboard motors at specific locations.
4. Ensure that health centres have an adequate supply of essential medical equipment.
5. Enhance the ability within each province to carry out infrastructural maintenance.

### D. PROJECT SUMMARY

The project aimed to renovate existing clinics and nurses' quarters and build new nurse-aide posts, clinics and nurses' quarters, at 11 locations in Temotu Province and at 18 locations in Makira Ulawa Province. Water supplies were to be improved and pit-latrines and showers built. New radio installations were to be provided at the clinics and at the provincial hospitals at Lata and Kirakira. New canoes and outboard motors were to be supplied to some clinics and essential medical equipment supplied to all clinics. The participation in the building process of the various communities was to be encouraged to promote a sense of ownership and responsibility for the buildings. Maintenance officers were to be engaged and trained in each province in order that proper maintenance of the facilities would be carried out after the construction phase was completed.

#### E. PROJECT INPUTS

Various inputs were required from both the British and Solomon Island Governments to ensure the success of the project.

The British Government was to provide funds up to £900,000 to be used for: repair or replacement of clinics and nurses' quarters; the provision of new radios and equipment; purchase of canoes and outboard motors; improvements to water supply and sanitation; medical equipment; and the salaries of maintenance staff, on a tapering basis, after completion of the project. See Figure 6.

The Solomon Islands Government was to ensure that land would be made available where necessary for new facilities; that adequately trained staff were available to run the clinics upon completion of the project; and that each province had sufficient recurrent funding to ensure that the facilities will be effectively operated and maintained.

#### F. PROJECT ADMINISTRATION

The project was to be administered by a project manager, financed under a separate Construction Management and Training Project, who would be based in the Ministry of Health and Medical Services and report to the Chief Health Planning Officer. Construction work was to be carried out by locally recruited teams, supervised by two VSO construction supervisors. The project manager was first to arrange the construction of two staff houses, one at Lata and one at Kirakira, using the design in the project document, for use by the two VSO construction officers. He was then to prepare contract documents based upon the building designs included in the project document, using consultants if necessary, and call for tenders for the supply of construction kits and materials. The project manager was also to assist in preparation of an inventory of medical and radio equipment and canoes and outboard motors in each province in order that a list of equipment to be supplied by the project could be drawn up.

	S.I. \$	
1	Repair/replacement of health care centres and nurses' quarters, shipment of materials and labour costs for construction	* 2,236,000
2	Provision for supply and installation of radio equipment and repairs to existing radios (including maintenance manuals and training)	510,000
3	Provision for water supply/sanitary installations	435,000
4	Provision for OBMs/Canoes (including maintenance course and training)	140,000
5	Provision for essential medical equipment	127,500
6	VSO costs (2 officers up to 3 years)	130,000
7	VSO Assistants (4 officers up to 3 years)	90,000
8	Allowance for in-country travel and subsistence costs for project officers	75,000
9	VSO housing costs	140,000
10	Architectural services (if required)	25,000
11	Maintenance officers costs post project Provisional, subject to SIG/UK Agreement	60,000
12	Provision for construction tools	70,000
13	Provision for works to provincial centres	25,000
14	<b>SUB-TOTAL</b>	<b>4,063,500</b>
15	Contingency (subject to AMO approval)	200,000
16	<b>TOTAL</b>	<b><u>4,263,500</u></b>

**NOTE:** At SI\$4.73 = £1 stg the total project cost is estimated at £900,000

\* An additional £40,000 was provided later to cover the cost of replacing buildings at Tawaraha damaged by Cyclone Nina

**FIGURE 6: BRITISH GOVERNMENT FUNDING**

### 3. PROJECT IMPLEMENTATION

#### A. PROJECT MANAGEMENT

The project officially started on August 5 1992 with the arrival in Honiara of the Project Manager (PM). An assistant to the PM was appointed at the beginning of February 1993. Office space was provided at the headquarters of the MHMS in Honiara and a counterpart to the PM was appointed from the staff of the MHMS Planning Unit. Project funds were expended through an imprest account run by the PM.

The two British volunteers (VSOs) who were to supervise the construction work arrived at the end of January 1993 and took up their posts in the provinces in mid-February 1993. The VSOs had imprest accounts, funded from the PM's account, which they used to pay their staff and local suppliers of materials, tools, etc.

Two maintenance officers were to be recruited in each province and these positions were advertised soon after the arrival of the PM. Only one person responded to the advertisement in Temotu Province and he was appointed in December 1992. He started the foundations for the staff house at Lata and worked with the VSO for a year but was then dismissed for various reasons. There was no response to the advertisement in Makira Ulawa Province and it proved impossible to fill the two posts there.

Final designs and working drawings for the two MHMS staff houses, nurse-aide posts, clinics, staff quarters, latrines and shower units were prepared by the PM. The structure and bracing were checked by a structural engineer and schedules of materials were prepared by a firm of quantity surveyors. Designs for the renovation of clinics in Makira Ulawa Province were prepared by the PM and working drawings and schedules of materials were then prepared by the PM and project assistant. The PM and VSOs prepared lists of tools and equipment required for the implementation of the project and these were purchased locally and replaced as necessary during the life of the project.

## B. BUILDING DESIGN

There were outline designs for the nurse-aide posts, clinics and nurses quarters and for the MHMS staff houses in the project document. These were amended by the PM after consultation with the MHMS and the provincial Directors of Health Services. The main amendments being made to the staff houses to provide a separate kitchen and two bedrooms, within the same overall area.

The staff houses were constructed first and were used as prototypes for the main part of the project. After the staff houses were finished, various amendments were made to the construction and detailing of the clinics and nurses quarters in order to simplify construction.

Three types of clinics were built: a single room Nurse-Aide Post; a 2 Room Clinic; a 3 Room Clinic; together with Registered Nurses' Houses. Two types of pit-latrines were built: a VIP Latrine; and a Pour-Flush Privy; together with a Shower Unit. All buildings were provided with 1000 gallon rainwater storage tanks. See Annex 2 for details.

The buildings were designed to be, as far as possible, cyclone resistant. They were constructed of timber components raised off the ground on galvanised steel posts in concrete foundations. All connections were made with galvanised bolts; the timber bearers and structural window frames were bolted to the steel posts and the rafters were bolted to the window frames, to give continuity from roof to foundations. Joists and purlins were fixed with cyclone straps. The buildings were braced laterally with external timber braces, bolted to the steel posts and frames and across their width with steel strapping within the external and internal walls. See Annex 2 for details.

The window panels and door frames were prefabricated in Honiara and the other timber elements were pre-cut to size as far as possible. The timber components and building materials were then packed, by site, for shipping to the provinces.

### C. MEDICAL EQUIPMENT, RADIOS, CANOES & OUTBOARD MOTORS

Provision was made in the project document for the supply of essential medical equipment, the installation of new radio communications systems and the provision of canoes and outboard motors (OBMS) to selected clinics. There was no provision for the supply of furniture to clinics or houses. See Annex 1.

A list of essential medical equipment for the clinics was drawn up by the provincial Directors of Medical Services and agreed with the MHMS. Some equipment was already being supplied under a Japanese aid project and was therefore not provided by the UK project. A list of furniture was prepared and some (filing cabinets, steel cupboards, examination couches and delivery beds) was supplied from UK and the rest was made locally. See Annexes 3 and 4 for provision of furniture and equipment.

An outline specification for the radio equipment was given in the project document. After consultation with the Ministry of Posts and Communications, the MHMS and the local supplier, it was agreed that this specification was too sophisticated and a much simpler system was supplied. The MHMS obtained agreement from the Ministry of Posts and Communications for the use of a national medical frequency, at no cost, and the use of this plus the two provincial frequencies, meant that a simple, pre-set transceiver could be used in conjunction with a solar panel and battery. See Annex 3 for the supply of radio equipment.

Allowance had been made in the project document for the supply of imported GRP canoes to selected clinics. These canoes are large, heavy, liable to being damaged on reefs and very difficult to get out of the water. Therefore, after discussion with the MHMS, nursing staff and local boat builders, it was decided to purchase locally made aluminium canoes in two sizes, 19'0" and 24'0", both powered by 25hp OBMs. These have the problem that they get very hot when left in the sun but they have a long life, being less prone to damage on reefs, and are much easier to pull out of the water. See Annex 3 for provision of canoes and OBMs.

#### D. IMPLEMENTATION

The project started in August 1992. Work began immediately on the detail design and working drawings with priority being given to the MHMS houses which were to be built first.

The clinic sites on Nendo and Reef Islands in Temotu Province were visited in September and all the sites in Makira Ulawa Province were visited in October 1992. Discussions were held with villagers and nursing staff at each site and they were informed of their responsibility to provide sand and gravel for the foundations and to accommodate the building teams.

Final designs for all buildings were agreed with MHMS in November, working drawings for the MHMS Houses were prepared and tender documents issued in December 1992. Contracts were awarded for the supply of timber and building materials in January 1993. Various amendments were made to the detail designs for the clinics and RN houses while working drawings were being finalised and tender documents for these were issued in January and returned in February. Contracts were awarded in March 1993.

The timber and building materials for the MHMS Houses were shipped by government barge to Lata and Kirakira in March and the first shipment of materials for the clinics (the sub-structure materials) for all sites except the outer islands in Temotu and Ulawa Island in Makira Ulawa Province, were shipped in May 1993. A private company which, although expensive, was more reliable than the government shipping service, was used for this and all subsequent shipments. There were eight further shipments of materials to the two provinces and the last one did not take place until November 1994.

The contractor had problems in obtaining sufficient timber to complete all buildings and could not keep to his contract programme. This however proved advantageous in that storage space for timber was not required until late in the project, most materials being delivered directly to the barge or ship.

The VSOs each trained a team of carpenters who worked with them, with a few changes, throughout the project. Both teams became very proficient and quick in erecting the buildings. Casual labourers were employed in each village to assist with excavation and other labouring work. See Annex 6 for construction programme.

Construction of the two MHMS staff houses was largely completed by May 1993. The first consignment of materials, for the foundations of the clinics, was shipped at the end of May and work began on site in June 1993. The VSOs and their teams then moved from site to site erecting the steel sub-structure posts for the buildings. The second shipment, the superstructure materials for the buildings at Nea, Kati, Otomongi, Vanikolo and Utupua in Temotu Province, was at the beginning of September and work then began on the superstructure of the Nurse-Aide Post at Otomongi, which was completed in mid-October 1993.

The third shipment, the superstructure materials for the new buildings at Manasughu, Maniwiriwiri, Narame, Karie, Santa Ana and Santa Catalina in Makira Ulawa Province, took place in early October and work began immediately on the Nurse-Aide Post at Maniwiriwiri. This was completed in mid-November.

The last shipment of materials to Temotu Province, to the outer islands, took place in March 1994 and there were four more shipments of materials to Makira Ulawa Province, the last one being in November 1994. The two teams of carpenters moved from site to site in each province, completing the buildings. The last clinic in Temotu Province, the Nurse-Aide Post at Ngaito, was completed in August 1994 and the VSO left in September. The team of carpenters from Temotu then moved to Makira to assist the VSO and his team there in the completion of the clinics. The two teams worked on separate sites and the VSO moved from site to site supervising the work. The VSO eventually split his own team into two, one to work on the renovation of existing clinics and the other to complete the new buildings. The last two clinics, at Taheramo on Ulawa Island and at Narame on Makira Island, were completed by the beginning of May 1995.



## E. CONSTRAINTS

The major constraint on the successful implementation of the project was shipping, both in terms of availability and of cost. Shipping costs were very high and amounted to 14% of the total construction cost. Ships were often not available and material deliveries had to be postponed and work delayed. The use of the government barges was investigated but rejected because, although much cheaper, they were smaller than the private barges and very unreliable. A government barge was chartered once to go to Makira when some materials were urgently required but its departure was delayed for two weeks while essential repairs were carried out (which had to be paid for, initially, by the project) and it was not used again. A private barge was used for most shipments at a cost of SI\$5,000 (approximately £1,000) a day for the first charter, rising to SI\$6,000 (approximately £1,200) a day for the last charter. Towards the end of the project, this barge was not available and a private ship was used, at the same cost, for the last shipments to Makira and Ulawa. See Annex 7 for shipping costs.

The team in Temotu Province had to travel between the outer islands by ship and the infrequency of shipping caused problems in that they were often unable to leave an island although their work was finished. This caused delays at several sites. At the start of the project, it was feared that bad weather and high seas might slow down progress. In Temotu, there was a problem on only one occasion when the barge delivering materials to the Duff Islands was caught by the tail end of a cyclone and off-loading was delayed. The work boat carrying materials sank, some materials were lost while transferring them to shore and a generator was badly damaged.

There were more problems in Makira where it proved impossible on two occasions to off-load materials at Karie because of rough seas. They had to be off-loaded further along the coast and moved back to Karie by canoe. There were similar problems at Santa Catalina and other sites.

The VSO and his team in Makira had great problems in getting into and out of the sites along the weather coast throughout the year because of rough seas, which caused delays in this province.

The project was very fortunate in fact that there were not more accidents. Apart from the incident at the Duffs mentioned above, an outboard motor was lost off of Otomongi when it struck a hidden reef; a canoe was badly damaged and an outboard motor lost at Kerepei when the island was struck by the tail end of a cyclone; at the very end of the project, one of the teams in Makira tried to get from Tawaraha to Kirakira in rough seas and his canoe was swamped and the outboard lost. The canoe was eventually retrieved and fortunately, in all these incidents, there were no serious injuries or loss of life.

As the construction period was relatively short, it was decided at the start of the project that both teams would have to use a variety of electric handtools: drills, screwdrivers, circular saws, planers, sanders, etc, in order to complete the buildings on time. These tools were not originally budgeted for and the use of them also meant that each team had to have a generator. These caused continuous problems and both had to be replaced eventually at great cost. The electric handtools also caused problems and were replaced regularly. The effect of this was that the tools and equipment budget was overspent by over 100%.

The contractor originally planned that all prefabricated elements and timber would be ready for delivery by late 1993. In fact the last buildings were not completed ready for delivery until late in 1994. Admittedly, there had been extra buildings added to the contract but the contractor obviously did not foresee the problems he would have in obtaining adequate timber supplies. During the contract period, the amount of timber, both sawn and logs, being exported from the country rose substantially and there was not sufficient timber to satisfy the local market. This caused problems to the project in that all the timber required for a shipment was often not available.

## F. PROJECT COSTS

In the project document, the UK Government was committed to providing up to £900,000 to cover the cost of new facilities, improved water supplies and sanitation, radios, canoes, OBMs, medical equipment and part of the cost of maintenance staff for three years after project completion. The cost of the Project Manager, office equipment, vehicle, etc were to be met by a separate Construction Management Project. No direct financial input was required from the Solomon Islands Government but it was to ensure that there were sufficient trained staff to man the facilities and recurrent funding to operate and maintain them.

During the life of the project, the number and type of buildings constructed were varied for several reasons. The clinic on the Duff Islands in Temotu Province was changed, at the request of the DMS, from a Nurse-Aide Post to a 2 Room Clinic and RN House because of the island's remote location and poor communications. In Makira Ulawa Province, the project document stated that staff were to be accommodated within the renovated clinics. This was felt to be inappropriate and was strongly resisted by the nursing staff. It was decided therefore to construct additional RN Houses at these locations and also at Kerepei where the existing building was in a dangerous condition. The clinic at Ubuna was to be renovated but again was in such a bad condition that it was replaced with a 3 Room Clinic. In January 1993, Cyclone Nina struck both provinces and caused serious damage to Waihaga and Tawaraha clinics. Additional funds were made available to construct a 3 Room Clinic at Waihaga and a Nurse-Aide Post (for use as a Malaria Lab) and two additional RN Houses at Tawaraha.

No provision was made for the supply of furniture for the clinics or staff houses. Locally made furniture was however procured for all buildings and delivery beds, examination couches, filing cabinets, cupboards, etc were imported from UK, all at extra cost. The number of radios supplied was also increased. Despite all the above additions, the final cost was kept within the initial project budget. See Annex 8 for final project costs.

