

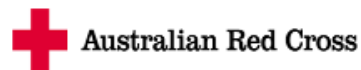


GOVERNMENT OF THE REPUBLIC OF VANUATU  
GOUVERNEMENT DE LA RÉPUBLIQUE DE VANUATU

## GAUA VOLCANO SITE ASSESSMENT AND PLANNING REPORT



JUNE 2010



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## EXECUTIVE SUMMARY

From May 21 – June 2, 2010, a multi-sectoral technical assessment team went to Gaua and Vanua Lava to review and update the March site assessment, provide detailed plans for selected evacuation and relocation sites, and to provide a quick update on the current IDP situation on Gaua.

The IDP situation is largely unchanged from what was found during the February reconnaissance mission: a lot of uncertainty regarding the volcano activity, whether IDPs can return home soon, what will happen in case of a full scale evacuation, and concerns over (food) distribution, medical care, livelihoods and school fees. A good portion of the IDPs still expect to be able to go back to their homes in the west soon and have not established themselves properly at their host communities. The uncertainty is causing psycho-social issues. Increased awareness, psycho-social support and active involvement of the Gaua population in the contingency planning process are highly recommended (as also previously indicated in the report of the inter-agency mission carried out in February 2010<sup>1</sup>).

Three evacuation sites were identified previously, based on access by sea: Losalava, Lembal and Biam. People south of Lasimal River however won't be able to reach Lembal in case of flooding; an evacuation point at Kaska has been added to cover for this. Similarly, Kuro in the south of Gaua has been added as an evacuation point, as the road from the west to Biam is very difficult and crosses a river as well, which is likely to flood during a volcanic eruption. The evacuation sites require few infrastructural inputs but First Aid training is recommended to assist in the treatment of wounded and sick people during evacuation.

Sola is the designated transitional camp site on Vanua Lava, with good access (sea and air), flat land and essential services nearby. It is not large enough to accommodate the full Gaua population in accordance with Sphere standards, but considering the short-term nature of the camp (several days max), the required camp density is considered acceptable. Evacuation should take place as rapidly as possible with all evacuees going to Sola first before moving on to their final destination. This greatly simplifies logistics, NFI distribution and registration. Evacuees will be registered first, go through a quick medical check and receive household and shelter NFIs upon arrival. Family shelters are proposed to be constructed of 2 tarpaulins and bush poles. Tarpaulins are readily available, are easier to stock, more versatile and a lot cheaper than tents. Water supply, sanitation and lighting can all be made available. The cramped camp conditions do not allow families to cook for themselves – a central cooking/food distribution facility is required.

The Anglican Church-owned land at Leon's Bay was previously identified as a potential short-term (up to 1 year) camp site. It was found to be too small, too steep and with very poor access. An additional area adjacent to the Church's land was offered, but suffers from the same issues. Leon's Bay is therefore not considered as a possible camp location. Tanmat in the north-east is unsuitable for much of the same reasons: very poor access and too steep.

At Vatop a potential area for a camp was identified, though the (land) negotiations were completed uncharacteristically fast for Melanesian settings. The availability of Vatop must as yet be verified in a formal agreement. The *provisional* long-term camp site at Vatop is suitable for approximately 1300 people, has good access and is flat but located next to a swamp (potential environmental health risks).

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<sup>1</sup> *Interagency Report, Gaua Island, Torba Province Vanuatu, 31 January - 5 February 2010*

Thirteen hundred people (217 families) are well below the anticipated 2000 that may require relocation on Vanua Lava. Though other sites were considered, none were found on Vanua Lava to be suitable for a (long-term) camp site. The Team therefore focused on host communities as an option for relocation.

Community hosting is recommended for a number of reasons:

- Hosting is more culturally appropriate in Vanuatu, traditionally adopted in the past as the principal form of support to displaced families;
- It allows family life at similar spacing density to current village arrangements;
- Hosted families will almost certainly achieve a higher quality of life than in a camp environment, provided that appropriate support is provided to both the IDPs and the host communities;
- Community hosting has a significantly reduced environmental impact on surrounding forest resources (especially given that each family requires a minimum of around 1 ha of land for subsistence gardening);

Discussions with various land owners and communities on Vanua Lava indicated a clear willingness to host evacuated families. Communities on Gaua, which previously had a preference towards relocation to a camp, were considerably less convinced when the realities of camp life were explained.

This report therefore strongly recommends community hosting to be adopted as the principal preferred relocation option. Details of the provisional camp site at Vatop are included in this report in case not all families can be hosted. It is regarded however as a “last-resort” option.

Lessons learned from the current IDP situation in Gaua must be addressed. This report repeats the recommendation from the February reconnaissance mission report that an agency/NGO is appointed to be accountable for the ongoing support and management of IDP and Host Communities on Gaua Island as well as planning for Host Communities on Vanua Lava and other Torba Islands.

A tour around all the communities on Vanua Lava and the outer islands is required to determine how many families can be hosted. A clear statement of how IDP and host families are to be supported must be established prior to the tour taking place. In addition, it is recommended that chiefs from Gaua meet with their counterparts on Vanua Lava and other islands to discuss and agree upon issues of law, order and ‘respect’. More active involvement of women and other groups (youth, Church) in the development of the hosting strategy is also recommended. This may be done through TAGs and CaVaWs.

Detailed recommendations arising from the assessment are provided in this report at CHAPTER 9: RECOMMENDATIONS & ACTION POINTS.

## ABBREVIATIONS

BoQ	Bill of Quantities
CaVaW	Committee against Violence against Women
CCCM	Camp Coordination and Camp Management Cluster
CHF	Swiss Franks
CoE	Church of England
EOC	Emergency Operations Centre
DGMWR	Department of Geology, Mines and Water Resources
GoV	Government of Vanuatu
GPS	Global Positioning System
HDPE	High-Density Poly Ethylene
IDP	Internally Displaced People
IFRC	International Federation of the Red Cross
IOM	International Organization for Migration
NCW	National Council of Women
NDMO	National Disaster Management Office
NFI	Non-Food Items
NGO	Non-Government Organization
SGBV	Sexual & Gender Based Violence
SitRep	Situation Report
SQM	Square Meter
TAG	Technical Advisory Group
TORBA	Torres and Banks (province)
UNHCR	United Nations High Commissioner for Refugees
VVAL	Vanuatu Volcano Alert Level
VWC	Vanuatu Women's Centre
WASH	Water, Sanitation, Hygiene



## **CHAPTER 1: INTRODUCTION**

### **1.1 BACKGROUND**

The Gaua volcano erupted on 18 November 2009 with significant emissions of ash, smoke and gas continuing to impact on the island. The West and North-Western sides of the island are most affected by the ash fall due to the predominant South-Eastern winds. A total of 423 people from these areas were evacuated to the North-East and East of Gaua on November 26, 2009. A contingency plan is being prepared in case a full evacuation of the population of Gaua is required.

In February 2010 an inter-agency reconnaissance mission was conducted, the report of which was used during the follow-up 3-day workshop in early March in Port Vila producing the first draft of the contingency plan.

In March 2010, a relocation sites assessment was conducted by the NDMO and TORBA Provincial staff to identify evacuation points, a transition site and short-term to long-term camp sites.

From May 21 – June 2, 2010 a technical assessment team carried out a follow-up mission to the March assessment, the results of which form this report. The Vanuatu Red Cross carried out a registration mission on Gaua during the same time, a report of which is soon expected to follow.

This site assessment and planning report, though presented separately here, has been prepared to inform future revision of the contingency plan.

### **1.2 MISSION OBJECTIVES**

The mission had the following 3 objectives:

1. *Provide a brief update of the current IDP situation on Gaua;*

In the interest of the continuing IDP support operations, an update of the situation on Gaua is required. With IDP families having been with host families for over 7 months, important lessons can be learnt.

2. *Review and update the March sites assessment;*

Though the March assessment identified several potential sites for evacuation points, and transition and long-term IDP camps, the assessment was not conclusive. All previously selected sites were assessed by a team of experts. New potential sites have been added.

3. *Develop detailed plans of all selected sites.*

Ensuant objective 2, detailed plans are worked out for selected sites.

### 1.3 TEAM MEMBERS AND METHODOLOGY

A multi-sectoral team was assembled consisting of the following members:

**Table 1: Team composition**

SECTOR	AGENCY	NAMES
TEAM LEADER	DGMWR	Mr. Piter Visser
SITE PLANNING	Red R Australia	Mr. Ken Collis
SHELTER	Australian Red Cross	Mr. Simon Turner
WATER & SANITATION	Oxfam Australia	Mr. Andrew Mills
PROTECTION		All
LOGISTICS & COMMUNICATION	NDMO	Mr. Ron Tamtam & Mr. Manua Nolen
HEALTH & NUTRITION	TORBA Health Officer	Mr. Franklin Dinh
EDUCATION	TORBA Education Officer	Mr. Reynolds Surmat
AGRICULTURE	TORBA Agricultural Officer	Mr. Barton Bisuwe
ADDITIONAL	TORBA Province Secretary General	Mr. Shadrack Welegtabit
	Gaua Area Secretary	Mr. Barry Wobur
	Gaua Disaster Committee & Gaua representative of the National Council of Chiefs	Mr. Victor Weitias

Additional assistance was provided by Mr. Lawrence Kithome, Civil Engineer, TORBA Province and Mr. Salathiel Nava, TORBA Provincial Water Supply Officer.