#### 4. CONCLUSIONS

##### A. ATTAINMENT OF PROJECT OBJECTIVES

The main objective of the project was to improve the effectiveness of health care delivery in the two provinces by improving the physical facilities, equipment and staffing of clinics and thus enhance the delivery of primary health care.

This objective was, to a great extent, achieved. 9No new Nurse-Aide Posts, 5No Two Room Clinics, 6No Three Room Clinics were constructed and 9No existing clinics were renovated. 15No RN Houses were also built and 6No existing houses were renovated. More new buildings than originally planned for were eventually constructed but the overall cost was kept within the budget.

Essential medical equipment was supplied to all clinics together with furniture not originally included in the project. New radios, tuned to the provincial and national medical frequencies, together with solar panels, batteries, etc, were supplied and these have greatly improved radio contact between central hospital, the provincial hospitals and the clinics. More radios than originally envisaged were supplied and existing radios were serviced and the new frequency installed. See Annex 3

There were two areas where project objectives were not fully met. The first was in the recruitment of maintenance officers for each province. It is hoped that one of the foremen from each construction team will be taken on by the provinces after the buildings are complete and that they will then, being fully conversant with the buildings, be able to maintain them.

The second area was in the provision of improved latrines. At several sites it proved impossible to construct latrines due to the very high water tables. These sites were all close to the sea with very small communities and it was felt better not to build a latrine that would fail within a short time, but to continue to use traditional methods.

## B. PROJECT BENEFICIARIES

The majority of the populations of both provinces live in small, scattered settlements and the construction of a large number of new facilities, together with the renovation of existing ones in Makira Ulawa Province means that there will now be more equity of access to health care. The greatest immediate advantage will be to the populations of the outer islands in Temotu and of the weather coast of Makira whose access to health care has, up until now, been severely restricted by transport difficulties.

Children account for about 80% of attendances at clinics and will thus be the main beneficiaries of the improved facilities. The improvement in antenatal services and in delivery facilities will obviously improve the service available to rural women and the provision of new, secure staff quarters, especially in the more remote locations, will mean that it will be easier to recruit qualified nurses, especially women, to staff them. This again will be of great benefit to the female population.

The provision of aluminium canoes, able to stand up to the wear and tear of being dragged up beaches and over reefs will help improve access to the more remote villages. The new radio systems are already proving to be of immense help in improving communications between senior nursing staff and doctors at the provincial hospitals and the nurses in the clinics. The nursing staff in the outer islands of Temotu Province in particular have always felt very isolated and out of touch. They now have access to diagnostic advice 24 hours a day and feel much less isolated.

At the time of writing this report, some of the clinics in Temotu Province have been operating for a year or more and it is very noticeable in visiting them how well they are being maintained and how proud the nursing staff and the communities are of them. The morale of the nursing staff has obviously been improved by the provision of the new facilities and hopefully, they will therefore stay longer in their posts and provide a better service to their communities.

### C. LESSONS TO BE LEARNED

There are several lessons to be learned which could be applied to other, similar projects, and these mainly concern building design, site selection, storage of materials and shipping.

Although the new buildings are fairly simple and straight-forward in design, there are various improvements that could be made to further simplify construction. The steel posts could be increased in size and reduced in number, thus reducing greatly the amount of excavation required for foundations. This proved to be a major task on many sites. There were problems on most sites with the erection and fixing of the structural window frames caused by distortion and opening up of the frames, wrong positioning of bolt holes, etc. Instead of prefabricating the window frames in Honiara they could be simplified in design, precut and assembled on site. The cantilevered store proved to be time consuming to construct and does not provide enough storage space for touring equipment. MHMS staff feel that a separate waiting area should be provided at the end of each clinic to give privacy in the consultation rooms and this could be combined with an enlarged store. Revised designs have been produced based upon these ideas and these are shown in Annex 11.

More consideration should be given to site selection before starting a project such as this. Although no insuperable problems were encountered, some sites and in some cases actual locations had to be changed before the clinics could be built. Land is of the utmost importance to all Solomon Islanders and communities should be made aware of their obligations as to the provision of land before starting a project.

Sufficient storage space for building materials must be found before such a project proceeds. Storage space is very limited in Honiara and finding a covered area to store the large amount of materials required proved to be difficult. Sufficient time and money must be allowed for obtaining and shipping materials to sites as this will be crucial to the implementation programme.

## ANNEX 1 : SITES AND FACILITIES AS PROJECT DOCUMENT

MAKIRA/ULAWA PROVINCE										
		CLINICS		HOUSING						
LOCATION	Pop.	Type	Budget	Type	Budget	Radio	Water/San.	Canoe/OBM	Equipment	ALLOCATION
			\$			\$	\$	\$	\$	\$
<b>SAN CRISTOBAL</b>										
Maniwiriwiri	900	2RM Clinic	62,500		22,000	22,000	15,000		5,000	104,500
Manasugu	1325	3RM Clinic	97,500	RN House	60,000	22,000	15,000		5,000	199,500
Aringana	1081	Conversion	25,000	Conversion	20,000	22,000	15,000		5,000	87,000
Narame	1722	Conversion	50,000	In Clinic		22,000	15,000	15,000	5,000	117,000
Karie	1678	Conversion	50,000	RN House	60,000	22,000	15,000		5,000	152,000
Mwanlbwaghosi		3RM Clinic	97,500	RN House	60,000	22,000	15,000	15,000	5,000	214,500
Na Mugha	4500	Conversion	50,000	In Clinic			15,000		5,000	70,000
Walhaga	500	2RM Clinic	62,500	Conversion	20,000		15,000		5,000	102,500
Paregho	950	2RM Clinic	50,000	In Clinic		22,000	15,000		5,000	92,000
Maroghu	555	Conversion	50,000	In Clinic			15,000	15,000	5,000	85,000
Tetere	1239	Conversion	50,000	In Clinic		22,000	15,000	15,000	5,000	107,000
Tawaraha	1264	Conversion	100,000	In Clinic			15,000		5,000	120,000
Ubuna	1700	3RM Clinic	97,500	Conversion	20,000	22,000	15,000		5,000	159,500
<b>SANTA ANA</b>										
Ghupuna	2100	Conversion	75,000	In Clinic			15,000		5,000	95,000
<b>SANTA CATALINA</b>										
Narara	700	2RM Clinic	62,500			22,000	15,000		5,000	104,500
<b>UKI NI MASI</b>										
Kerepei	1000	Conversion	50,000	In Clinic		22,000	15,000	15,000	5,000	107,000
<b>ULAWA</b>										
Hadja	2800	Conversion	50,000	In Clinic			15,000		5,000	70,000
Taheramo		2RM Clinic	62,500	RN House	60,000	22,000	15,000	15,000	5,000	179,500
<b>TOTAL</b>			<b>1,142,500</b>		<b>300,000</b>	<b>264,000</b>	<b>270,000</b>	<b>90,000</b>	<b>90,000</b>	<b>2,166,500</b>

ANNEX 1 : SITES AND FACILITIES AS PROJECT DOCUMENT

TEMOTU PROVINCE										
LOCATION	Pop.	CLINICS Type	Budget	HOUSING Type	Budget	Radio	Water/San.	Canoe/OBM	Equipment	ALLOCATION
			\$		\$	\$	\$	\$	\$	\$
<b>SANTA CRUZ</b>										
Naban	900	N/A Post	32,000			22,000	15,000		2,500	71,500
Luasalemba	800	N/A Post	32,000			22,000	15,000		2,500	71,500
Carlisle Bay	900	N/A Post	32,000			22,000	15,000		2,500	71,500
Nangu	1300	3RM Clinic	97,500	RN House	60,000	22,000	15,000		5,000	199,500
Noole Farm	1000	N/A Post	32,000			22,000	15,000		2,500	71,500
Bimbir	220	N/A Post	32,000			22,000	15,000		2,500	71,500
<b>REEF ISLANDS</b>										
Nuoba	1700	3RM Clinic	97,500	RN House	60,000	22,000	15,000		5,000	199,500
<b>UTUPUA</b>										
Nemba	780	2RM Clinic	62,500	RN House	60,000	22,000	15,000	15,000	5,000	179,500
<b>VANIKOLO</b>										
Emua	750	2RM Clinic	62,500	RN House	60,000	22,000	15,000		5,000	164,500
<b>DUFF ISLANDS</b>										
Ngauta	400	N/A Post	32,000			22,000	15,000		2,500	71,500
<b>ANUTA</b>										
	220	N/A Post	32,000			22,000	15,000		2,500	71,500
<b>TOTAL</b>			<b>544,000</b>		<b>240,000</b>	<b>242,000</b>	<b>165,000</b>	<b>15,000</b>	<b>37,500</b>	<b>1,243,500</b>
<b>GRAND TOTAL</b>			<b>2,230,500</b>		<b>780,000</b>	<b>748,000</b>	<b>600,000</b>	<b>120,000</b>	<b>165,000</b>	<b>4,653,500</b>

Note: There are discrepancies in the project document between this table and the detailed project estimates



## ANNEX 2 : SITES AND FACILITIES AS BUILT/SUPPLIED

MAKIRA/ULAWA PROVINC									
LOCATION	Pop.	CLINICS Type	HOUSING Type	LAT./SH. Type	Cost	Radio	Canoe/OBM	Furn./Equip	FINAL COST
<b>SAN CRISTOBAL</b>									
Krakira Hospital		-	-	-	-	11,588.03	-	-	11,588.03
Maniwiriwiri	?	-	-	2xVIP	41,979.75	12,712.06	-	4,490.46	59,182.27
Manasugu	1503	3RM Clinic	RN House	3xVIP	136,110.69	12,712.06	-	11,035.56	159,858.31
Aringana	1290	Conversion	Conversion	3xVIP+Sh	56,803.08	12,712.06	-	11,044.29	80,559.43
Narame	2002	Conversion	RN House	3xVIP+Sh	100,026.34	12,712.06	12,550.14	11,414.39	136,702.93
Karie	2026	Conversion	RN House	2xVIP+Sh	87,315.08	12,712.06	-	11,963.73	111,990.87
Mwanibwaghosi	?	3RM Clinic	RN House	3xVIP	126,932.80	12,712.06	12,550.14	11,035.56	163,230.56
Na Mughha	2413	Conversion	-	2xVIP	44,562.20	-	-	10,204.70	54,766.90
Waihaga	572	2RM Clinic	RN House	3xVIP+Sh	116,536.65	-	-	10,193.01	126,729.66
Paregho	1058	2RM Clinic	RN House	2xVIP	115,608.56	12,712.06	-	10,193.01	138,513.63
Maroghu	617	Conversion	RN House	3xVIP+Sh	84,700.61	3,470.12	12,550.14	9,642.97	110,363.84
Tetere	1479	Conversion	RN House	2xVIP	83,499.76	3,470.12	12,550.14	11,044.29	110,564.31
Tawaraha	1508	Conversion	RN House	-	59,018.20	12,712.06	-	16,124.00	87,854.26
		Malaria Post	RN Housex2	3xVIP+Sh	155,043.67				155,043.67
Ubuna	2003	3RM Clinic	RN House	2xVIP	130,492.93	12,712.06	-	10,193.01	153,398.00
<b>SANTA ANA</b>									
Ghupuna	2430	Conversion	RN House	2xVIP	86,520.99	-	-	9,272.88	95,793.87
<b>SANTA CATALINA</b>									
Narara	?	N/A Post	-	-	35,827.26	12,712.06	-	4,490.46	53,029.78
<b>UKI NI MASI</b>									
Kerepei	975	3RM Clinic	Conversion	3xVIP+Sh	109,324.02	12,712.06	12,550.14	11,035.56	145,621.78
<b>ULAWA</b>									
Hadja	3016	Conversion	Conversion	Shower	56,391.21	8,236.88	-		64,628.09
Taheramo	?	2RM Clinic	RN House	3xVIP	114,751.02	12,712.06	12,550.14	10,193.01	150,206.23
<b>TOTAL</b>					<b>1,741,444.82</b>	<b>179,309.87</b>	<b>75,300.84</b>	<b>173,570.89</b>	<b>2,169,626.42</b>

## ANNEX 2 : SITES AND FACILITIES AS BUILT/SUPPLIED

TEMOTU PROVINCE									
LOCATION	Pop.	CLINICS Type	HOUSING Type	LAT/SH Type	Cost	Radio	Canoe/OBM	Furn./Equip	FINAL COST
					\$	\$	\$	\$	\$
<b>SANTA CRUZ</b>									
Lata Hospital (Anuta)		/P Clinic	-	2xPFL	44,087.73	11,588.03	15,743.52	4,490.46	75,909.74
Kati (Naban)	?	N/A Post	-	2xPFL	45,179.51	-	-	4,490.46	49,669.97
Otomongi (Luasalemba)	?	N/A Post	-	3xPFL+Sh	49,475.73	12,712.06	-	4,490.46	66,678.25
Carlisle Bay	671	N/A Post	-	2xPFL	44,421.09	12,712.06	-	4,490.46	61,623.61
Nangu	1344	3RM Clinic	Conversion	Shower	96,329.26	12,712.06	-	11,035.56	120,076.88
Nea (Noole Farm)	?	N/A Post	-	2xVIP	46,135.04	12,712.06	-	4,490.46	63,337.56
Ngaito (Bimbir)	?	N/A Post	-	2xVIP	43,858.93	12,712.06	-	4,490.46	61,061.45
<b>REEF ISLANDS</b>									
Nuoba	1738	3RM Clinic	Conversion	2xVIP	98,334.21	12,712.06	17,705.90	11,035.56	139,787.73
<b>UTUPUA</b>									
Nembao	699	2RM Clinic	RN House	Shower	116,928.62	12,712.06	12,550.14	10,193.00	152,383.82
<b>VANIKOLO</b>									
Emua	681	2RM Clinic	RN House	Shower	118,319.42	12,712.06	-	10,193.00	141,224.48
<b>DUFF ISLANDS</b>									
Ngauta	412	2RM Clinic	RN House	Shower	122,106.15	12,712.06	-	10,193.00	145,011.21
<b>TOTAL</b>					<b>825,175.69</b>	<b>125,996.57</b>	<b>45,999.56</b>	<b>79,592.88</b>	<b>1,076,764.70</b>
<b>ADDITIONAL MATERIALS &amp; FREIGHT</b>					<b>171,456.16</b>				
<b>GRAND TOTAL</b>					<b>2,738,076.67</b>	<b>305,306.44</b>	<b>121,300.40</b>	<b>253,163.77</b>	<b>3,246,391.12</b>

### ANNEX 3: DETAILS OF BUILDINGS AS CONSTRUCTED

Details of the buildings as constructed are given on drawings RHC/1-11 following. Basic designs, agreed with MHMS and the ODA Regional Construction Adviser, were included in the project document. These were revised by the PM after consultation with the provincial Directors of Medical Services and MHMS. The buildings were designed to be constructed as simply and economically as possible; to deal adequately with the hot and humid climate; to use locally available materials as much as possible; and to be cyclone-resistant.

#### CLINICS & REGISTERED NURSES' HOUSES

Four types of building were constructed: a single room Nurse-Aide Post; a 2 Room Clinic; a 3 Room Clinic; and a Registered Nurse's House.

Construction was of locally milled hardwood with masonite internal wall linings, caneite ceilings and 24g 'Zincalume' corrugated steel roofs. The buildings were raised off the ground on 75x75 galvanised steel posts at approximately 1.6 metre centres along the building and 2.5 metres across, with a 1.6 metre wide balcony. Double floor bearers were bolted to the steel posts supporting floor joists fixed with cyclone straps. The roofs were supported on rafters at 1.6 metre centres bolted between the structural window frames which were in turn bolted to the steel posts at floor level. This gave continuity from the roof to the foundations to prevent uplift during cyclones.

The construction sequence was: 1) the steel posts were positioned and concreted into the ground; 2) floor bearers and joists were fixed and the prefabricated window and door frames erected and bolted to the steel posts; 3) The pre-cut centre posts, roof beams and rafters were erected and bolted into place; 4) the wall studding and bracing was fixed 5) the purlins, roof bracing and roof sheets were fixed 6) the floors, ceilings, weatherboard and wall linings were fixed and fitting out and painting completed.

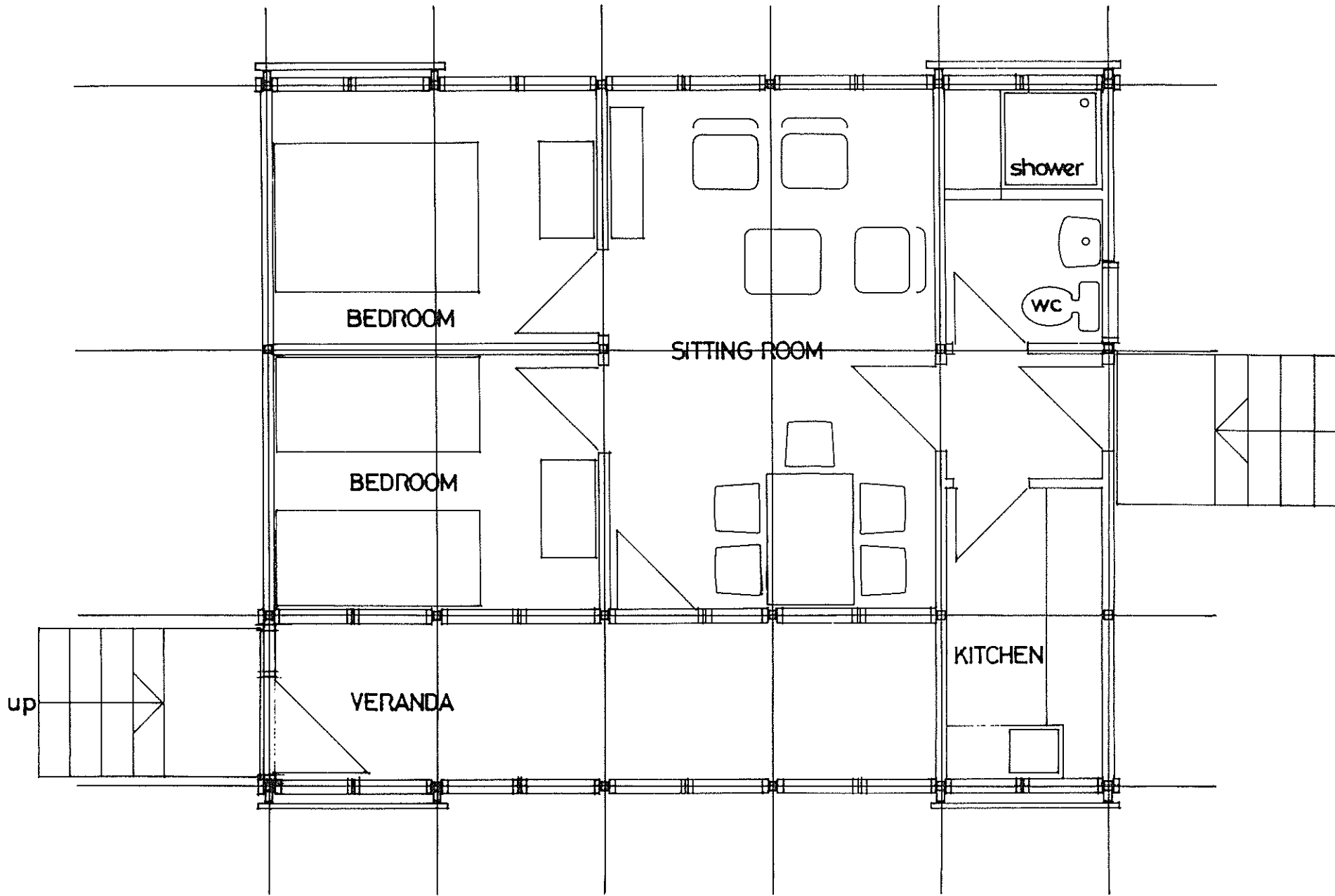
## KITCHENS, LATRINES AND SHOWERS

Most Solomon Islanders in the provinces spend their day outside or on the veranda of their houses. The RN Houses were seen therefore as providing: security for the nurse and his/her belongings (essential if posting female nurses to the provinces); two rooms for sleeping in (bed nets were provided); a sitting room for use in bad weather; a small veranda; and a refuge in times of cyclones. No kitchen was provided. Nurses in the provinces almost always cook over wood fires and so kitchens have been built out of local materials close to the houses.

Two kinds of latrine were built; a Ventilated Improved Pit Latrine; and a Pour Flush Privy. Both latrines had the same enclosures which were prefabricated out of timber in four panels, one panel per side. A 300x300 RC ring beam was constructed in the ground and the pit excavated. Holding down bolts were cast into the ring beam, one course of blockwork was laid and the floor, of precast RC slabs, was laid on the blocks. The panels were then erected, bolted to the ring beam and bolted together. Rafters, purlins and the roof sheets were then fixed.

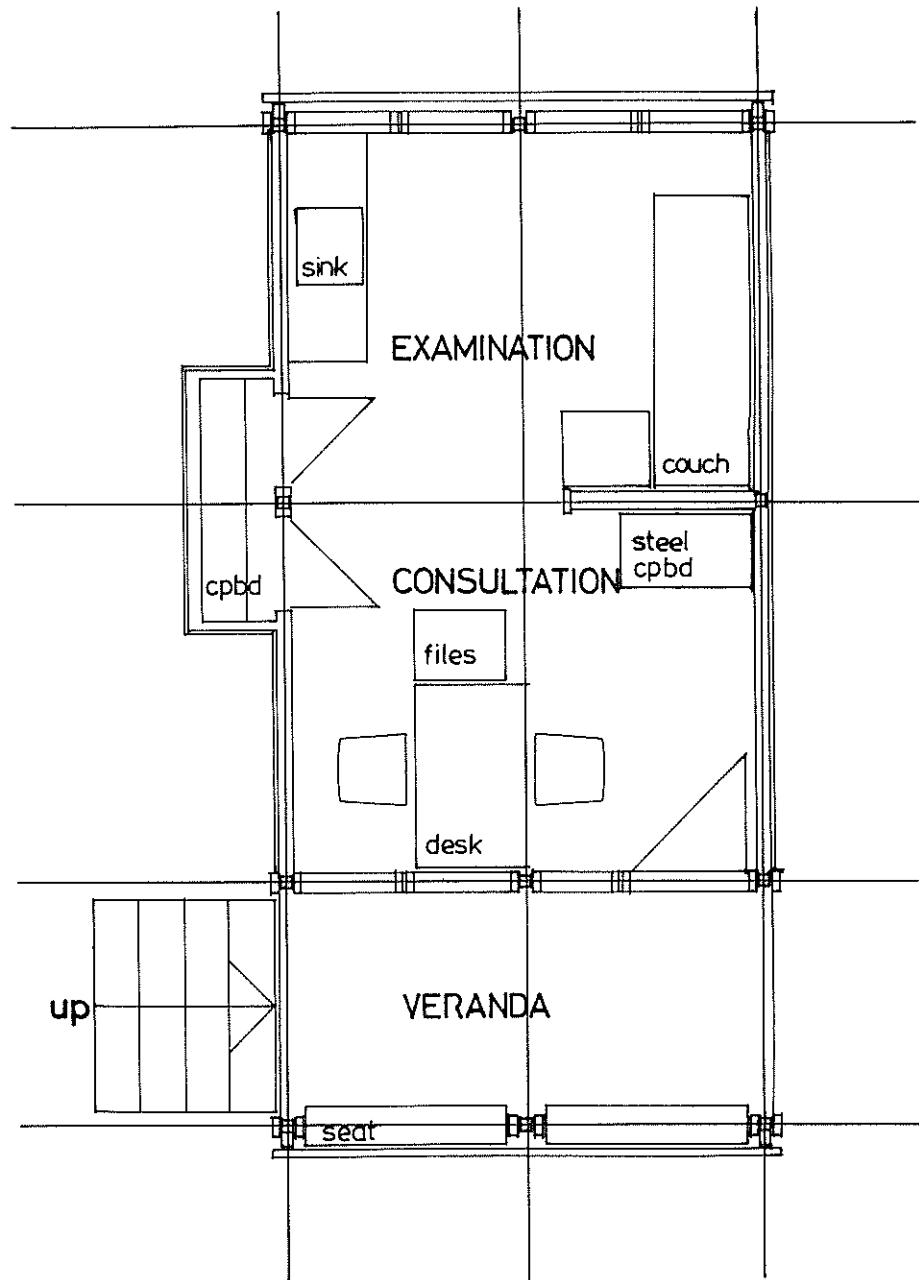
The Pour Flush Privy had a concrete upstand, a seat and a water seal. The pit was not vented. A tap was installed in the privy to provide water for flushing. These units were only constructed in Temotu Province in villages which had reasonably reliable gravity-feed water supplies. There was, at the time the project started, a rural water supply project constructing similar privies in the province and carrying out an education programme. Where there was no water supply in the province, and at all sites in Makira Ulawa Province, VIP Latrines were built. These were similar in most respects to the privies except that they had no seats and the pits were vented with 150mm pvc pipes.

A Shower/Laundry unit was built out of blockwork adjacent to the RN Houses on sites where there was running water.



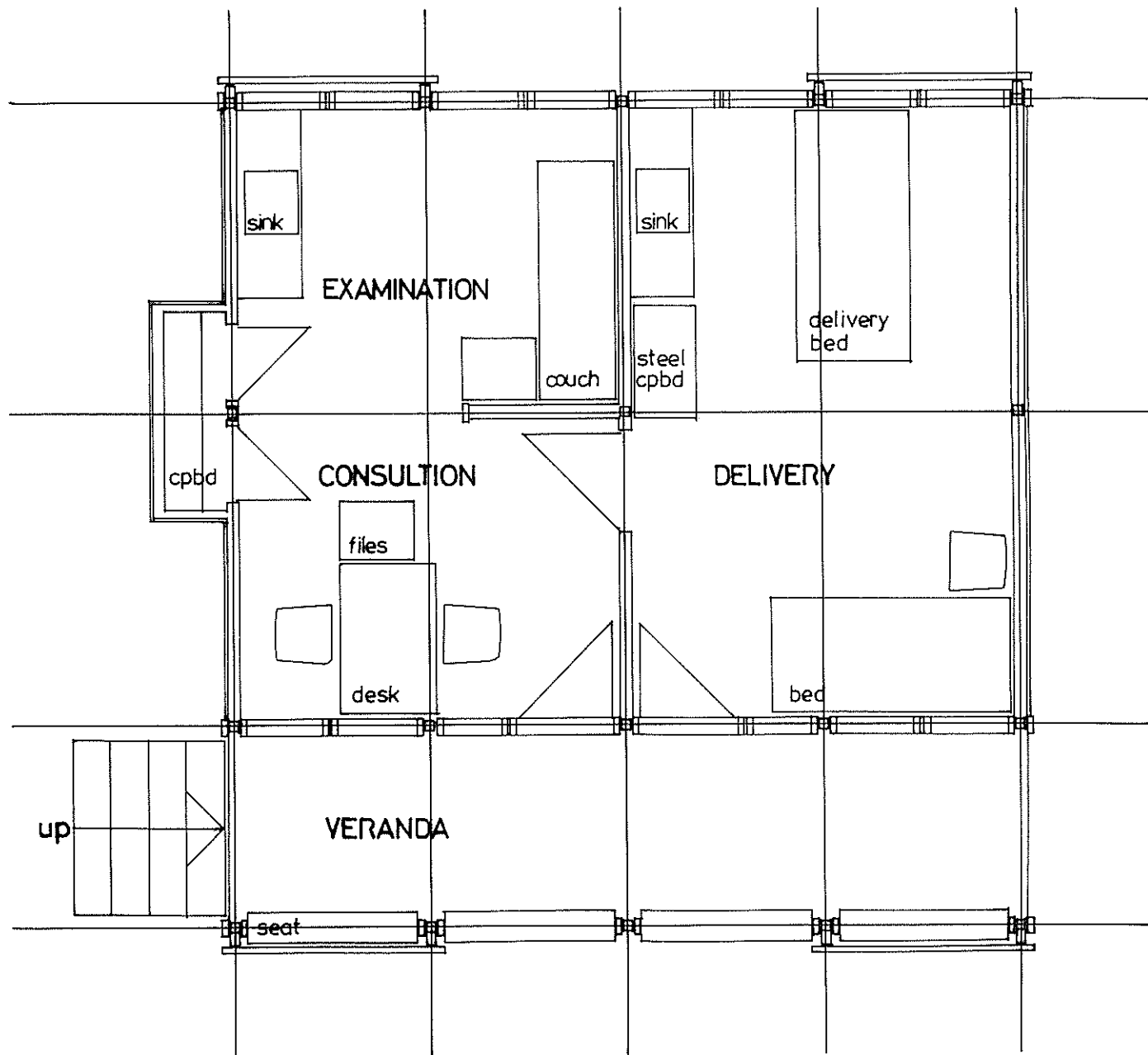
RHC/01: MHMS STAFF HOUSE

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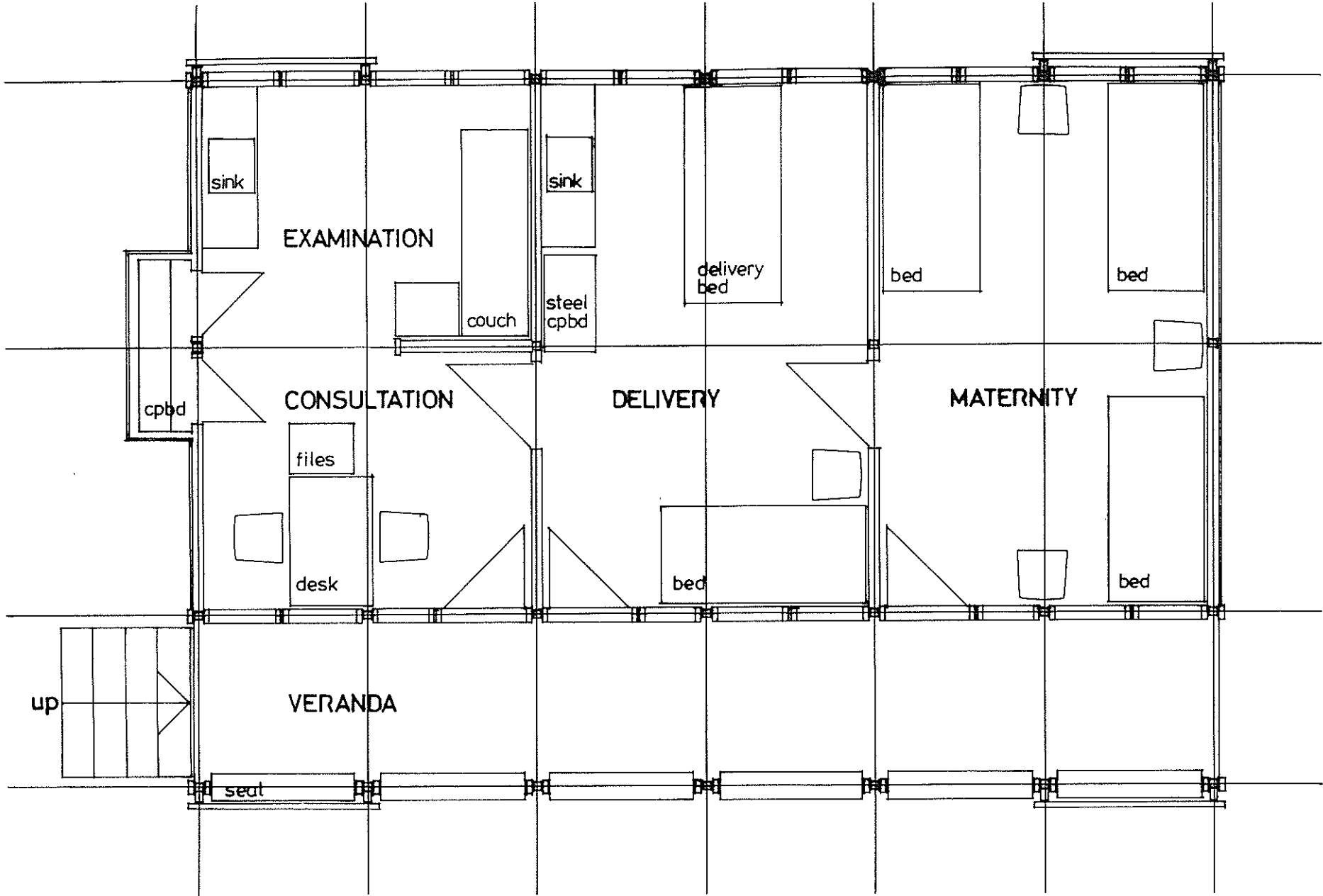
RHC/02: NURSE-AIDE POST