The team conducted detailed site assessments using GPS, water quality testing and other equipment. Numerous consultations were held with communities, individual families, Chiefs and others. A detailed itinerary of the field activities and persons met can be found in APPENDIX 1: ACTIVITIES.

## **CHAPTER 2: CURRENT IDP SITUATION**

*This section only briefly discusses the IDP situation, as the main focus of the mission was one of technical assessment. Many of the same issues identified in the February assessment still exist.*

### **2.1 VOLCANO STATUS**

The activity level of Gaua volcano remains at level 2 with continuing ash fall and gas emissions. Compared to April, a slight increase in activity has been recorded. Seismic activity has increased slightly as well, with more tremors recorded. Gas emissions are still recorded but are not as erratic and large as in April. Vegetation in the immediate surroundings of the volcano vent has turned brown. Shortly after the departure of the mission team, large ash eruptions were seen by Geohazards staff, with the ash fall still mainly on the Western side of Gaua.

### **2.2 AWARENESS**

There is a great need and demand for increased awareness activities in the Gaua (and Vanua Lava) communities. IDP families in particular are uncertain of their situation, with many still assuming they will be returning soon to their homes in the West. Consequently, many have not completed their gardens and homes or engaged in income generating activities, though the latter in part is because (government) support for it is lacking. This increases the financial burden on the host families who now share part of their already minimal income. Increased awareness of the status of the volcano, the situation in the Western part of Gaua and the possibilities for returning home or evacuation away from the island would help to alleviate many problems.

All people on Gaua share the common uncertainty of what will happen with them if a full scale evacuation should take place. The message of evacuee camps is fairly well known throughout Gaua but what exactly a camp involves is not. The apparent preference for camps is based on vague stories about the 1973 evacuation and earlier ideas brought forward at contingency planning activities. However, with this mission's findings moving away from the camp option towards host families, renewed awareness is necessary. People are not able to prepare or decide well without proper knowledge.

Awareness should be raised on a regular and continuing basis and at least include the following:

- Volcano activity updates;
- Situation of West Gaua;
- Clear information on Government contingency plans;
- EOC procedures;
- Host community and IDP support;
- The extent of Government support in case of a full evacuation;

A great deal of uncertainty exists on Vanua Lava on the impact an evacuation may have on them as well.

### **2.3 PSYCHO-SOCIAL ISSUES**

Related to awareness are psycho-social issues. The IDP families are already under stress for leaving their homes in the West. Their reliance on host families with minimal means to support themselves increases the stress levels even more.

Adding to earlier reports of increased stress levels amongst IDP families, are reports of youth and students beginning to get affected by the situation. Some youth refuse to go to school and disobey elders and authorities.

Most of these issues may be removed and avoided with ample and proper awareness.

## 2.4 CONFLICT RESOLUTION AND 'RESPECT'

The issues reported here mainly concern what will happen if a full evacuation will take place. Conflict resolution within and between communities is the responsibility of the chiefs. There is great concern about cultural differences and who's rules to abide to. For example, the chief at Vatop on Vanua Lava would welcome IDPs from Gaua but they would have to abide by his local rules. Though this makes sense, it also means Gauan chiefs will lose (part of) their power and status. The cultural differences may require considerable adaptation by the people from Gaua and their host families.

The fear for 'black magic' was raised as well, as Vanua Lava is perceived to be a place where it is practiced a lot. The stories originated mainly from the 1973 evacuation when many people are supposed to have died as a result of black magic. The stories are unclear, as one suggested it was the Gauan people performing the black magic and it backfired on them rather than the other way around.

No matter what the actual story may have been, it is part of Vanuatu culture and should be addressed. To do so, it is recommended that the Gaua Council of Chiefs meet with their counterparts on Vanua Lava and other Banks Islands and discuss cultural issues and all issues of 'respect' and come to a common understanding and agreement as to how to deal with these matters. Not all communities need to be visited, though some key locations (such as the potential Vatop camp site) should.

## 2.5 EDUCATION

The issue with the high school near Losalava on Gaua is not so much a development one (improving infrastructure and resources there) but providing alternate and adequate facilities for the pupils and staff should they all be evacuated to Sola or elsewhere.

The general conditions at the school can be described as functional although as the staff requested that more could be done to improve the school. There are two high school classes, functionally sitting as one double classroom building. School population figures provided were rather spurious and inaccurate however they are presented here:

**Table 2: Gaua High School students and staff**

	Male	Female	Total
<b>Boarding students</b>	22	30	52
<b>Day students</b>	2	7	9
			<b>61</b>
<b>Government teachers</b>			3
<b>Assistant Teachers</b>			2
			<b>5</b>

Additional classes include 2 x year 9 and 1 x year 10 students excluding junior high students (figures not supplied).

The teachers are government employees however the school is run by a CoE mission. Though primary schools are free for all, mission schools still charge a fee. There is considerable concern how they may be paid when income generation is absent at least for a certain time. This concern applies to the current IDP families as well as the wider population of Gaua in case of a full evacuation.

It was reported that a senior education officer told the people on Gaua that school fees would be waived. However, the promise has not been verified in writing and the school authorities are refusing students from taking part.

In the event of an evacuation it is not known how many students would require relocation (from Gauan families) and how many would return to their families already living on other islands. Should additional infrastructure be provided at Sola so that the school there can cater with additional classes (including accommodation for boarders) then there should be no reason why the high school students from other islands could not continue their studies on Vanua Lava.

The school principal suggested that possible relocation points might be; St Patricks on Ambae or Arap. The decision as to where the teachers and their families would go depends on the mission however it is likely that they would all remain with the bulk of the students.

It is assumed that the majority of the students above would continue their education at Sola.

No intervention is required at the Gaua high school in terms of improving the facilities there (outside the scope of this investigation) however improved first aid capability at the school in the event an evacuation is required.

#### *Recommendations:*

- *First aid training be carried out with (at least) 2 suitably chosen high school staff, and*
- *A first aid kit(s) is provided for the above.*
- *A clear agreement between the Ministry of Education and the (potential) IDPs is made.*

## **2.6 FOOD AND NFI DISTRIBUTION**

NFIs were distributed at the time of the evacuation of West Gaua in November 2009. Food distributions started in November as well but have stopped in April 2010 due to lack of funds. With some IDP families not having completed their gardens yet, food issues now arise. In addition, food distribution was equal to every IDP family regardless of its size, causing discontent amongst some large families. Distribution was focused IDPs only, none was provided to host families.

## **2.7 EOC MANAGEMENT**

The Emergency Operation Centre was established soon after the volcano increased its activity and evacuation of West Gaua was required. It is charged with maintaining order, conduct awareness, food and NFI distribution, general support for the IDP and hosting communities, assist in disaster activities, maintain a link with the NDMO amongst other roles.

Though the EOC has been of great assistance with the disaster management thus far, there are a few points which require mentioning:

- Situation Reports: the EOC now reports to the VMF headquarters in Santo but the report is rarely available to the other stakeholders. It may or may not reach NDMO regularly either. The Team provided the EOC management with a 1-page SitRep to be filled in each week and mailed to Port Vila using the regular mailing of the Geohazards staff if needed. The SitRep includes reports on the status of equipment, store inventory, items distributed, security, communications, health, volcano, community consultations and other emerging issues.

- Communication: Gaua Island has a limited number of telephone landlines available. There is no mobile phone coverage as yet. The EOC can be reached by radio but with difficulty. Better communication lines should be established, perhaps through the use of satellite phones.
- South Gaua: the South of Gaua is difficult to reach and reports to and from are sparse. A concerted effort to visit regularly or establish radio communication is required. The radio previously located at Ontar (West Gaua) will be moved to Biam after its battery is replaced/fixed.
- Rules and procedures: there is a lack of understanding of the EOC rules and procedures, which should be rectified by increased awareness. For example, there are no-go zones on Gaua to where access is only allowed with prior approval from the EOC. During the Team's visit, several villagers were apprehended for accessing an area without approval.
- Consultations: a more pro-active approach is necessary to obtain a clear picture of the needs and wellbeing of the population. It is recommended that regular meetings should be organized with communities and chiefs.

## **2.8 LIVELIHOODS**

The importance of livelihoods should be stressed. With long-term internally displaced people now on Gaua, and in the case of a full-scale evacuation elsewhere, support for livelihoods should be included. As mentioned above, income-generation activities are absent amongst IDP families increasing the financial burden of their hosts. Not all IDP families are allowed access to commercial fishing areas. More copra can be harvested but the means are not available.<sup>2</sup>

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<sup>2</sup> *NDMO quickly responded to this by purchasing empty fuel drums to be used for 5 copra driers thus increasing income.*

## **CHAPTER 3: SITE ASSESSMENTS**

### **3.1 EVACUATION SITES**

The March assessment identified 3 possible evacuation sites: Losalava, Lembal and Makione (near Biam). The sites were selected based on accessibility by sea. Details on the updated assessment of the evacuation sites can be found in CHAPTER 5: EVACUATION SITES.