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RHC/03: TWO ROOM CLINIC

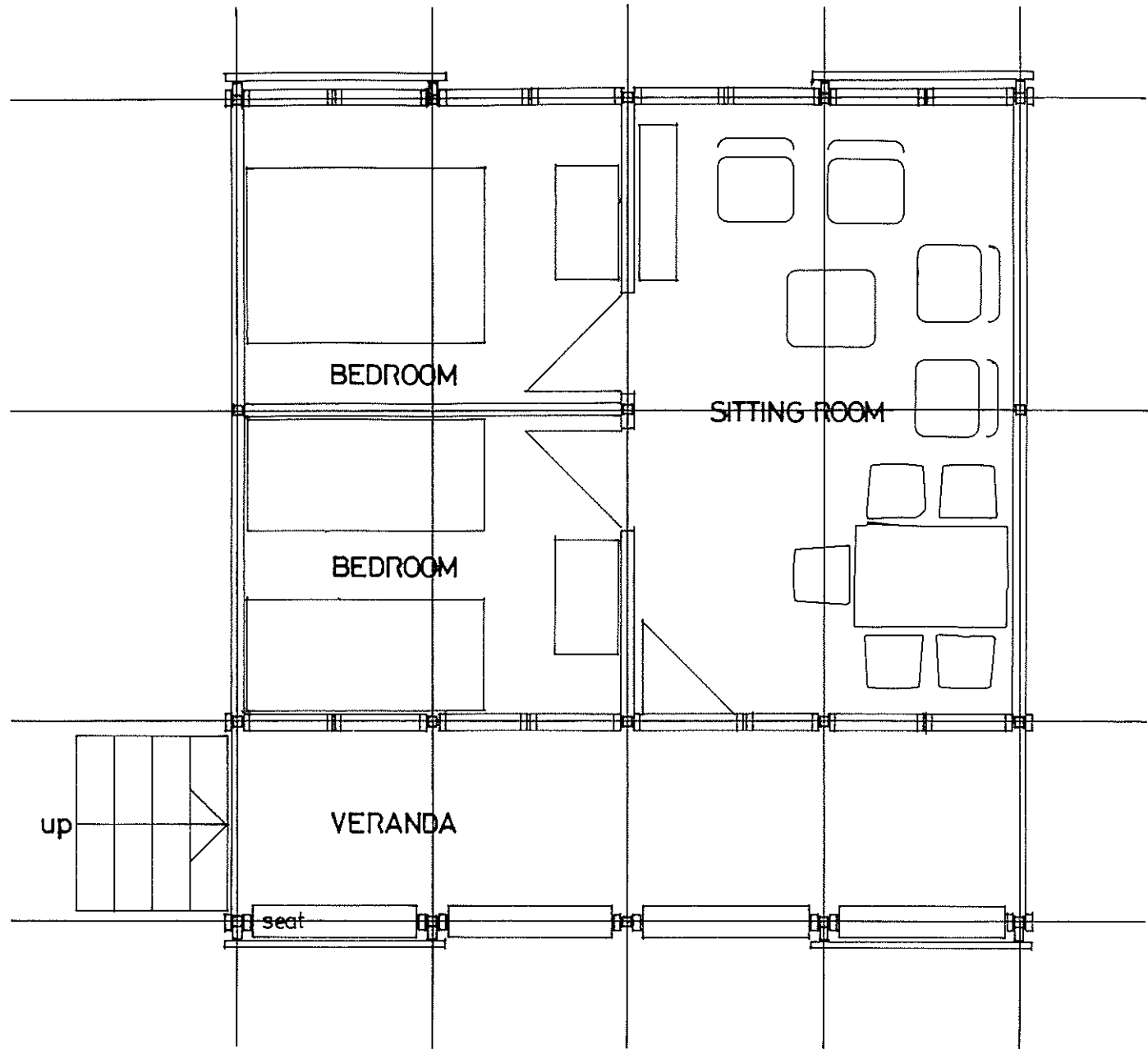
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RHC/04: THREE ROOM CLINIC

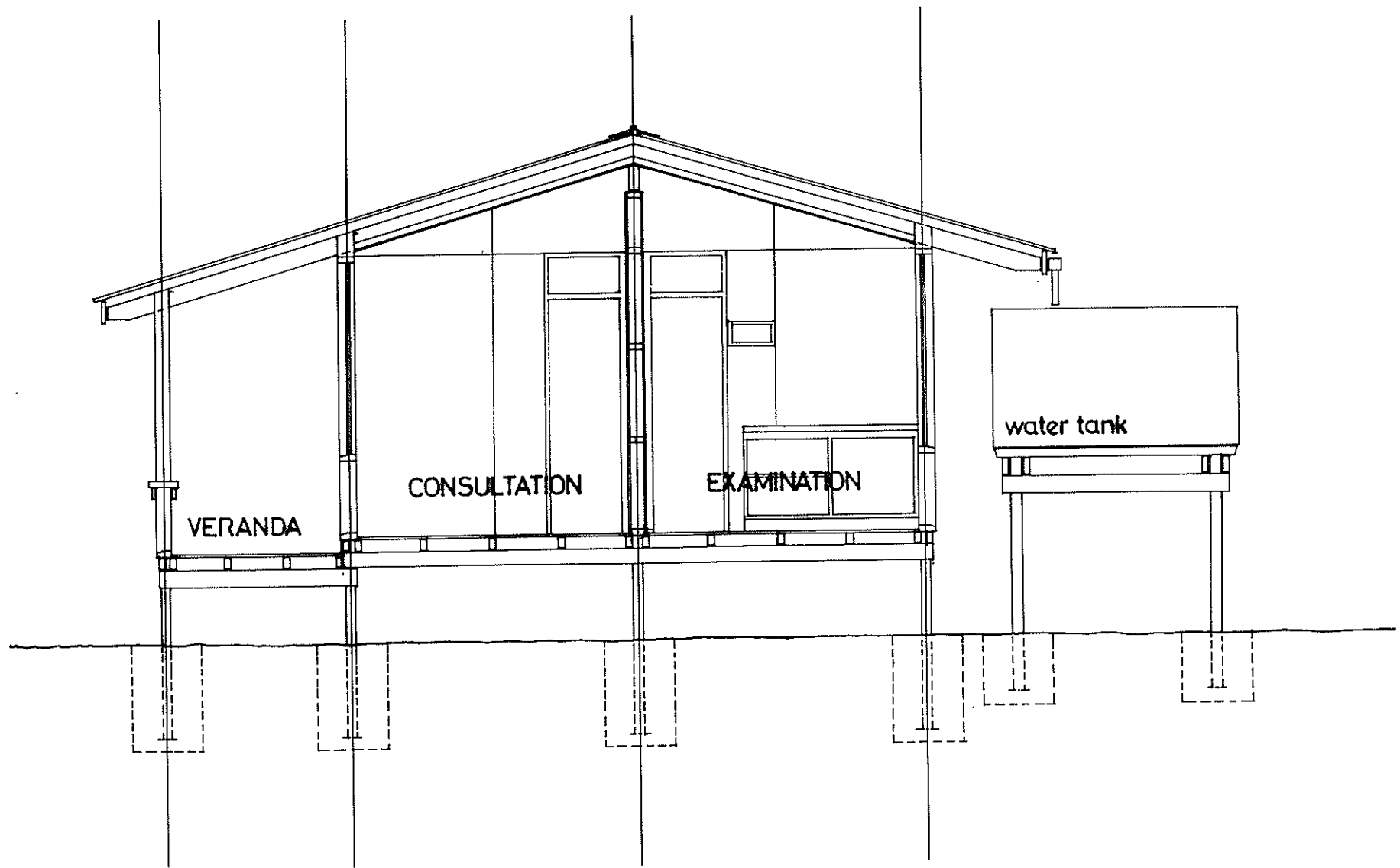
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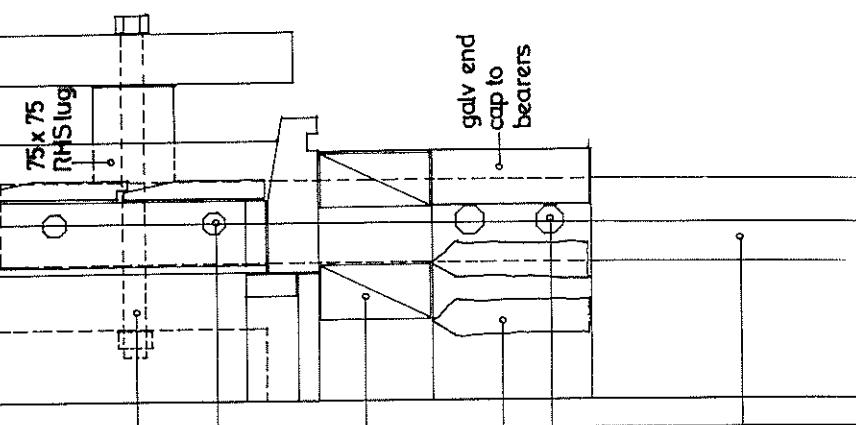
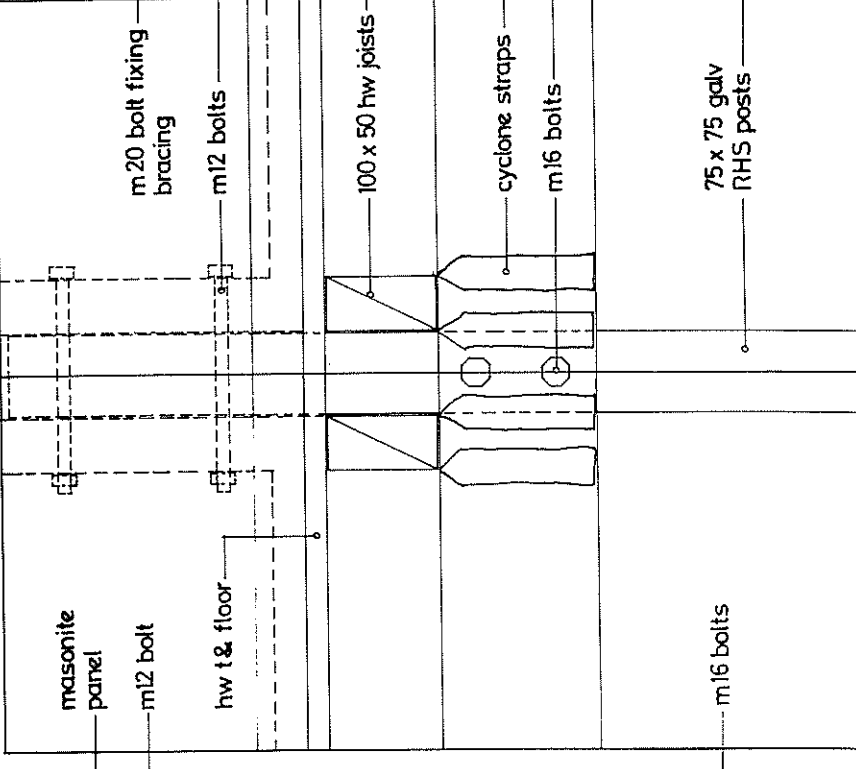
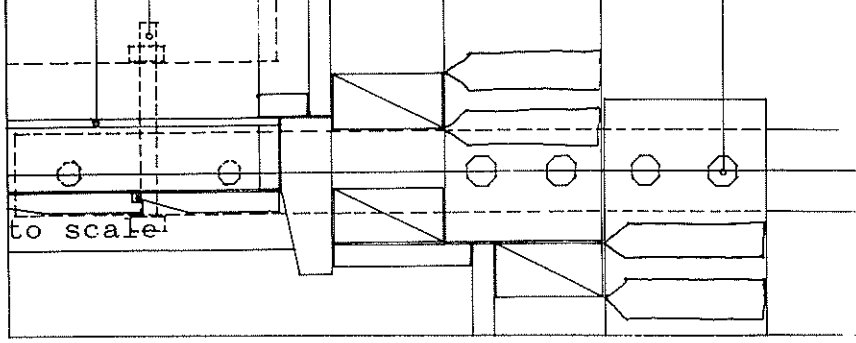
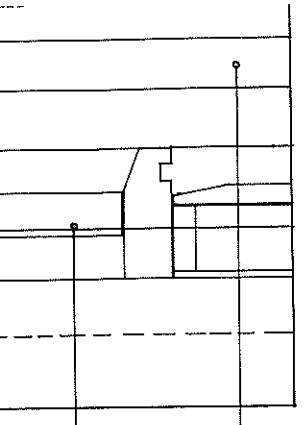
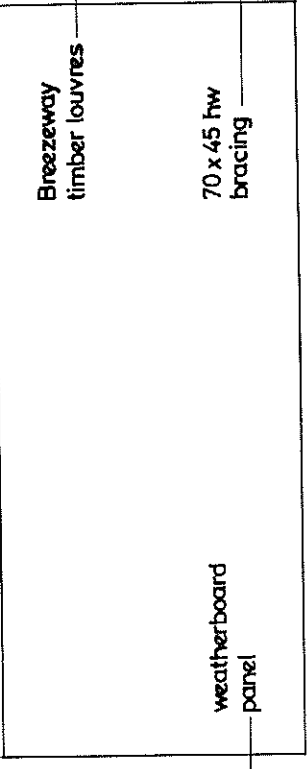
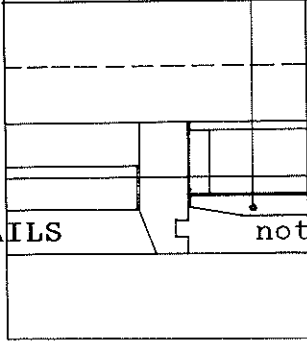
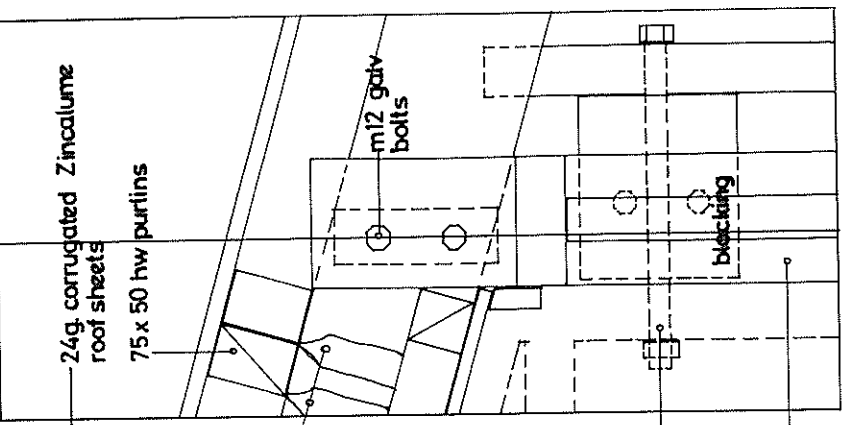
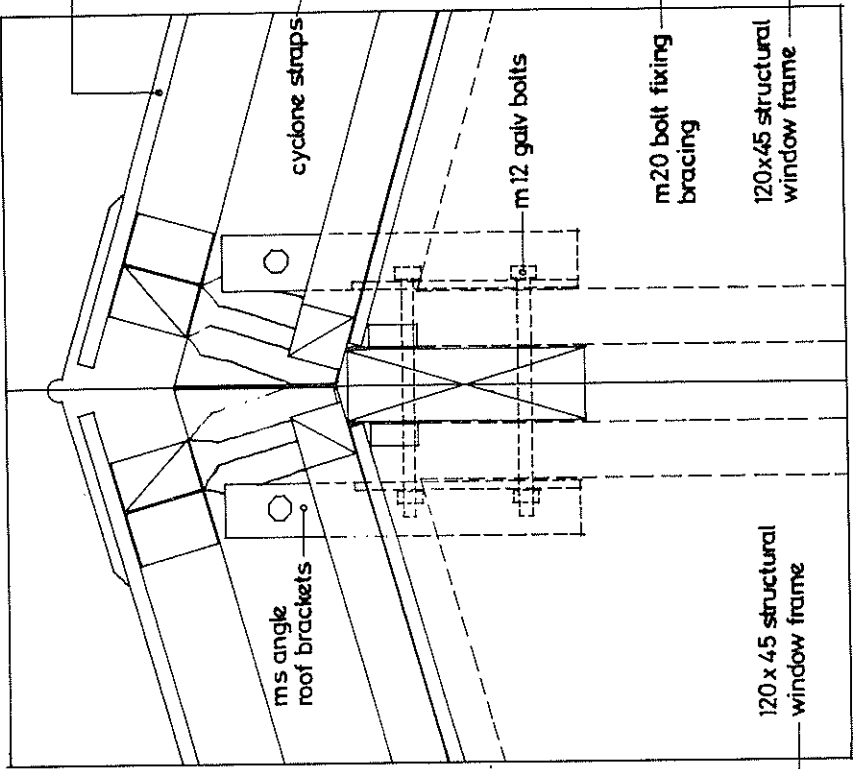
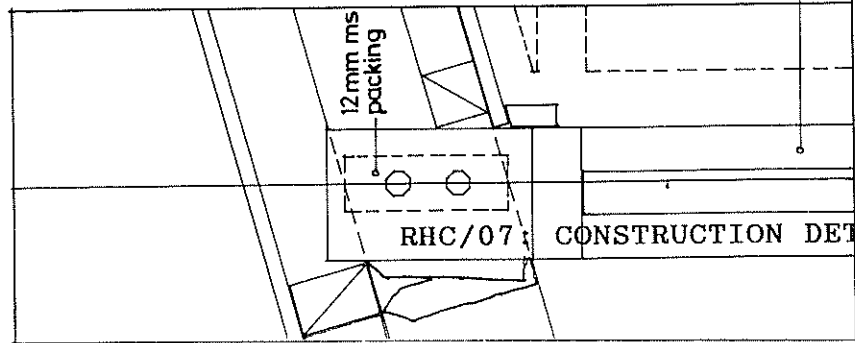
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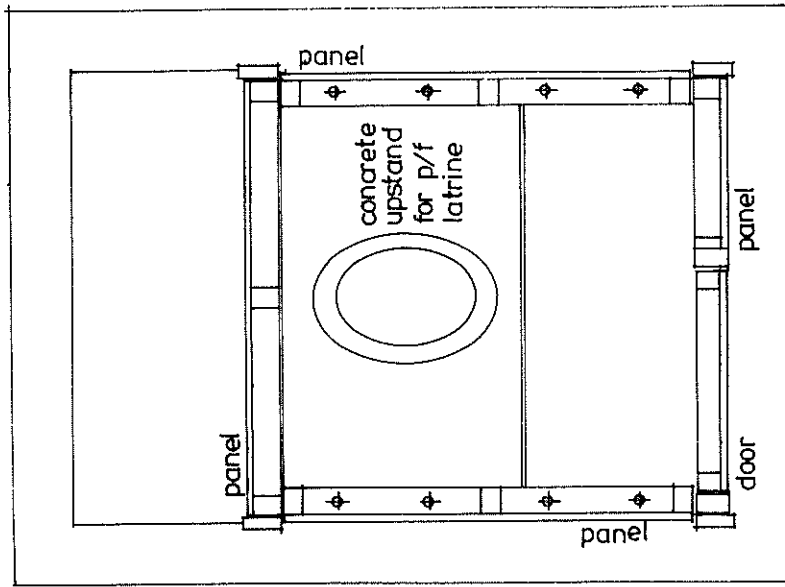
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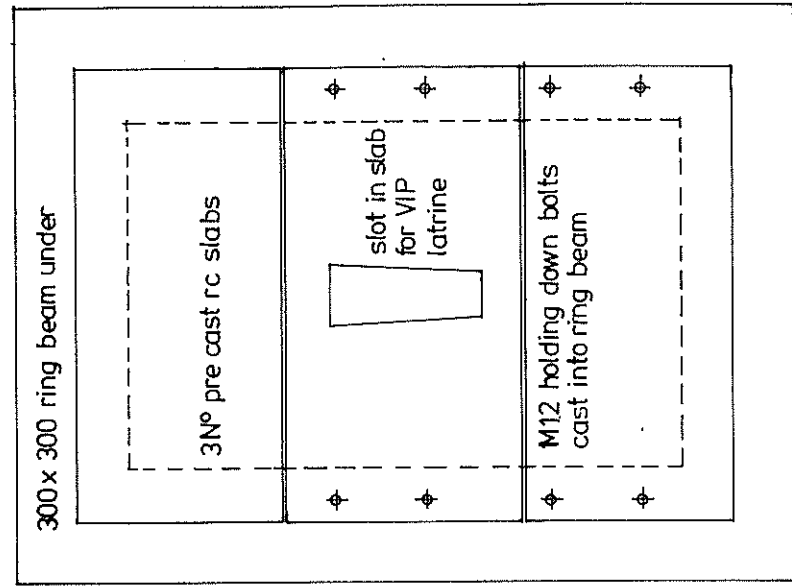