### **3.2 TRANSITION SITES**

In the March site assessment, Wosaga was identified as a possible transition site based on its proximity to Gaua. The site was replaced by Sola, as Wosaga is far away from any services and is reachable over land on foot only. Furthermore, sufficient land area for a transition camp was not secured and would have required more negotiations. Sola does not have these limitations and was agreed to be the transition site.

Sola station is the provincial government centre of TORBA Province. It has access to general services such as a hospital, secondary school, an airstrip and mobile and landline telecommunication. A suitable water source is available. The football field area plus space near the government buildings can be used for a camp site. Details on the transition camp at Sola can be found in CHAPTER 6: SOLA TRANSITION CAMP.

### **3.3 CAMP SITES**

#### **3.3.1 Leon's Bay**

Leon's Bay on West Vanua Lava was offered by the Anglican Church of Vanuatu as a relocation site, available for up to a year. It was estimated to be approximately 10ha, but the March assessment found it to be roughly 4 ha in size. The March assessment also described it as 'flat land'.

The Team resurveyed the site and calculated it to be about 2.5ha. The shape also differs from the one in the March assessment report, suggesting that the Team was guided along different boundary lines. The site is not flat enough to be suitable for a camp site, where shelters are placed very near to each other to maximize space use. The area is overgrown with dense bush and would require extensive clearing.

Poor access is a major restricting issue for Leon's Bay to be used as a camp site. There is no road access to the site and it can only be reached on foot via a full day's walk from Sola. Access by sea is possible but has restrictions as well: barges can only access the shore line at low tide and then only to the edge of the reef which is approximately 200m away from the beach. Any relocation site will require time for people to clear bush land for gardening plus time to plant and harvest the 1<sup>st</sup> crop (3 months), during which the people rely on assistance from the Government. Regular (food) distribution will be required, and good access to the site is essential. Leon's Bay does not meet this requirement at all.

During community consultations, an additional 6ha was offered in return for the construction of permanent medical and school facilities. The area offered is adjacent to the church land and suffers from the same issues.

The area at Leon's Bay could be used for a normal village style settlement potentially housing a small village if agricultural land is made available elsewhere, or for 4 or 5 families if the same area is used for growing crops. The church land is in this case not included as it is available for 1 year only. This option was not discussed with the land owners however.

### **3.3.2 Tanmat**

Tanmat in the North-East of Vanua Lava was identified by the March assessment as a potential long-term relocation site, mainly as it is the only large land area available where there are no apparent landownership issues. The exact size is estimated as somewhere between 50 and 80ha.

The area is strongly undulated, with steep hills intersected by valleys. Access by sea is very hazardous. The area is remote from services, has poor land access (including a difficult river to cross by children and elderly) and consists of primary bush. Very large capital investment would be required to prepare the area for use, including a bridge over the river and the construction of a wharf (or road access to Sola).

The Team verified the March assessment's conclusion of its unsuitability for use as a relocation site.

### **3.3.3 Vatop**

Vatop community (population 145) is located just north of Tanmat area. Brief consultations between TORBA Provincial staff and landowners resulted in an offer of an area for use as a camp site. The agreement was reached uncharacteristically quickly for Vanuatu standards and did not involve one of the landowners. Though the site was surveyed and is presented in this report as a potential site for a relocation camp, the agreement and its terms need to be verified.

The area offered is adjacent to the village and is approximately 8.5ha. It is situated at the foot of a hill on one side and a swampy area on the other. Access by sea is good but the land requires full clearing. Its location near a swamp (with a high potential for vector borne diseases), high groundwater tables and the lack of services and drainage issues limit the maximum number of potential evacuees to 1300, well below the 1900 of previous estimates.

Details on the Vatop site can be found in CHAPTER 8: VATOP CAMP

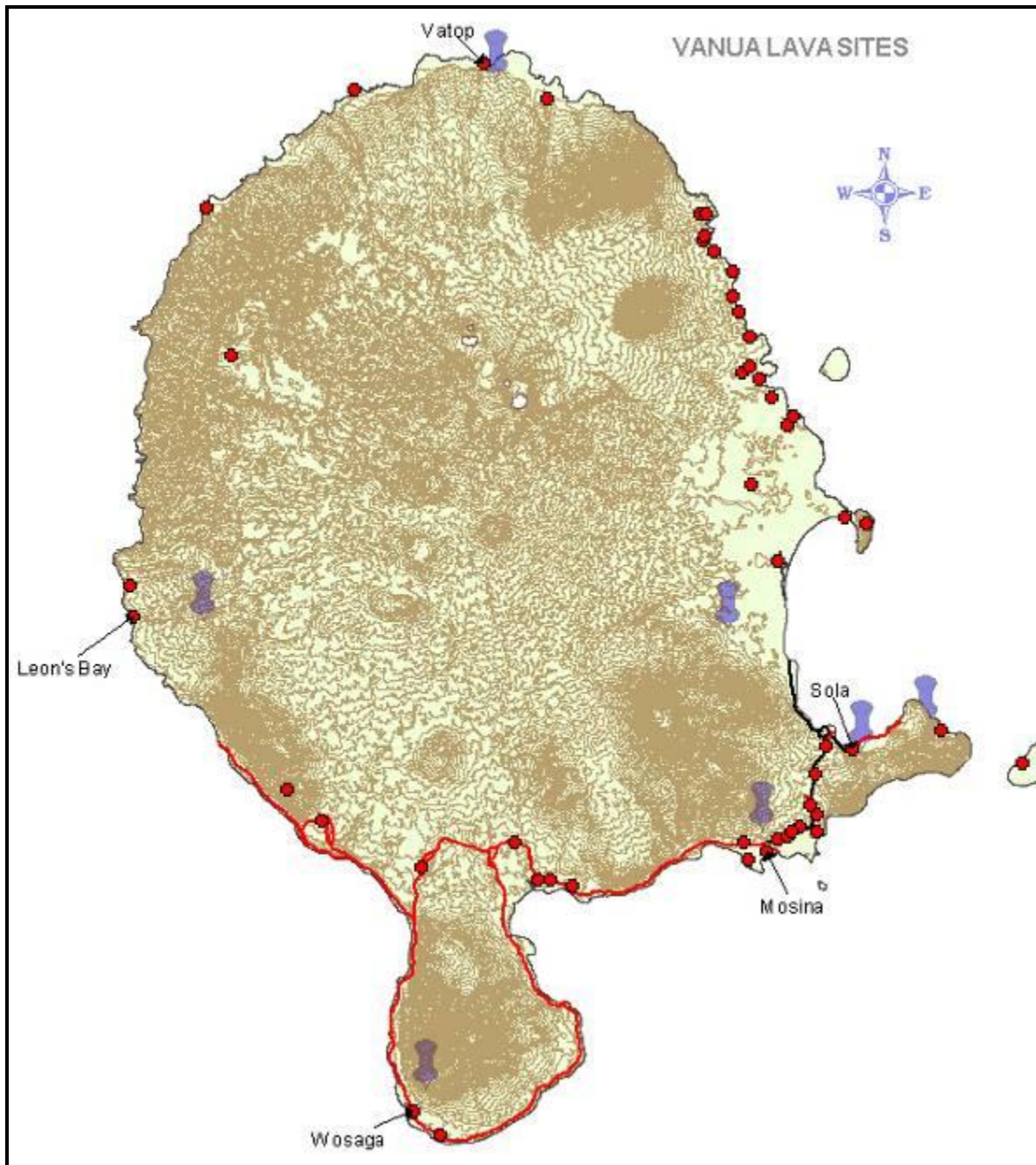
### **3.3.4 Other sites**

An area reportedly 30ha was offered by Fr. Lucas, owner of a guesthouse at Sola. The area is located at half an hour's walk north from the airstrip at Sola. Discussions with several people from Sola suggested that the ownership of the land is heavily disputed. The Team did not visit the area therefore and the option was discarded.

Another area was offered just south of Sola Station but was found to be up in the hills on too steep a terrain to be suitable. It was therefore discarded as well.

Mosina community, about 20 minutes drive west from Sola Station, was considered as a potential (transition or long-term) relocation site. The community leaders however were not in favour of allowing a camp site to be built on their land. They did indicate that they would support hosting a large number of families from Gaua (see below).





**Figure 1: Reviewed Vanua Lava sites**

Table 3 summarizes the suitability of the various locations against the requirements for camp sites. The essential and relevant criteria are presented here, more detailed and general site selection criteria can be found in APPENDIX 2: GENERAL SITE SELECTION CRITERIA.

**Table 3: Site selection criteria (abbreviated)**

	Site slope & drainage	Clear land?	Land Tenure Secure	Access (Road/Sea)	Nearby reliable water supply	Access to existing infrastructure. Schools., hospital etc.	Land area available to permanently house 2000?	Proximity to low lying water/vectors?	Access to local bush materials/fuel wood?	Solid Waste disposal options off-site?	Exclusive use of the site by IDP's (not others)
Sola	✓	✓	✓	✓/✓	✓	✓	✓	✗	✓	✓	✗
Vatop	✓	✗	✗	✗/✓	✓	✗	✗	✗	✓	?	✗
Mosina	✓	✗	✗	✓/✓	✓	✓	✓	✓	✓	✓	?
Leon's Bay	✗	✗	✓	✗/✗	✓	✗	✗	✓	✓	✗	✓
Tanmat	?	✗	✗	✗/✗	?	✗	✗	?	✓	✗	?
North of Sola Airstrip	✗	✗	✗	?	?	✗	✗	?	✓	✗	?
South Sola	✗	✗	?	✓/✗	?	✓	✗	✓	✓	✓	?

### 3.4 CONCLUSION - HOST COMMUNITIES

The Team set out to work out the details for a relocation site to house approximately 2000 people (with the remaining 700 people planning to resettle with families on other Banks islands). It was however unsuccessful in identifying a site large and/or suitable enough for such purposes, though it is noted that the total number of people to be relocated will change pending the result of the registration work done by the Red Cross.

This poses a significant problem, as a long-term relocation site for a large number of people is not available. Sola may just be suitable as a transition site, i.e. used for only a few days, but it is not large enough to house up to 2000 people for a long time. It must be noted that the Team only focused on TORBA Province for potential relocation, in line with most of the contingency planning work done so far. The difficulties finding a suitable site (or sites), prompted the recommendation to start including and informing the SANMA Provincial Council in the discussions as the nearest province. This makes sense as a large number of Gaua people indicated that they would relocate to relatives on Santo Island though the primary focus remains on TORBA.

As suitable long-term sites cannot be found, the Team recommends the hosting option to be extended. Rather than limiting the option to Gaua evacuee families being hosted by relatives only, have as many evacuee families hosted by communities throughout TORBA. Of course, families hosting relatives should have preference, and the registration exercise should provide a clear picture as to how many will be able to do so.

Reasons for preference to be given to community hosting over large camps include:

- Hosting is more culturally appropriate in Vanuatu, traditionally adopted in the past as the principal form of support to displaced families
- It allows family life at similar spacing density to current village arrangements
- The community hosting option is more sustainable than long-term camps – families resettled in cramped camps would not remain in the camp when they have the option to relocate to other communities
- Community hosting has a significantly reduced environmental impact on surrounding forest resources (especially given that each family requires a minimum of around 1 ha of land for subsistence gardening).
- Hosted families will almost certainly achieve a higher quality of life than in a camp environment, provided that appropriate support is provided to both the IDPs and the host communities (see below).
- Community hosting is generally preferred as an option for resettlement of IDPs. As noted in the Handbook for the Protection of Internally Displaced Persons<sup>3</sup> *“Generally, staying with host families is the preferred alternative for displaced populations, as it builds on their own coping mechanisms and enables them to live in more dignified conditions, surrounded by extended family or friends. Although camps are considered an option of last resort, they might be the only viable option when dealing with large influxes”*.

During the mission, this option was discussed with a number of communities and heads of families. The initial responses were positive with Mosina community indicating they could host as many as 300 people (50-60 families) in their area, and other visited communities suggested they could host varying numbers of families (5, 10 or even 20). The extended hosting option therefore appears to have real potential. It is also seen as the ‘Melanesian way’ of dealing with such a crisis. It would provide evacuated families living conditions close to what they had on Gaua, which is preferable than the completely unfamiliar and cramped circumstances of a camp.

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<sup>3</sup> *‘Handbook for the Protection of Internally Displaced Persons’, Global Protection Cluster Working Group, December 2007, p.269.*

To fully explore this option, it is recommended that all communities on Vanua Lava and other TORBA Islands are visited with the purpose of finding out how many families each community could host. This community tour is envisaged to be carried out by TORBA Provincial staff, and NDMO and Gaua disaster committee representatives. It must be made clear to the potential host families what the conditions are: their contribution (land for housing and gardening, materials for housing, etc.) and what support they can receive. Host family support requires careful consideration prior to the tour and must be agreed to by all parties.

The host option implies that evacuees are spread out throughout the islands. Consequently, management of the situation will be challenging. The recommendation in the February Gaua assessment report for an NGO (or other agency) to provide ongoing support and management of IDP and host families is repeated here for emphasis. Support for IDP families must clearly be agreed upon and IDPs must be involved in the process<sup>4</sup>.

Though the hosting option appears to be the most likely and appropriate solution and would provide a more normal situation to that left behind on Gaua, it must be noted that communities will most likely be dispersed. Though families will relocate as a unit, it is highly unlikely that a full community from Gaua would be able to settle in a host community elsewhere. It must also not be underestimated that hosting most families on Vanua Lava constitutes a significant increase in the total population of the island. Vanua Lava has a little over 3000 people. Adding nearly 2000 evacuees means an average increase of about 60% of all communities. Though the land area can easily sustain this number of people, protection issues must be taken into account.

It is possible that not all IDP families can be hosted. In that case, a (smaller) camp is still required. Several points should be noted: Conflicts may arise as to who goes to a hosting community and who to the camp; the camp site would involve a considerable additional expense to Government and donors for a relatively small number of people. One option in this event would be to consider Sola Station as the camp site as most of the infrastructure would be already in place. This would prevent double expenditure.

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<sup>4</sup> *For example: are IDP families assisted only once in relocation? If serious problems arise between IDP and host families, will the government be obliged to provide a second relocation?*

## CHAPTER 4: SCENARIOS

*Various scenarios are discussed in this chapter including reduced volcano activity, status quo, and increased activity. The focus of this report is on the scenario when a full-scale evacuation is required, but both other scenarios should not be ignored.*

### 4.2 REDUCED VOLCANIC ACTIVITY

Past records of Gaua volcano, and of other volcanoes in the same category, show a quite different activity pattern than is displayed by the volcano in 2009/2010. Previously changes in activity level developed much more rapidly with both increase and decrease in activity over a much shorter time frame. Gaua volcano has been at VVAL 2 for much longer than expected. However, under this scenario, it is expected to reduce its level at some time, thus allowing people to return to their land. This may apply to the current 423 IDPs or the full population in case a full-scale evacuation takes place prior to the volcano quieting again. In both cases the contingency plan should allow for the needs of the returnees.

Villages in West Gaua have already sustained significant damage: houses need major repair and gardens need replanting. Livestock numbers have been reduced as well. Returnees would require tarpaulins or something similar for shelter while repairs are made to the houses. NFIs may have to be distributed as well; the items depended on an assessment to be carried out. Gardens will need clearing and reseeded, and seedlings may be required.

Other infrastructure (water supply, roads etc.) may require repair due to the lack of maintenance. Livelihood assistance will be required as well.

The return to Gaua may happen several years after the full evacuation took place. Many people may not wish to return having secured a good existence elsewhere. Prior to returning to Gaua, an assessment should be done to determine who will return and to where. However, it should be assumed in the contingency plan that the full population will return.

Depending on the result of the assessment, assistance to returnees should include the following:

- Shelter NFIs;
- Household NFIs;
- Livelihood support (perhaps including cash-for-work);
- Food distribution until gardens are providing food again;
- Information Centre/Awareness;
- Psycho-social support.

### 4.3 STATUS QUO

Gaua volcano has been at VVAL 2 for 9 months at the time of the writing of this report and is likely to remain at this level for some time yet. Similarly, after an eruption it may take considerable time before returning to Gaua is possible.

As agreed upon in the current draft contingency plan, it is essential that IDPs are supported in establishing normal economic and social activities as soon as possible. Continuing awareness of the volcano activity status is essential but should not interfere with IDPs establishing as much of a normal life as possible.

The needs of the current IDP and host families need urgent addressing now with awareness as the starting point.

Assistance to IDP and host families should include the following:

- Awareness/Information Centre (as described in Section 2.2 above);
- Psycho-social support;
- Shelter NFIs;

#### **4.4 INCREASED VOLCANIC ACTIVITY**

In the case of a significantly increased volcanic activity prompting a full-scale evacuation, two scenarios are possible:

1. Gradual evacuation during which the people have the time to move to evacuation points in an orderly fashion;
2. Emergency evacuation during which the population needs to be evacuated as quickly as possible.

In the case of a more planned and orderly evacuation, previous discussions have suggested that IDPs would be transported directly to their final destinations and the transition camp at Sola would not be needed. The suggestion was that the transition camp would only be used in case of an emergency evacuation during which there is no time at Gaua to gather families together that wish to go to the same destinations. However there are practical reasons against this approach:

- It should not be assumed that there is ample time for evacuation. Even a gradual increase in volcanic activity may change into an eruption without warning. Any evacuation should therefore take place as quickly as possible;
- Organization of families proposing to return to the same destination is difficult logistically. Families with the same destination may be spread out all over Gaua. Transport would have to go around and pick them up at whichever evacuation point they may be, with increased chance for mistakes.
- NFIs would have to be distributed and prepositioned at all evacuation points. Prepositioning at the numerous destinations is even more impractical;

It seems clear that evacuation should take place rapidly under any circumstance, with all IDPs conveyed to the Sola transition camp. There they get registered, get a quick medical check and receive NFIs. Transport to their final destination is far more easily organized from a central location. Prepositioning is only required at Sola<sup>5</sup>.

When IDP families are ready to move from the transition camp, they take their NFIs with them, including the shelter materials.