RHC/07 CONSTRUCTION DETAILS

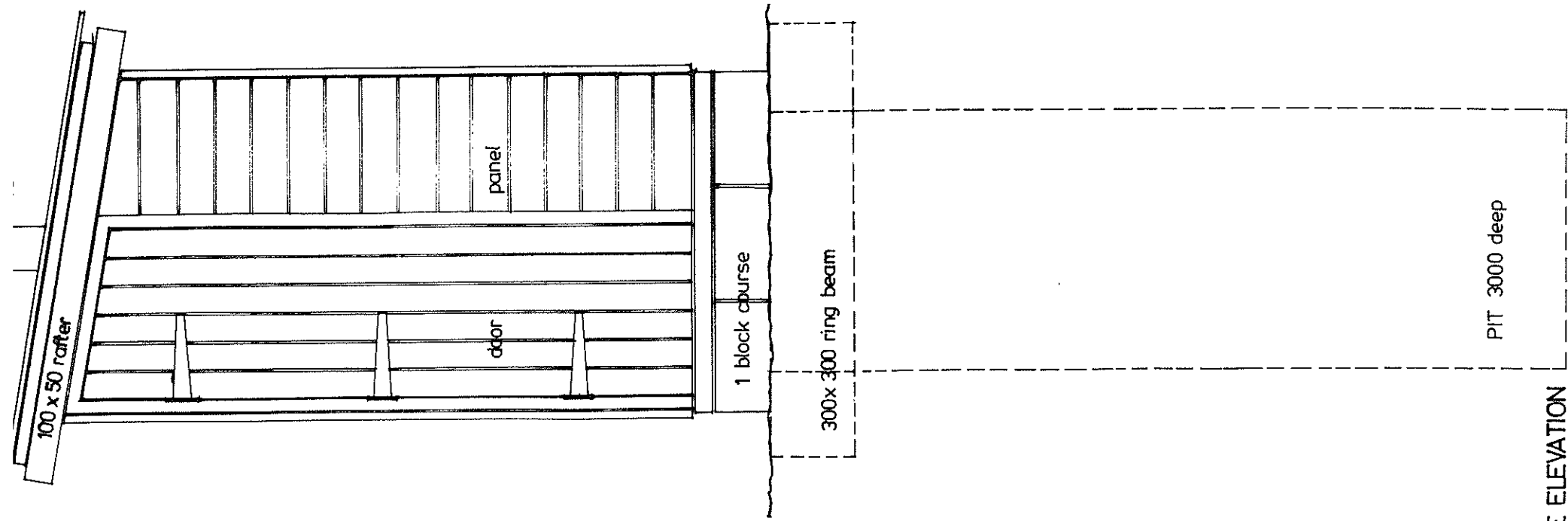
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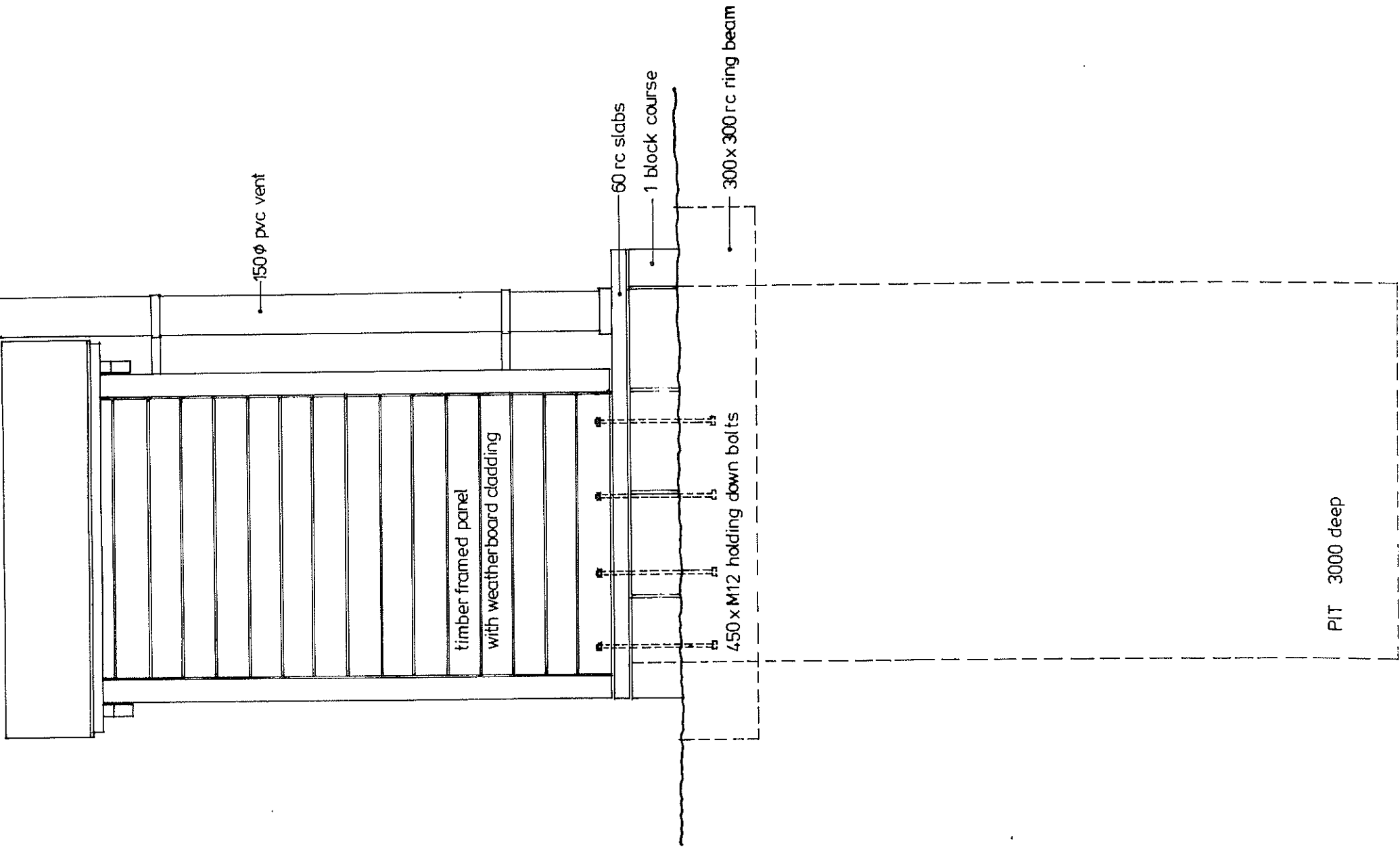
PLAN SHOWING TIMBER PANELS