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<sup>5</sup> *This report proposes only partial prepositioning at Sola due to limited storage availability. Additional prepositioning can be done in Santo and/or Australia/New Zealand where well kept storage facilities and stocks are available (See section 6.13 below)*

## CHAPTER 5: EVACUATION SITES

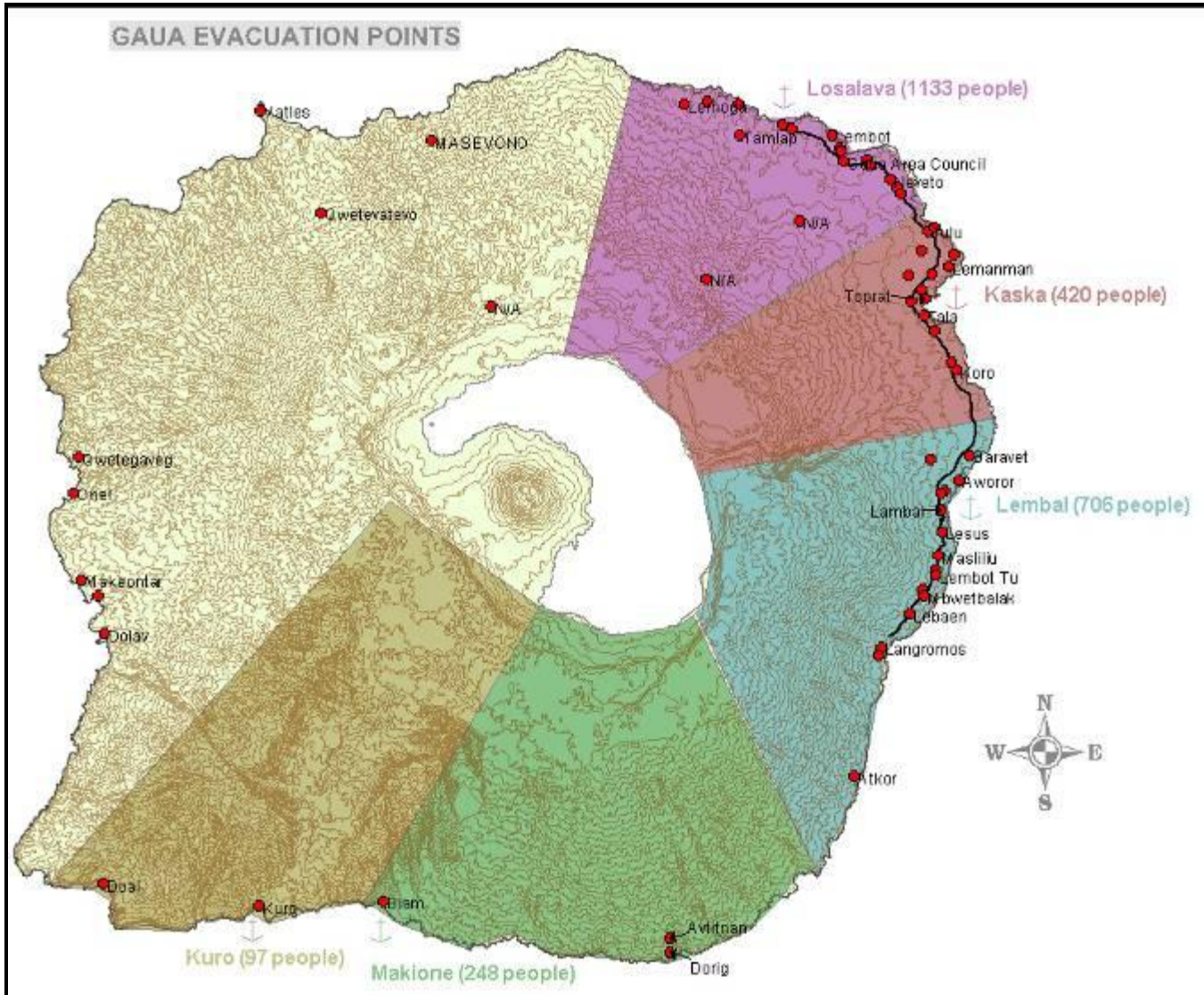


Figure 2: Gaua evacuation locations

### 5.1 ACCESS

#### 5.1.1 Losalava

The harbour at Losalava is available for use by barges on all tides. Access for people to the nominated evacuation point is also good, via the village of Namasari.

#### 5.1.2 Lembal

The evacuation point at Lembal will allow landing by barges on both high and low tides. However, it may not be available during strong SE winds. There are no other potential evacuation points to the south of Lembal. Further options need to be investigated for access to this area should access to the north be cut off by flooding of the Salimal River and water craft are unable to deploy due to SE winds. Evacuation by helicopter may become necessary? If this

is the case then provision of a cleared site suitable for use by helicopters needs to be incorporated into the evacuation strategy.

The site is easily accessible for people to board water craft. However people from Atkor (9 households) will need to walk approximately 7 kilometers to Lembal over difficult terrain.

### **5.1.3 Kaska**

Previous planning by the EOC for evacuation has assumed that Lembal could serve as the main evacuation site for people from Lemanman south to Atkor. However there is a risk that the bridge over the Salimal River (flowing directly from Lake Letas) to the south of Kaska could be washed away in conjunction with increased volcanic activity and significantly increased river flow. In this event people living north of Salimal River would be unable to access the evacuation site at Lembal. Accordingly a further site for evacuation is now proposed at Kaska Bay.

Kaska Bay is a sheltered harbour with good barge access on both high and low tides. It is also easily accessible for people to walk from the surrounding communities. Access to the evacuation point will require a short somewhat steep descent over rocks to water level, however this should be easily negotiable by most people.

### **5.1.4 Biam & Kuro**

The bay below the village of Biam has been nominated as the preferred evacuation site for all of the southern villages (Doal, Kuro, Biam, Dorig and Avitnan) in previous planning documents.

This would require people from Dorig (5 households) and Avitnan (21 households) to travel west along the coast to Biam (12 households) and people from Doal (1 household) and Kuro (14 households) to travel east to Biam.

Pickup of people from the bay at Biam will be very difficult if required at low tide and will only really be possible at high tides using small boats (known locally as “banana boats”). However, given the lengthy journey required for people from Dorig and Avitnan, Biam should be maintained as an evacuation point in reasonable expectation that the operation will be able to take place at high tide. If there is a need to evacuate at low tide, then everyone would need to travel to Kuro (see below).

There is a major valley between Kuro and Biam that (on advice from Geohazards) may be subject to extensive mudslides if the volcano erupts. If this occurs then it will not be possible for people from Kuro and Doal to walk to Biam. There is a beach at Kuro that is accessible by barge on all tides. Accordingly, adoption of a second evacuation point at Kuro is proposed.

## **5.2 SHELTER**

Given the short stay of people at the evacuation sites on Gaua, the shelter requirements are minimal. However, some form of covered waiting space is considered appropriate due to the high likelihood of ash fall and/or rain during evacuation operations. Desirably people will stay at the evacuation site no more than 24-48 hours and preferably less especially if the evacuation is planned.

Existing buildings such as schools and nakamals/community halls are the preferred way to shelter waiting evacuees, particularly where people are required to wait overnight. These sites will provide access to existing services and these more substantial structures are more likely to offer safe shelter from falling ash.

Where the distance from existing community buildings is more than 500m from the barge loading point, additional shelters will be required. A shade structure which is simple to erect located close to where boats will load people will shelter people while they wait to board the boats.



Given the likely short notice of an evacuation it would be necessary to stockpile materials for this purpose close to the site particularly as road access may be cut off, and watercraft would be used to evacuate people.

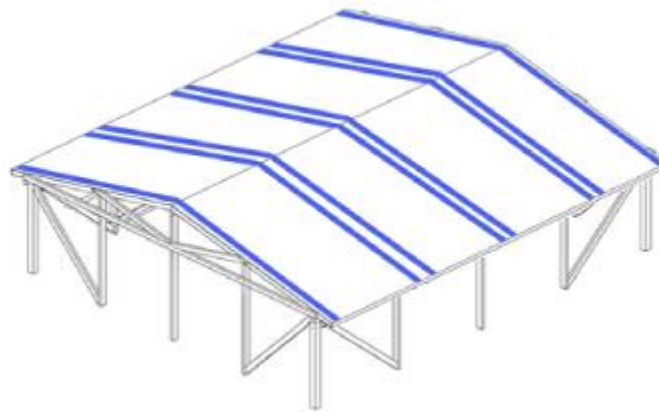
Training of people in how to erect and maintain such structures throughout the evacuation should be conducted as part of disaster preparedness. People living closest to the evacuation sites would be the ideal candidates as they would typically be in a position to respond first.

There are two different options proposed for this structure:

***Option 1 – Low cost, Local Materials***

The design is based on a standard 2 bay timber framed open walled structure in accordance with the Shelter Project<sup>6</sup>. Local bush poles have been substituted for sawn timber as these are readily available in the area. It would be necessary to source these poles from the surrounding bush.

Two shelter kits comprising of tools and a total of Four 4 x 6m tarpaulins will be sufficient to construct this structure.



**Figure 3: Tarpaulin shade structure**

***Option 2– High cost, quick assemble***

Given the short time available to erect a shade structure to assist with an emergency evacuation a pre-fabricated metal frame may be more appropriate. Unlike the bush poles which would need to be sourced when the structure was needed, an aluminium frame can be stored for more than 5 years (some manufacturers say as long as 20 years). Whilst more expensive than other alternatives, this type of marquee is collapsible meaning that it can be assembled in under 15 minutes by a team of 4 people.

The shade structure shown in Figure 4 is the largest standard collapsible marquee structure readily available. There are a number of different suppliers of these types of structures including Extreme Marquees based in Melbourne Australia. It provides 32m<sup>2</sup> of covered space. The structure can be supplied with sand bags which can be filled with sand to weigh down the support legs. The entire structure weighs 90kg and retails at around AU\$2,700 ex Melbourne.

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<sup>6</sup> *Guidelines for the Construction of Emergency Relief Infrastructure October 2003. Shelter Project working in Collaboration with the University of Cambridge.*



**Figure 4: Marquee style shade structure**

Option 2 is preferred as an evacuation site shelter despite its significant extra cost because of the speed with which it can be erected.

It will be important to regularly clear any ash which collects on the roof otherwise the structure may collapse. Table 4 provides the shelter requirements for the various evacuation sites.

**Table 4: Shelter requirements at evacuation sites**

Evacuation Site	Possible Evacuees	Existing Structures	Proposed Structures	Pre-positioning
Losalava	1133	Large Nakamal/Community Hall (300m away)	No shade structure required	
Kaska	420	6 Class rooms available at Santa Maria Primary School (400m away)	No shade structure required	
Lembal	706	4 Class rooms available at Aworor Primary School (1km away)	Shade Structure Required	Marquee should be stored at the Aworor school.
Biam	248	Existing houses (200m away)	No shade structure required	
Kuro	97	Existing houses (<100m away)	No shade structure required	

People will be required to bring their own means of lighting with them when evacuating.

### **5.3 WATER SUPPLY & SANITATION**

The general philosophy for water and sanitation at the evacuation sites is to ensure that enough facilities are present within 200 meters of the evacuation site to serve basic needs (note that in some cases reduced Sphere guideline values are utilized because of the transient nature of the sites). Family members will be able to walk hundreds of meters to collect water and return to the site without compromising their positioning for evacuation craft access.

General existing water supply systems will be adequate in terms of water quality. The main point of concern is the potential for roof catchment tanks becoming contaminated from ash fall. Contamination of other natural water sources from volcanic activity cannot be prevented however water already in rainwater tanks can be kept safe. This can be achieved through preparing a community advice warning (equivalent to a standard operating procedure) which should include the following message;

1. If ash fall is observed in your area immediately disconnect the inlet pipe from the roof catchment to the water storage tank.
2. Reconnect this pipe during the next rainfall event only after the ash fall event has ended AND water from the catchment roof is observed to be clear (during heavy ash falls the roof area should be swept clean).

It is recommended that the GoV consider incorporating a simple ‘disconnect’ system into all rainwater catchment tanks constructed in areas potentially affected by ash-fall.

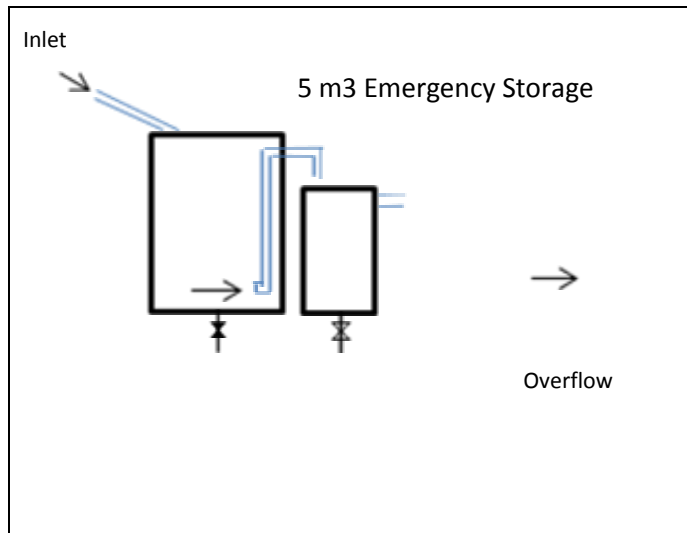
All five evacuation sites were inspected and all were deemed acceptable in terms of existing infrastructure (per estimated population, see Table 5– figures determined for a 24 hours stay – not SPHERE compliant due to the transient nature of the sites) except for Lembal where the existing water supply was deemed inadequate. It is assumed that local, family constructed latrines would be used as required during an evacuation. Although additional latrines at some sites might be warranted, maintenance of such latrines would prove problematic (no ownership) and result in broken superstructures, filled pits and in the longer term lead to additional health problems which are what the project is trying to avoid in the first place.

**Table 5: WASH infrastructure quantities**

	<b>Design Population</b>	<b>Latrines (1 per 100 persons)</b>	<b>Water Points (1/200 people)</b>	<b>Water Required m3 (based on 5 L/P/D)</b>
Losalava	<b>1133</b>	11	6	6
Lembal	<b>706</b>	7	4	4
Kaska	<b>420</b>	4	2	2
Biam	<b>248</b>	2	1	1.5
Kuro	<b>97</b>	1	1	0.5

The only concern is the lack of proximate water at the Lembal site. This report therefore recommends the installation of a 5 m<sup>3</sup> rainwater tank, collection roof and fittings. The system will contain (see BoQ for cost breakdown);

- 25 m2 roof area,
- Precast 5 m<sup>3</sup> storage tank (normally locked),
- Overflow from 5 m3 tank from bottom of the tank,
- Transfer ‘overflow’ from 5 m3 tank to additional 1.1 m3 tank for community use.



**Figure 5: Suggested flow design for Lembal rainwater catchment**

The tank system above should be located close to the evacuation site. Guardianship of the system should be entrusted to the local community. The concept is to maintain a permanent supply of water for emergency purposes and to ensure that;

- The water remains safe and fresh (ie. the water itself is turned over),
- Care is taken to maintain the system by the community (by providing water for general use as well), and
- To make sure that the water is there when it is needed.

The community at Lembal should be entrusted with the maintenance of this tank and provided with a key to the main tanks which is only to be unlocked for emergency evacuation or tank maintenance. By locating the off-take of the overflow pipe at the bottom of the main tank, water will continually circulate and not remain stagnant. The time to fill the main tank will depend on the local rainfall but once full water harvested from the system will immediately be available for the local community (hence, hopefully a sense of ownership will develop; note, a larger community tank could be installed).

## **5.4 HEALTH & NUTRITION**

### **5.4.1 Losalava**

The clinic is typical of remote health facilities in as much as it is understaffed and undersupplied. The buildings are structurally sound and seem fit for purpose and water is provided by functioning rain water catchment systems.

The permanent staffs include:

- One nurse, and
- One microscopist (mainly malarial identification).

There is a very obvious and concerning lack of medical supplies at this clinic. The nurse can provide only primitive services without adequate supplies of medicines, bandages and associated supplies.

Given that the nurse has a family of her own, it is unlikely that she will be in a position to care for any significant number of injured peoples during an emergency evacuation. Recommendations:

- That this clinic is provided with adequate supplies as soon as possible and that supplies are maintained in the future. This is to maximize existing public health and to minimize the number of persons with (preventable) health problems during any future emergency, and
- Provide some medical supplies and equipment in easily transportable containers to allow treatment away from the clinic and to facilitate removal of some equipment during an evacuation so that the staff can continue to provide some form of health services after evacuation.
- A training program in first aid for people at Namasari and surrounding communities is required. This program needs to be supported through the supply of sufficient first aid materials, medicines and equipment to the health centre.

The Mataka health centre is close to Namasari. As noted above there is a strong possibility that there will be injuries and other health impacts from increased activity from the volcano and the associated requirement to move to evacuation points. Losalava harbor will be one of the main evacuation points and the effective delivery of a first aid program will be important.

Water craft deployed for the evacuation must carry adequate supplies of food and water for distribution as well as having a first aid capability where possible.

Psychological counseling is required as soon as possible to assist people and communities to live with continuing uncertainty and strong expectation of volcanic eruption.

#### **5.4.2 Lembal & Kaska**

A training program in first aid for people at Lembal and nearby communities is required. This program needs to be supported through the supply of appropriate first aid materials, medicines and equipment to the communities.

Water craft deployed for the evacuation must carry adequate supplies of food and water for distribution as well as having a first aid capability where possible.

Psychological counseling is required as soon as possible to assist people and communities to live with continuing uncertainty and strong expectation of volcanic eruption.

#### **5.4.3 Biam & Kuro**

There is a first aid post at Biam, however the villagers advised that there is an urgent need for follow-up training to be provided. The level of available medicines and first aid stores at the Biam first aid post is apparently also very low.

There is a strong possibility that there will be injuries and other health impacts (including breathing difficulties, burns and stress) resulting from increased activity from the volcano and the associated requirement to move to evacuation points. A training program in first aid for people at both Biam and Kuro is required. This program needs to be supported through the supply of appropriate first aid materials, medicines and equipment to the communities.

It is possible that people will need to wait at the evacuation points for several days while waiting for arrival of help. This will put a lot of pressure on the ability of the Biam and Kuro communities to provide food and water. It will be important to ensure that the water craft deployed for the evacuation carry adequate supplies of food and water for distribution as well as first aid capability.