PLAN SHOWING PRE CAST SLABS

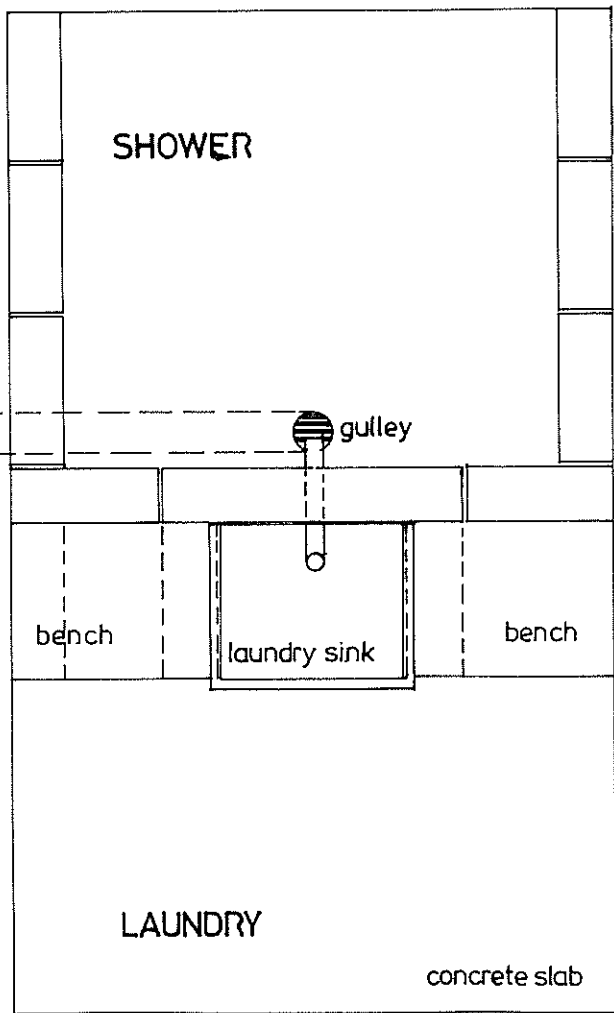


ENTRANCE ELEVATION

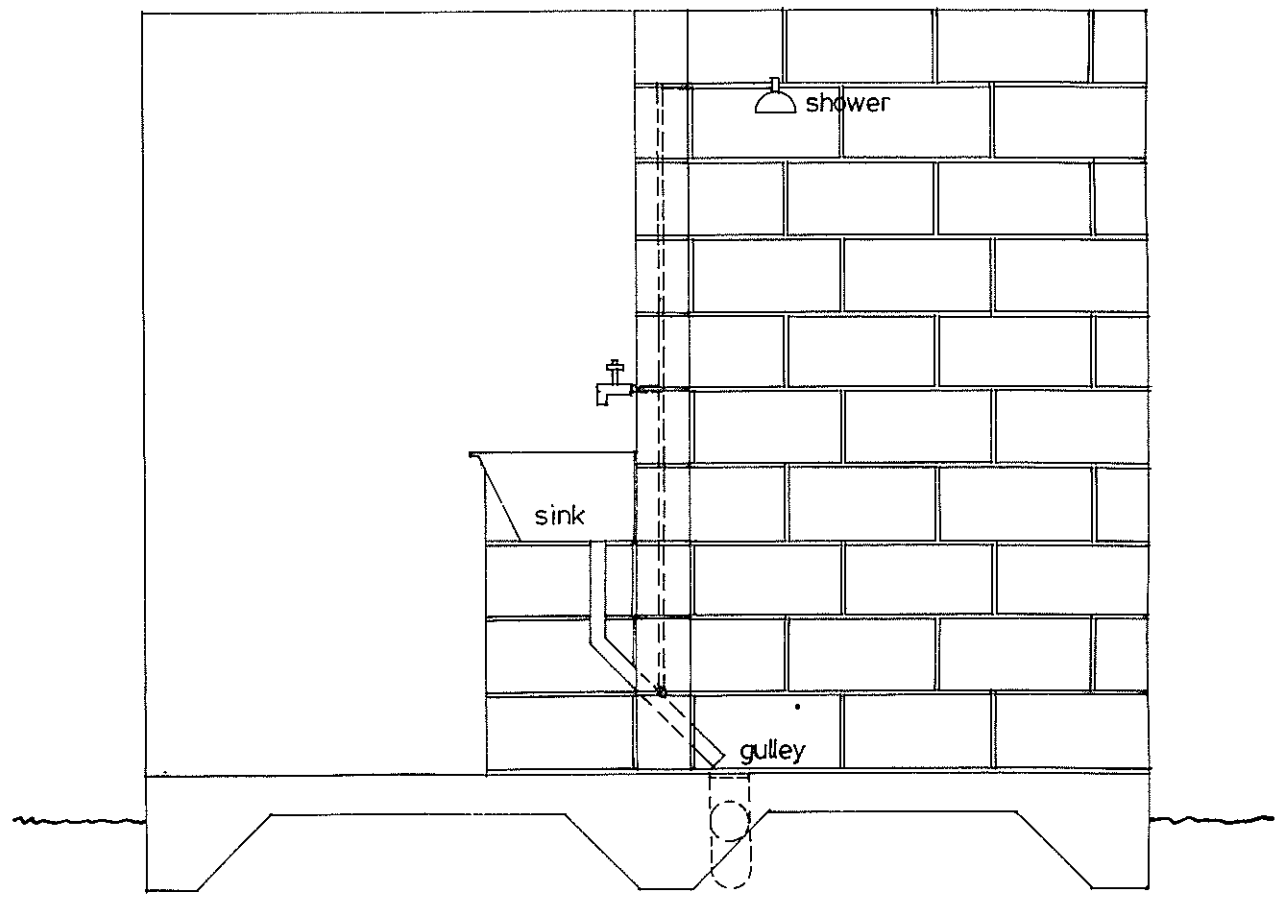


RHC/08: VIP LATRINE/POUR FLUSH PRIVY: ELEVATION

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PLAN



SECTION

ANNEX 4 : RURAL HEALTH FACILITIES PROJECT:  
TEMOTU & MAKIRA ULAWA PROVINCES

FURNITURE & EQUIPMENT SUPPLIED BY BRITISH GOVERNMENT

FURNITURE

---

CLINICS	NAP	2RM	3RM	RNH
Examination couch, adjustable ends	1	1	1	
Lockable steel cupboard	1	1	1	
Wooden desk, 2-drawer	1	1	1	
Lockable steel filing cabinet	1	1	1	
Wooden chairs	2	3	4	8
Delivery bed	-	1	1	
Single bed with mattress	-	1	4	
Baby cot with mattress	-	1	1	
Double bed	-	-	-	1
Single bed	-	-	-	2
Dining table	-	-	-	1
Bed nets (single)		1	4	2
Bed nets (double)				1
Bed nets (cot)		1	1	

---

## ANNEX 4

### EQUIPMENT

---

CLINICS	NAP	2RM	3RM
Dressing trolley	1	1	1
Stretcher	-	1	1
Rucksack, 30 litre	1	1	1
Waterproof torches	2	2	2
Pair large, pair small crutches	1	1	1
Metal bucket	1	1	1
Pedal bin	1	1	1
Fuel pump (petrol)	-	1	1
Fuel pump (kerosene)	-	1	1
Heavy-duty PVC raincoats	2	2	2
Adult life-jackets to A.S.1512	-	2	2
Plastic apron	1	1	1
Stainless steel instrument trays	2	2	2
Stainless steel bowls, 10", 6" & 4" dia	2	2	2
Artery forceps	8	8	8
Dressing forceps	4	4	4
Kocker forceps	4	4	4
Airways, small, medium and large	2	2	2

---



ANNEX 5 : EQUIPMENT SUPPLIED FROM NATIONAL MEDICAL STORES

Drip stands, metal  
Tilly lamps  
Primus stove, kerosene  
Bowl, baby bathing, polypropylene  
Haemoglobinometer, Reichert equivalent  
Auroscope, Heine mini or equivalent  
Aneroid sphygmomanometer with stethoscope  
Forceps, non-toothed dressing 5"  
Forceps, dissecting toothed 2-3, 5"  
Scissors, dressing 5" blunt/sharp  
Scissors, heavy duty cloth cutting  
Speculum, duckbilled, (Cusco's) s/steel, small  
Ditto, medium  
Ditto, large  
Needle holder, 6" squeeze action  
Kidney dish autoclavable plastic medium 6"  
Ditto, medium 8"  
Ditto, large 10"  
Lotion bowl autoclavable plastic medium 6"  
Ditto, large 8"  
Jugs, plastic graduated 1lt. with lid  
Umbilical cord clamping forceps, 8" locking  
Umbilical cord scissors  
Sponge forceps  
Instrument boiler "fish kettle" type complete with lift-out  
instrument trays for primus 27x12x65cms (not electrical)  
Nebuliser pump hand/foot operated. "Easy Air" (2/3 paed mask;  
1/3 adult mask)  
Vaccine carrier 1.7lt. with four ice packs and sponge lid/vial  
holder  
Reference book "Common Medical Problems In The Tropics"  
by C R Shull  
Fuel can for petrol, 20lt. with filter & filling nozzle  
Ditto, for kerosene  
Stethoscope, nurses type diaphragm

## ANNEX 5

Foetal stethoscope, metal  
Salter baby-weighing scale (hanging type)  
Adult weighing scale (bathroom type)  
Scalpel handle s/s/ No.3  
Ditto No.4  
Lotion bowl autoclavable plastic, small 80mm  
Bed pan, adult plastic  
Male urinal, plastic  
Eye test chart, ABC type  
Ditto, EEE (illiterate)  
Cheatles forceps (lifting)  
Delivery tray with lid  
Episiotomy scissors curved  
Episiotomy sutures  
Mucus extractors, sterile packed singles  
Operating table  
Dissecting scissors curved  
Dissecting scissors straight  
Artery forceps

ANNEX 6: RADIO EQUIPMENT AS SUPPLIED TO CLINICS

EACH CLINIC WAS SUPPLIED WITH A SOLAR POWERED HF/SSB RADIO TRANSCEIVER AND EQUIPMENT TO THE FOLLOWING SPECIFICATION:

- A: Codan X-2 transceiver with 2No fixed frequencies; the National Medical frequency and the respective provincial frequency
- B: Dipole aerial system complete with co-axial feeder cable
- C: Solar panel mounting frame
- D: Solarex MSX-50 solar panel
- E. Solarex SR 4-12 regulator
- F: N120 dry charged battery complete with acid
- G: Interconnecting wiring set allowing the aerial to be erected up to 6 metres from the clinic
- H: 13 metre aerial support pole complete with guy wires and accessories

THE TWO PROVINCIAL HOSPITALS WERE SUPPLIED WITH SIMILAR EQUIPMENT POWERED BY MAINS UNITS WITH BATTERY BACK-UP.





## ANNEX 8 : TEMOTU AND MAKIRA ULAWA PROVINCES : FINAL CONSTRUCTION COSTS

MAKIRA ULAWA PROVINCE										
	CLINICS		HOUSING		LATRINE/SHOWER					
LOCATION	Type	Materials	Type	Materials	Type	Materials	SHIPPING	LABOUR	TOTAL COST	PROJ.DOC.COST
<b>SAN CRISTOBAL</b>										
Maniwiriri	N/A Post	29,773.25	-		2xVIP	5,089.37	4,210.12	2,907.01	41,979.75	47,000.00
Manasugu	3RM Clinic	57,541.71	RN House	38,702.17	3xVIP	7,634.05	21,050.62	11,182.14	136,110.69	172,500.00
Aringana	Conversion	18,372.89	Conversion	14,191.33	3xVIP+Sh.	9,531.93	8,835.58	5,871.35	56,803.08	60,000.00
Narame	Conversion	31,130.54	RN House	38,702.17	3xVIP+Sh.	9,531.93	12,838.04	7,823.66	100,026.34	65,000.00
Karie	Conversion	22,932.92	RN House	38,702.17	2xVIP+Sh.	6,987.24	11,044.48	7,648.27	87,315.08	125,000.00
Mwanibwaghosi	3RM Clinic	57,541.71	RN House	38,702.17	3xVIP	7,634.05	15,346.34	7,708.53	126,932.80	172,500.00
Na Mugha	Conversion	31,272.53	-		2xVIP	5,089.37	4,733.35	3,466.95	44,562.20	65,000.00
Waihaga	2RM Clinic	44,593.21	RN House	38,702.17	3xVIP+Sh.	9,531.93	18,561.24	5,148.10	116,536.65	97,500.00
Paregho	2RM Clinic	44,593.21	RN House	38,702.17	2xVIP	5,089.37	18,561.24	8,662.57	115,608.56	65,000.00
Maroghu	Conversion	17,386.60	RN House	38,702.17	3xVIP+Sh.	9,531.93	12,138.16	6,941.75	84,700.61	65,000.00
Tetere	Conversion	20,459.49	RN House	38,702.17	2xVIP	5,089.37	12,138.16	7,110.57	83,499.76	65,000.00
Tawaraha	Conversion	20,316.03	RN House	38,702.17	-				59,018.20	
	Malaria Lab	29,773.25	RN Housex2	77,404.34	3xVIP+Sh.	9,531.93	20,053.07	18,281.08	155,043.67	285,000.00
Ubuna	3RM Clinic	61,822.25	RN House	38,702.17	2xVIP	5,089.37	13,867.06	11,012.08	130,492.93	132,500.00
<b>SANTA ANA</b>										
Ghupuna	Conversion	23,685.51	RN House	38,702.17	2xVIP	5,089.37	12,838.04	6,205.90	86,520.99	90,000.00
<b>SANTA CATALINA</b>										
Narara	N/A Post	29,773.25	-				4,210.12	1,843.89	35,827.26	47,000.00
<b>UKI NI MASI</b>										
Kerepei	3RM Clinic	57,541.71	Conversion	24,912.54	3xVIP+Sh.	9,531.93	7,372.86	9,964.98	109,324.02	65,000.00
<b>ULAWA</b>										
Hadja	Conversion	20,503.61	Conversion	17,737.28	Shower	1,897.88	8,835.58	7,416.86	56,391.21	65,000.00
Taheramo	2RM Clinic	46,334.32	RN House	41,555.87	3xVIP	7,634.05	11,044.48	8,182.30	114,751.02	137,500.00
<b>TOTALS</b>		<b>665,347.99</b>		<b>601,525.23</b>		<b>119,515.07</b>	<b>217,678.54</b>	<b>137,377.99</b>	<b>1,741,444.82</b>	<b>1,821,500.00</b>

## ANNEX 8 : TEMOTU AND MAKIRA ULAWA PROVINCES : FINAL CONSTRUCTION COSTS

TEMOTU PROVINCE										
	CLINICS		HOUSING		LATRINE/SHOWER					
LOCATION	Type	Materials	Type	Materials	Type	Materials	SHIPPING	LABOUR	TOTAL COST	PROJ.DOC.COST
<b>SANTA CRUZ</b>										
Lata Hospital	F/Planning	29,773.25	-		2xPFL	4,900.55	5,689.06	3,724.87	44,087.73	47,000.00
Kati	N/A Post	29,773.25	-		2xPFL	4,900.55	6,693.46	3,812.25	45,179.51	47,000.00
Otomongi	N/A Post	29,773.25	-		3xPFL+Sh	9,248.70	6,693.46	3,760.32	49,475.73	47,000.00
Carlisle Bay	N/A Post	29,773.25	-		2xPFL	4,900.55	6,693.46	3,053.83	44,421.09	47,000.00
Nangu	3RM Clinic	57,541.71	Conversion	9,269.05	Shower	1,897.88	22,756.28	4,864.34	96,329.26	172,500.00
Nea	N/A Post	29,773.25	-		2xVIP	5,089.37	6,693.46	4,578.96	46,135.04	47,000.00
Ngaito	N/A Post	29,773.25	-		2xVIP	5,089.37	5,689.06	3,307.25	43,858.93	47,000.00
<b>REEF ISLANDS</b>										
Nuoba	3RM Clinic	57,541.71	Conversion	7,998.23	2xVIP	5,089.37	22,756.28	4,948.62	98,334.21	172,500.00
<b>UTUPUA</b>										
Nemba	2RM Clinic	44,593.21	RN House	38,702.17	Shower	1,897.88	26,773.84	4,961.52	116,928.62	137,500.00
<b>VANIKOLO</b>										
Emua	2RM Clinic	44,593.21	RN House	38,702.17	Shower	1,897.88	26,773.84	6,352.32	118,319.42	137,500.00
<b>DUFF ISLANDS</b>										
Ngauta	2RM Clinic	44,593.21	RN House	38,702.17	Shower	1,897.88	30,202.94	6,709.95	122,106.15	47,000.00
<b>TOTALS</b>		<b>427,502.55</b>		<b>133,373.79</b>		<b>46,809.98</b>	<b>167,415.14</b>	<b>50,074.23</b>	<b>825,175.69</b>	<b>949,000.00</b>
<b>ADDITIONAL MATERIALS &amp; FREIGHT</b>									<b>171,456.16</b>	
<b>GRAND TOTAL:</b>		<b>1,092,850.54</b>		<b>734,899.02</b>		<b>166,325.05</b>	<b>385,093.68</b>	<b>187,452.22</b>	<b>2,738,076.67</b>	<b>2,770,500.00</b>

## ANNEX 9 : TEMOTU &amp; MAKIRA ULAWA PROVINCES

## FINAL PROJECT COSTS

ITEM	MEMO COST	FINAL COST
Clinic Construction	***2,841,000	2,738,076.67
Radio Installations	520,500	305,306.44
Canoes/OBMs	140,000	121,300.40
Equipment and Furniture	127,500	253,163.77
VSO Costs	130,000	67,549.77
Construction Assistants	90,000	3,734.54
Const.Asst./Post Project	60,000	-
Consultants	25,000	25,772.40
MHMS Houses	140,000	*170,727.32
Tools and Equipment	70,000	155,917.35
Provincial Hospital Costs	25,000	-
Travel and Subsistence	75,000	121,951.21
Administration Costs	-	70,533.63
Incinerators	-	**122,388.00
Contingencies	200,000	-
<b>TOTALS</b>	<b>4,444,000</b>	<b>4,156,421.10</b>

Note: \* Includes furniture and electrical services not originally budgeted for. \*\* Not included in original project. \*\*\* Includes additional funds allocated for cyclone damage.