As noted in other sections of this report (and in the February 2010 Inter-Agency Assessment Report), there is an evident need for delivery of a psychosocial support program. Psychological counseling is required as soon as possible to assist people and communities to live with continuing uncertainty and strong expectation of looming disaster from volcanic eruption.

## **5.5 PROTECTION**

### **5.5.1 Losalava**

Around 1000 people could assemble at Losalava Harbour for evacuation. This means the area will be very crowded and potentially lead to numerous protection issues including GBV, crime, inter-community tensions, panic.

EOC should deploy officers to the area to maintain a secure environment and to manage safe access to the barge and other water craft.

Awareness programs are needed to strengthen the protection capacity of the communities, including training in personal items to take, measures to prevent family separation and measures to address property issues.

### **5.5.2 Lembal**

The walk required for people walking from Atkor to Lembal will be at least 6km over rugged terrain for around 50 people – whether ill, disabled, pregnant, very young or frail aged.

There appear to be no other options for evacuation sites in this area other than Lembal. Accordingly the only mitigation option appears to be implementation of an awareness program that encourages the communities to develop appropriate strategies to manage the risk – to strengthen the protection capacity of the communities. This awareness/training program should also include consideration of the personal items that people bring with them – as well as the items that must be left behind.

The awareness program should also include discussion of strategies to assist prevention of family separation and measures to address property issues.

As noted above, security and assistance should be provided through urgent deployment of EOC officers to each community in the event of an evacuation.

### **5.5.3 Kaska**

Around 500 people could potentially assemble at Kaska Bay for evacuation. As a result the area will be very crowded, potentially leading to numerous protection issues including GBV, crime, inter-community tensions, panic.

Vulnerable people may require assistance in descending to the Bay to board watercraft.

The EOC strategic plan for evacuation should include immediate deployment of officers to the area to maintain a secure environment and to manage safe access to the barge and other water craft.

Awareness programs are needed to strengthen the protection capacity of the communities, including training in personal items to take, measures to prevent family separation and measures to address property issues.

### **5.5.4 Biam & Kuro**

The journey required for people walking from Avitnan and Dorig to Biam is cause for concern. This will be at least a 6km walk over steep terrain for around 165 people of all ages and physical fitness – whether ill, disabled, pregnant, very young or frail aged.

There appear to be no options for evacuation sites closer to Avitnan and Dorig, so the only mitigation option appears to be implementation of an awareness program that encourages the communities to develop appropriate strategies to manage the risk – to strengthen the protection capacity of the communities. This awareness/training program should also include consideration of the personal items that people bring with them – as well as the items that must be left behind.

Family separation is a significant risk in the event of an emergency evacuation and the above awareness program should also include discussion of strategies to assist prevention. The proposal to transfer all IDPs initially to Sola for registration will also assist response to potential family separation.

The IDPs will be leaving behind their land, houses, pets, livestock and crops (vegetable gardens and coconut plantations). This will have ongoing significant consequences for livelihoods, health and well-being as well as money for education and health care. It will be important for people to be reassured by Government that every effort will be taken to safeguard their property during their absence. Measures should be taken to record property ownership to facilitate resolution of possible future disputes as well as consideration of any compensation that may be provided. These issues should also be addressed as part of the awareness/training program proposed above.

Security and assistance should be provided through urgent deployment of EOC officers to each community in the event of an evacuation.

## **5.6 COMMUNICATION**

Losalava Harbour is only a short distance from the EOC. Even so, it will be important for EOC to develop a communications strategy for effectively advising the local communities of the requirement to implement evacuation. This strategy should include deployment of EOC officers to assist the communities to prepare for and move to the evacuation point.

As for Losalava Harbour, Kaska Bay is reasonably close to the EOC. Even so, it will be important for EOC to develop a communications strategy for effectively advising the local communities of the requirement to implement evacuation. This strategy should include deployment of EOC officers to assist the communities to move to the evacuation point.

Communications will be more difficult between the EOC and Lembal – particularly if the bridge over the Salimal River is washed away.

There are two telephones at the school at Aworor. Development of a communications strategy by the EOC for effectively advising the local communities of the requirement to implement evacuation could include use of these telephones. This strategy should also include urgent deployment of EOC officers by speedboat to assist the communities to move to the evacuation point.

Radio receivers should be provided to nominated people at each of the communities south of the Salimal River.

There is no communication equipment at either Biam or Kuro. People also advised that while radio reception is available, no-one in either community has a radio receiver.

In the event of a major incident occurring in the area (significant ash event, mud flow, etc) the only way for people to raise the alarm will be to walk for two days to the EOC. Similarly, the only way for EOC to advise people of the need for evacuation will be to travel south by speedboat.

EOC advise that a spare VHF radio is currently available for deployment to Biam (this was previously sited at Ontar). Arrangements should be made for this as soon as possible, together with the required power source (generator or solar) and training given to local people in use of the radio. This strategy should be accompanied by adoption of a firm communications protocol between EOC and Biam. A protocol for updating communications between each of the southern communities also needs to be established.

EOC representatives should regularly travel south to Biam (say every two weeks), to check on conditions, increase awareness and consolidate communications training.

Provision of radio receivers to nominated people at each of the southern communities is also recommended.

The following evacuation sites are currently in urgent need for improved communication and it is suggested that the appropriate communication technology that is required would be the installation of VHF or HF radios together with distribution of a number of transistor radios to each community. The following table summarizes the equipment that should be provided to each community.

**Table 6: Gaua Island communication needs**

Evacuation Site	Communication equipments	Quantity Needed	Transistor Radios needed
Losalava	VHF or HF Radio	1	10
	Walkie Talky (Portable radios)	4	
Kaska	VHF or HF Radio	1	7
	Walkie Talky (Portable radios)	4	
Lembal	VHF or HF Radio	1	4
	Walkie Talky (Portable radios)	4	
Biam	VHF or HF Radio	1	4
	Walkie Talky (Portable radios)	4	
Kuro	VHF or HF Radio	1	4
	Walkie Talky (Portable radios)	4	

The following settlements also need transistor radios. However the people do not have the funds to buy this equipment (or the batteries required). Provision of transistor radios to the communities as indicated in the following table is recommended.

**Table 7: Gaua transistor radio recommendations**

Community	Radios Needed
Lemoka	1
Tamiap	1
Namasari	3
Lembot	1
Tulu	1
Lemanman	2
Aworor	1
Dorig	3
Baravet	1
Queteon	1

## 5.5 EVACUATION LOGISTICS

The evacuation sites proposed for movement of people from Gaua are Losalava, Kaska, Lambal, Biam and Kuro. There are not enough boats on the island for evacuation in the event of a declared emergency. (There are only 4 or 5 banana boats on the island.) It is important to note that there are currently also only two motor vehicles available on the island; a NDMO Mitsubishi 4X4 and a Rural Water Supply Toyota Land Cruiser 4X4. The latter will be relocated when needed for another drilling project elsewhere.

Evacuation of close to 3000 people from Gaua to respond to an emergency will require significant additional resources to transport them to Vanua Lava. These potentially include additional banana boats from Vanua Lava, barges from Santo, other private commercial shipping, and the French Navy (from New Caledonia).



Further information on each of these options is provided below.

- **Vanua Lava Banana Boats**

**Table 8: Banana boat availability Vanua Lava**

Owner/Gov Dept	No of Boats	Passenger Capacity	Estimate Trips Per day to Gaua	Time
Education	2	7	2	2 hrs
Health	2	7	2	2hrs
Province	1	7	2	2
AOG	2	7	2	2
Police	1	7	2	2
Rural WS	1	7	2	2
Port Patson	1	7	2	2
Patrap	1	7	2	2
NDMO	1	7	2	2
PWD	1	7	2	2
Total	13			

Note that out of the total of boats above, two will be used for safety and rescue purposes.

There are no banana boats available on Gaua.

- **Other Commercial Shipping**

Commercial vessels may be used to transport people of Gaua. The Banks Islands receive relatively little shipping service and the time to reach Gaua is relatively long. Passenger capacity is large however. Details of 2 commercial vessels are presented in Table 9. No information on other vessels available as yet.

**Table 9: Commercial vessels**

Name Vessel	Type Vessel	Travel Port Vila - Santo	Travel Santo - Gaua	Travel Gaua - Vanua Lava	Passenger capacity
MV Sabrina	Barge	n/a	11 hrs	4 hrs	50
MV Belsaert	Cargo ship	9 hrs	3 hrs	1hrs	100

- **French Navy**

The French navy based in New Caledonia has agreed to make available navy ship in case of an emergency. Travel to Gaua requires 48 hours from Noumea, longer if the ship is away on an exercise. The identified landing sites are Losalava on Gaua, and Sola on Vanua Lava. It is unclear at this stage how many passengers it can accommodate.

- **Other Options**

In case of a major life-threatening emergency, it may be possible to divert Air Vanuatu flights from their normal routes to assist in the evacuation. An 18-seat charter flight is available as well at Vt 15,000 per round trip to Vila.

Overseas military airplanes are not able to land on either the Gaua or the Sola airstrip. They are prohibited to fly near an active volcano as well.