## ANNEX 10: SELECTED SITE PHOTOGRAPHS

1. 2 ROOM CLINIC & RN HOUSE, NGAUTA, DUFF ISLANDS
2. 2 ROOM CLINIC, NGAUTA, DUFF ISLANDS
3. 2 ROOM CLINIC & RN HOUSE, NEMBAO, UTUPUA ISLAND
4. RN HOUSE & 2 ROOM CLINIC UNDER CONSTRUCTION, EMUA, VANIKOLO ISLAND
5. RN HOUSE & 2 ROOM CLINIC COMPLETED, EMUA, VANIKOLO ISLAND
6. 3 ROOM CLINIC, NUOBA, REEF ISLANDS
7. NURSE-AIDE POST, NGAITO, SANTA CRUZ ISLAND
8. 3 ROOM CLINIC & RN HOUSE UNDER CONSTRUCTION, MANASUGU, SAN CRISTOBAL ISLAND
9. NURSE-AIDE POST & VIP LATRINE, MANIWIRIWIRI, SAN CRISTOBAL ISLAND
10. TYPICAL CLINIC INTERIORS
11. CONSTRUCTION DETAILS/1
12. CONSTRUCTION DETAILS/2





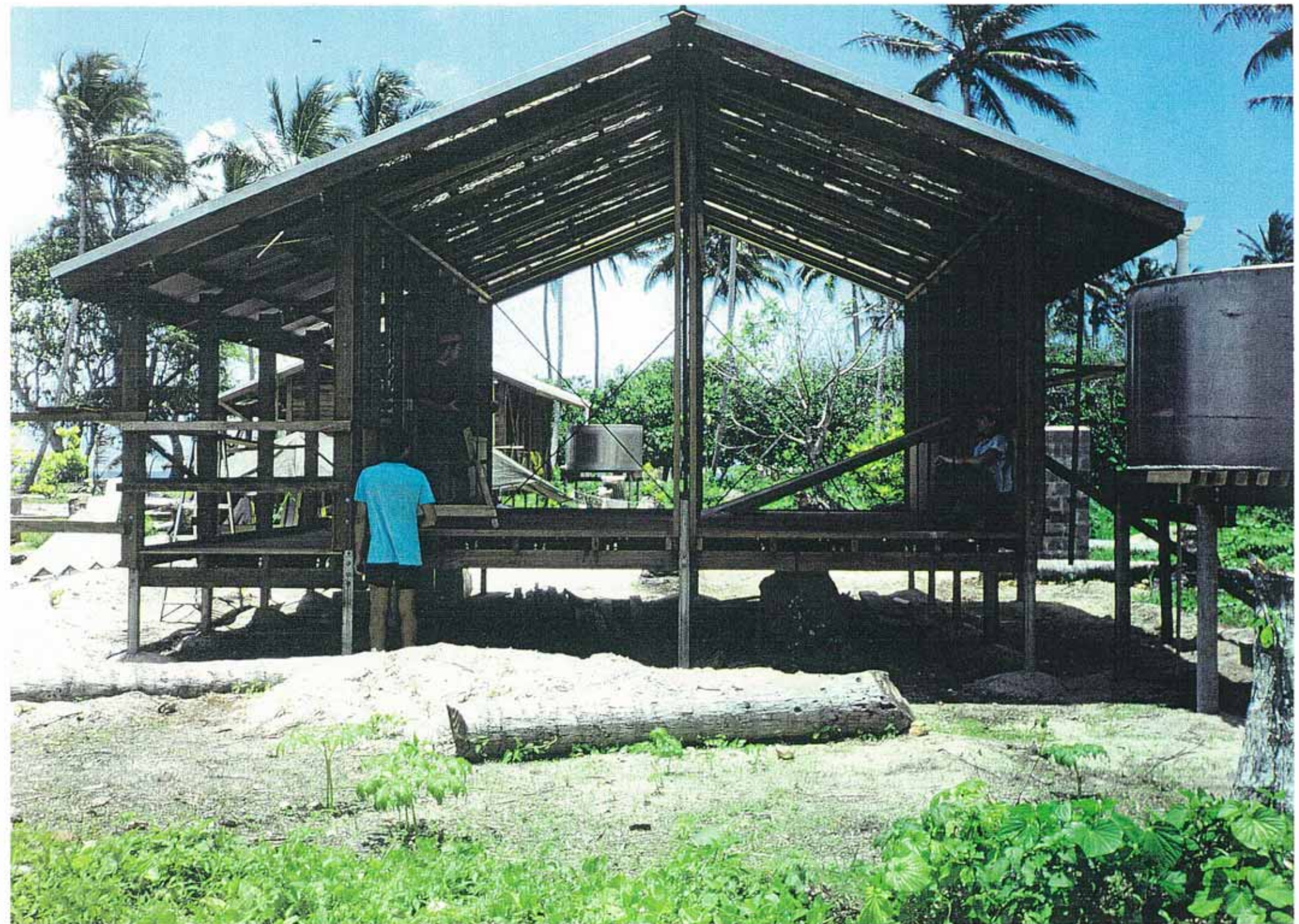








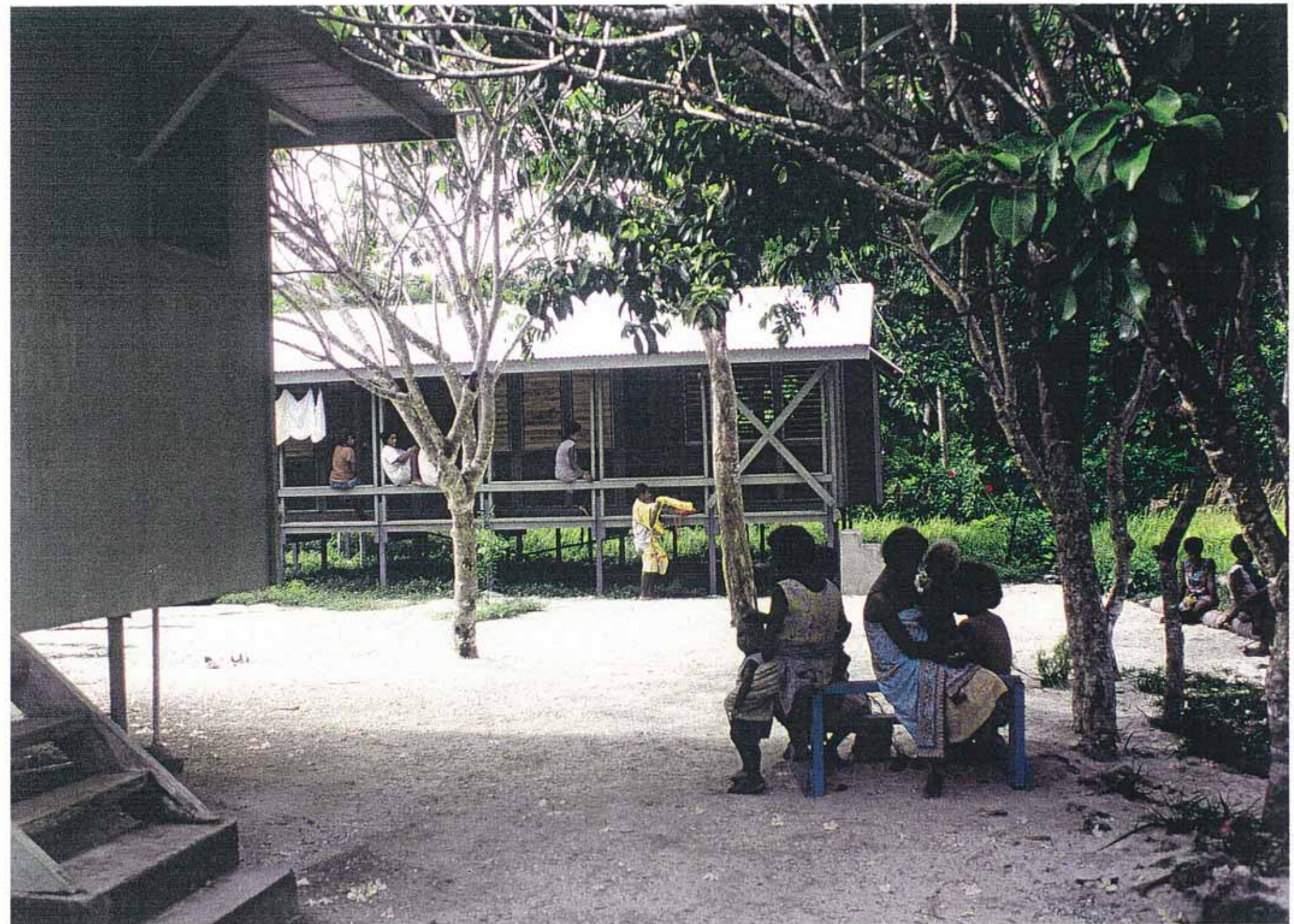




































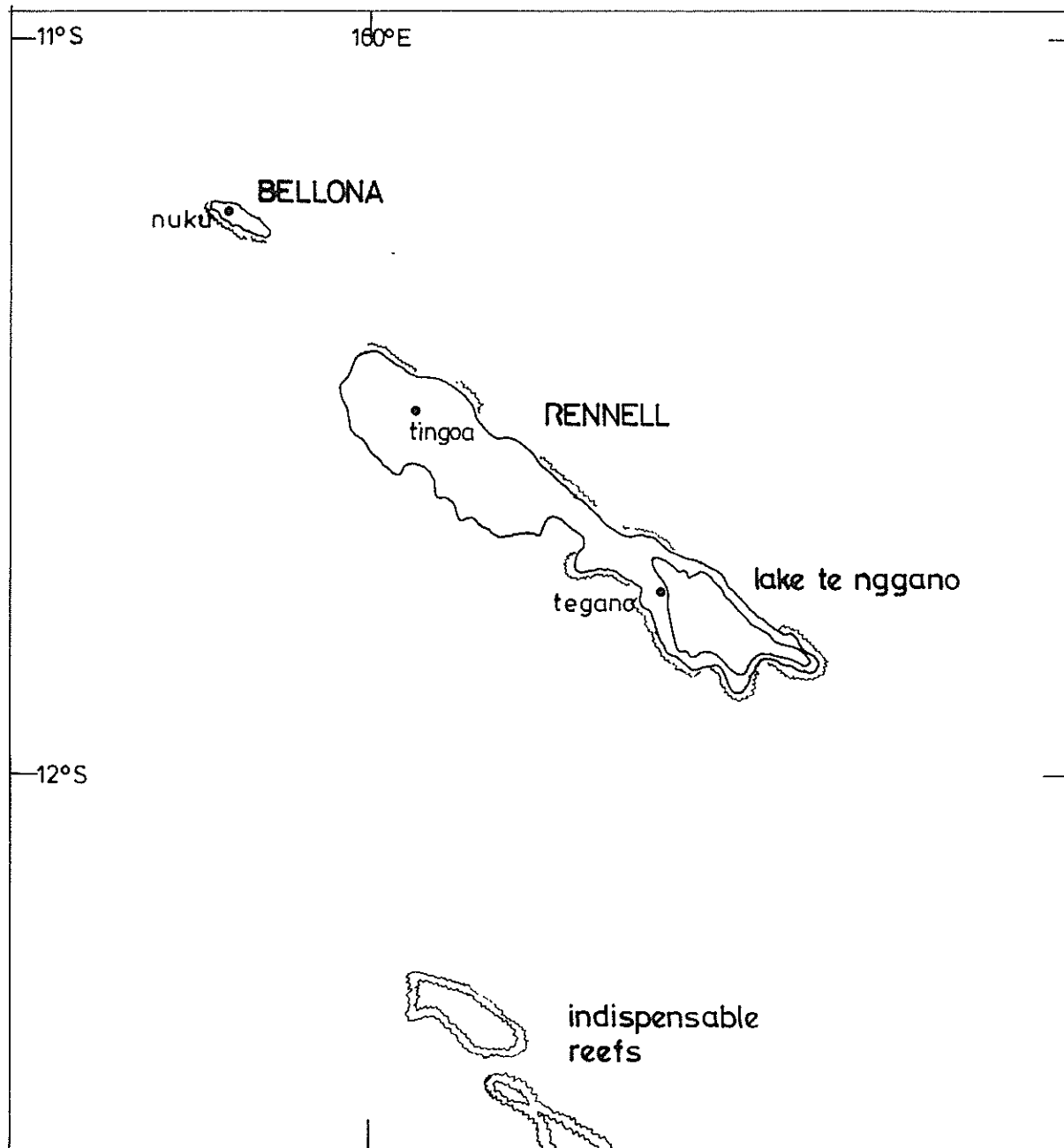


ANNEX 11: UK/SIG CYCLONE REHABILITATION PROJECT: RURAL HEALTH FACILITIES, RENNELL AND BELLONA PROVINCE

In January 1993, Cyclone Nina swept across the Solomon Islands causing damage to Temotu, Makira Ulawa and Rennell and Bellona Provinces. The islands of Rennell and Bellona had only three clinics and all three were destroyed by the cyclone. At a meeting of aid donors in March 1993, the British High Commission indicated an interest in rehabilitating the clinics as an extension of the rural health facilities project then underway in Temotu and Makira Ulawa Provinces. A project was eventually agreed between both governments in August 1993.

The project document allowed for the construction of a 2 Room Clinic, an RN House and three VIP latrines at Nuku on Bellona; a 3 Room Clinic and two VIP latrines at Tingoa in west Rennell; and a 2 Room Clinic, an RN House and three VIP latrines at Tegano on the lake in east Rennell. See map of Rennell and Bellona. Similar radios, medical equipment and furniture to that supplied in Temotu and Makira were to be supplied to these clinics.

A short-term placement VSO was recruited to be construction supervisor and he arrived at the end of January 1994. He went first to Makira to work with the VSO there to get experience of the construction system. A contract had been let to the same contractor who had supplied materials for the previous project and the materials for the clinics at Nuku and Tingoa were delivered, after delays caused by timber shortages and shipping problems, in May 1994. The VSO started work on the clinic at Nuku which was completed, apart from the latrines, by the middle of July. Work on the clinic at Tingoa was 95% complete by September when the VSO had to return to UK. It was impossible to transport the materials for Tegano to the site until the EC funded road to the lake was finished in December 1994. The materials were shipped, again after delays caused by shipping problems, in February 1995 and the team of carpenters from Temotu went to Rennell in early March to start construction of the clinic at Tegano, which was completed, after further delays, in mid-July 1995.



MAP OF RENNELL AND BELLONA SHOWING PROJECT SITES

ANNEX 11 : RENNELL AND BELLONA PROVINCE

FINAL PROJECT COSTS

ITEM	MEMO COST	FINAL COST
Clinic Construction	410,000.00	411,218.07
Radio Installations	39,000.00	32,022.00
Equipment and Furniture	15,000.00	20,774.90
VSO Costs	10,000.00	8,480.19
Tools and Equipment	20,000.00	33,260.42
Travel and Subsistence	10,000.00	11,974.41
Administration Costs	-	19,800.60
Contingencies	50,000.00	-
<b>TOTALS</b>	<b>554,000.00</b>	<b>537,530.59</b>



ANNEX 11 : RENNELL AND BELLONA PROVINCE : FINAL CONSTRUCTION COSTS

RENNELL AND BELLONA PROVINCE										
	CLINICS		HOUSING		LATRINE/SHOWER					
LOCATION	Type	Materials	Type	Materials	Type	Materials	SHIPPING	LABOUR	TOTAL COST	PROJ.DOC.COST
<b>RENNELL</b>										
Tingoa	3RM Clinic	72,147.78	-		2xVIP	6,171.19	14,043.30	9,525.70	101,887.97	104,545.46
Tigano	2RM Clinic	57,701.32	RN House	50,210.71	3xVIP	9,264.06	21,311.70	10,556.00	149,043.79	152,727.27
<b>BELLONA</b>										
Nuke	2RM Clinic	57,701.32	RN House	50,210.71	3xVIP	9,264.06	15,000.00	5,645.79	137,821.88	152,727.27
<b>ADDITIONAL MATERIALS AND FREIGHT</b>									22,464.43	
<b>TOTALS</b>		<b>187,550.42</b>		<b>100,421.42</b>		<b>24,699.31</b>	<b>50,355.00</b>	<b>25,727.49</b>	<b>411,218.07</b>	<b>410,000.00</b>



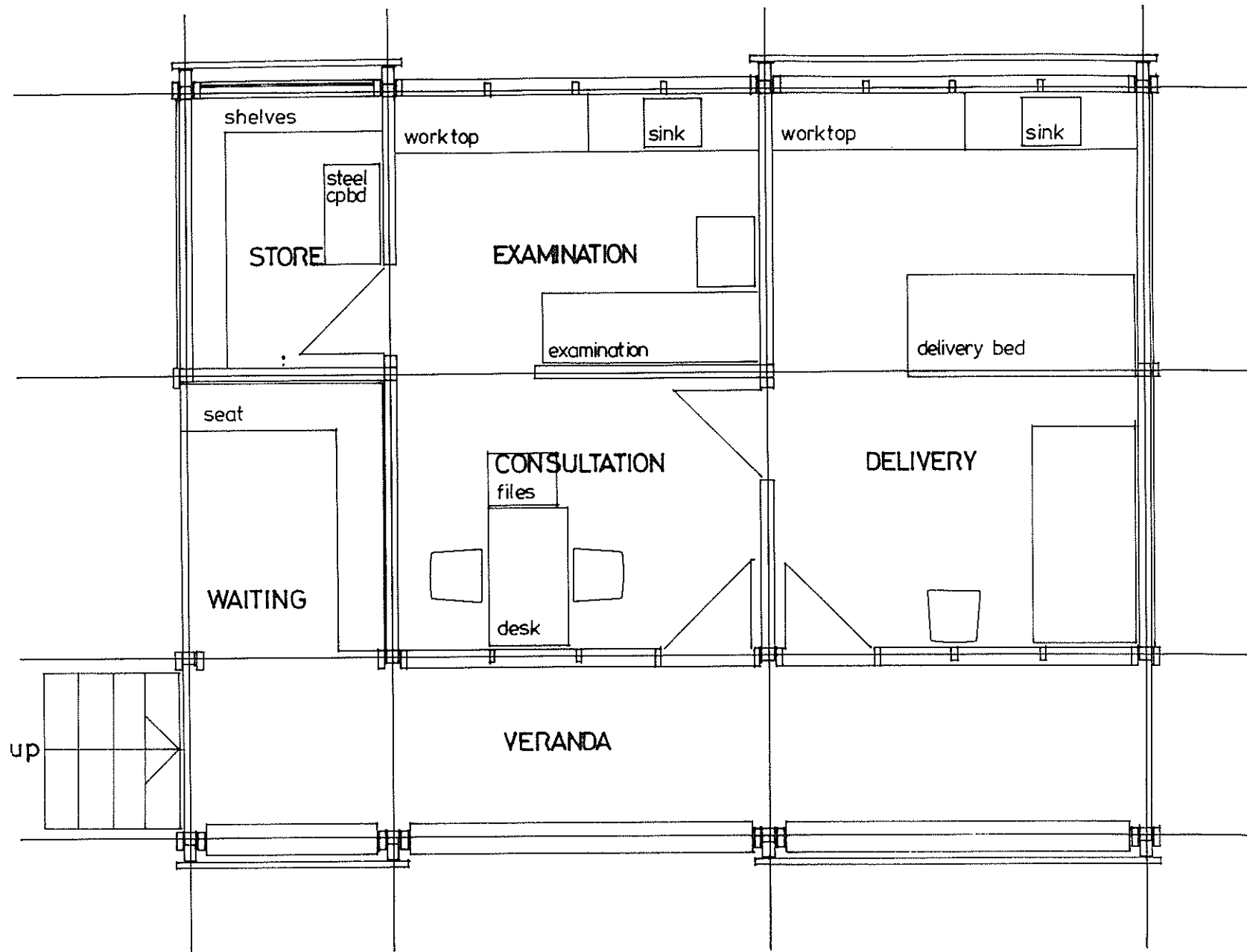
## ANNEX 12: REVISED BUILDING DESIGNS

Towards the end of the project, the PM was asked by MHMS to look at the designs of the clinics used both in the UK financed project and in a parallel EC project being implemented in the other provinces in the country and produce revised designs.

This was done and designs were produced based on the UK project originals with various amendments. In terms of accommodation, the rooms in all units are still accessed off the open front verandah but a separate waiting area has been added at the entry end. The cantilevered store has been omitted and a larger store included behind the waiting area. This store is large enough to accommodate a steel cupboard (rat-proof, for drugs), the radio battery, general supplies and touring equipment. The position of the sinks in the examination and delivery rooms has been changed, the construction of the benches simplified and a worktop added. See drawings RHC/R/01-04.

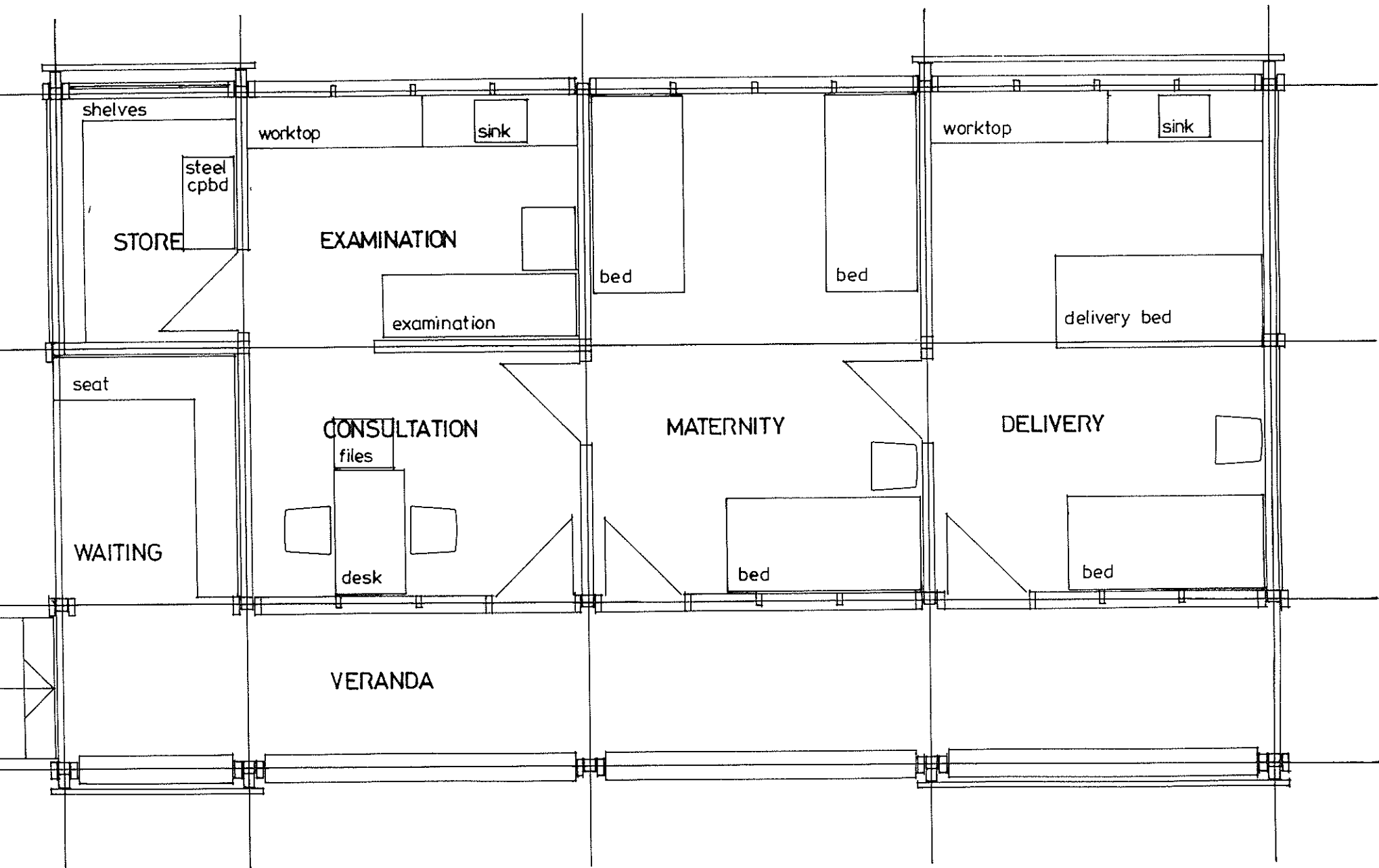
Various amendments were also made to simplify construction without reducing cyclone resistance. The steel columns have been increased in size to 100x100 and the number of supports reduced; they now occur only on the lines of partitions at 3.33 metre centres. This will greatly reduce the amount of excavation required and the number of steel posts and holding-down bolts. The design of the windows has been altered in order that they can be assembled on site whilst still providing continuity of structure. The use of 'Breezeway' louvres with timber blades is still recommended and the room width has been slightly increased to allow the use of a standard length of blade. Floor joist and purlin sizes have been increased (and intermediate rafters omitted) to cope with the increased floor and roof spans.

Various types and sizes of clinic can be achieved using different combinations of room units. See drawings RHC/R/01-10. As nurse-aides are now being trained to carry out deliveries, it is recommended that the the smallest unit should be a 2 Room Clinic, which has a delivery room.



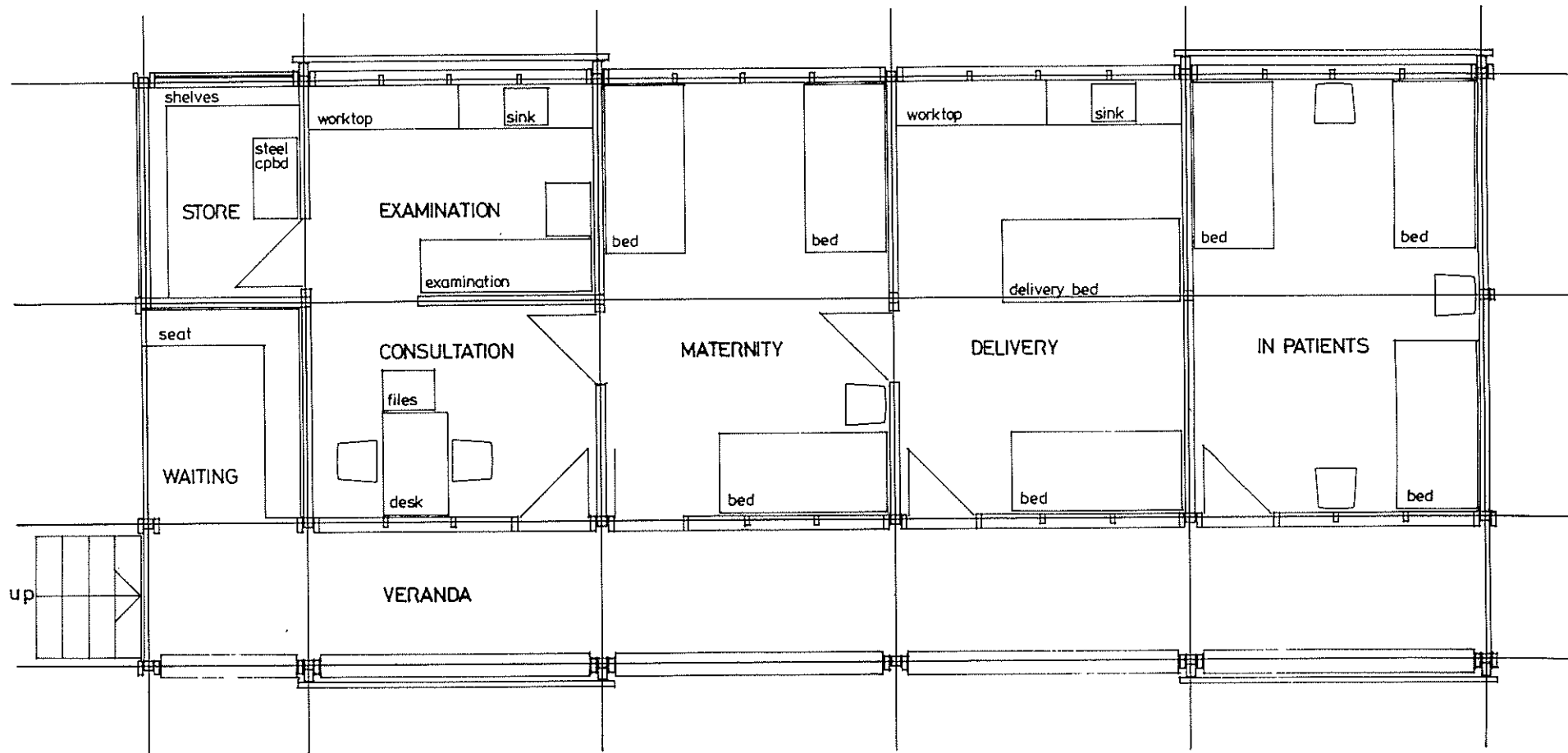
RHC/R/01: TWO ROOM CLINIC

scale: 1:50



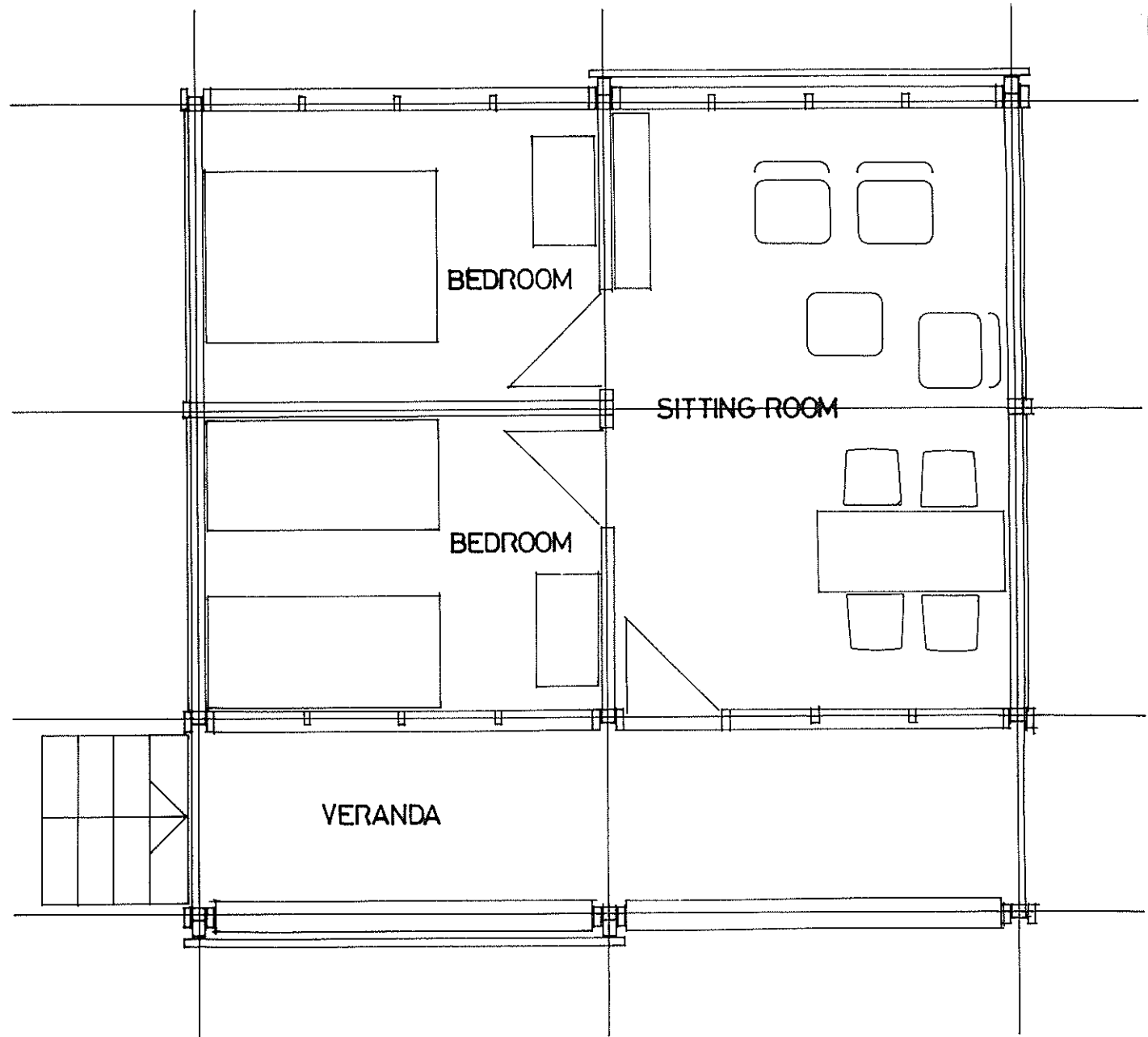
RHC/R/02: THREE ROOM CLINIC

scale: 1:50



RHC/R/03: FOUR ROOM CLINIC

not to scale



RHC/R/04: REGISTERED NURSE'S HOUSE

scale: 1:50