## CHAPTER 6: SOLA TRANSITION CAMP

### 6.1 EVACUEE RECEPTION

#### 6.1.1 Reception process

The assessment has found that all evacuated people from Gaua should be initially taken to Sola. The primary purpose of this is to ensure registration of every IDP, provision of a preliminary health/psychosocial/protection check and distribution of necessary non-food items to allow families to re-establish.

At Sola, watercraft carrying IDPs will be directed to the main barge landing area, roughly adjacent to the Police Office. On leaving the craft, people will be directed to a reception tent, where details including names, Gaua village of origin and preferred destination village (if any) will be recorded. Ideally, people should be provided with an ID tag (wristband?) with this recorded information.

This reception process could possibly take several days depending on the speed of the evacuation from Gaua. Two registration teams are required consisting of at least two registration officers and a supervisor.

From the reception tent people will be directed to a Health/Psychosocial/Protection tent for initial assessment of needs and impacts from the evacuation (see more details below on staffing). A further tent is required for this operation. Note that the Principal of the Sola School has advised that shelter at the school can be provided for those people assessed as vulnerable.

From the Health/Protection tent, people will be directed to the NFI Distribution Centre. There is an existing building approx 22m x 7m adjacent to the reception area that is available for NFI distribution (see Figure 6). Further details on staffing and NFIs to be distributed are provided below.

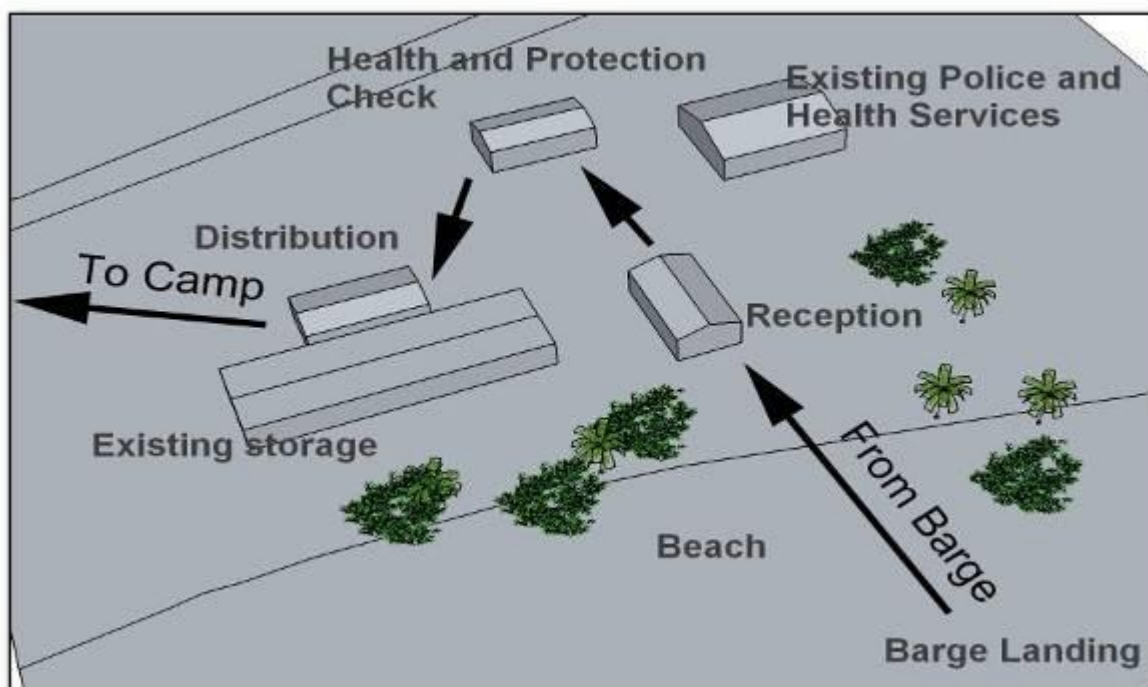


Figure 6: Sola transit camp reception

## 6.1.2 NFI Distribution - Household support

The following table summarizes the items that need to be distributed to each family. The set of items is based on a standard family size of 6. However the quantity of items will need to be adjusted during distribution to suit the actual number of family members. If there is sufficient advance warning it may be possible to repackage items to suit different family sizes.

The list of items was determined through workshops with some Gauan families. Wider consultation will provide greater acceptance by the residents and can aid awareness of what items families are to bring with them when they are evacuated and what they should leave behind.

**Table 10: Household NFI support**

Item	Description	Cost	Volume	Qty/Family
<b>Kitchen Set – Family of 5</b>		CHF 28	0.022m <sup>3</sup>	<b>1.2</b>
	BOWL, for food, 1L, stainless steel			5
	FORK, table, stainless steel			5
	FRYING PAN, 2.5L, used as lid for the 7L cooking pot			1
	KNIFE, kitchen, stainless steel blade 15cm, plastic handle			1
	KNIFE, table knife, stainless steel			5
	SPOON, wooden, stirring, 30cm			1
	SPOON, soup, stainless steel, 15 ml			5
	COOKING POT, 5L, s.steel, diam 20 cm, with handles and lid			1
	COOKING POT, 7L, s.steel, diam 24 cm, with handles			1
	CUP, stainless steel, with handle, 300ml			5
	PLATE, deep, stainless steel, diam. 22 cm, cap. 0.75L			5
	SCOURING PAD			1
	re-usable packing plastic box (optional)			1
<b>Bucket</b>	BUCKET, plastic, 14L with clip cover and 50mm outlet	CHF 5	0.006 m <sup>3</sup>	<b>2</b>
<b>Pot Stand</b>	Steel stand to sit over fire (Sourced Locally)	CHF10 (est)	0.1 m <sup>3</sup>	<b>1</b>
<b>Blanket</b>	BLANKET, woven, 100% COTTON, 1.2x1.8m, light	CHF 7	0.0005 m <sup>3</sup>	6
<b>Sheets</b>	(Sourced Locally)	CHF 5 (est)	0.0002 m <sup>3</sup>	6
<b>Bedding Mat</b>	Bamboo Woven Mat (Sourced Locally)	CHF 5 (est)	0.0005 m <sup>3</sup>	6
<b>Pillows</b>	To be sourced locally	CHF 7 (est)	0.002 m <sup>3</sup>	6
<b>Clothing</b>	Second Hand	CHF 10/kg	0.0024 m <sup>3</sup> /kg	3
<b>Lighting</b>	Hand Held Torch and Batteries	CHF 5 (est)	0.001 m <sup>3</sup>	2
	Cigarette Lighter	CHF 1 (est)	0.0001 m <sup>3</sup>	1
<b>Hygiene Kits</b>	Soap (250gm Per Person Per Month – for laundry and personal hygiene); All Purpose Towelling Cloth X 2(For Sanitary Protection, Nappies Etc.); Sanitary Towels (both disposable and reusable are possible but disposal systems must be considered); 1 Litre Storage Container And Lid (for making up ORT); Cord For Washing Line; Toothbrushes X 5 And Toothpaste X 1 Large Tube; Combs X 2; Condoms X 20 (depending on levels of acceptance); Washing Basin; Trowel (for burial of children’s and infants’ faeces especially); Oxfam Bucket X 1; Jerry Can 20 Litres X 2	AUS\$39.50		<b>1</b>
<b>Mosquito Nets</b>	MOSQUITO NET, LLIN, rectangular large 160 x 180 x 150cm	CHF 6	0.0017 m <sup>3</sup>	<b>6</b>
<b>Total per Average Family</b>	Based on Average Family Size of 6	CHF 275	0.177 m <sup>3</sup>	
<b>Total for Gaua Population</b>	Based on 2700 people	CHF135K	87m <sup>3</sup>	

### 6.1.3 NFI distribution - Shelter Support

The IFRC have developed a standard shelter kit for distribution to people whose homes have been badly affected by a disaster. The contents of the kit have been refined over the years based on experiences with disaster relief operations over many years. It is designed to allow each family to quickly construct a temporary shelter incorporating locally available materials. The shelter kit provides tools to people so that they can continuously improve the standard of the shelter over time by adding additional local materials to improve privacy, amenity and better protection from environmental factors.

Being a standardized kit means that there is a large number of them stockpiled for immediate dispatch from international emergency relief warehouses including the Australian Red Cross in Brisbane and the IFRC zone office in Kuala Lumpur. The kits cost CHF60 including the tools, fixings and 2 tarpaulins. A detailed listing of the kit contents can be found in APPENDIX 4: IFRC SHELTER KIT.

From the Distribution Centre people will be directed to the Transition Camp.

Emergency accommodation will be required for:

- Reception Centre: 6 staff
- Health/Protection Check: Number of medical and protection staff to be identified.
- Distribution Centre: 6 staff

### 6.2 ACCESS & LOGISTICS

The Torba Provincial Government has identified the sporting fields at Sola as the location for a short-term transition camp (see Figure 7). This is close to the proposed reception area for IDPs and easily accessible. Barges have good access at any time but ships can only anchor off shore as the wharf is no longer functioning.

Access to the Transit Camp at Sola will be mainly by use of the existing barge landing area with people entering the site via the reception site as described above. However there are further options. If circumstances allow, it may be possible to transport some people by air from Gaua direct to the airstrip at Sola. In addition, it may also be possible for some watercraft to land people at Mosina rather than Sola, saving transport time and allowing additional trips to be made to and from Gaua. Barges may also land at the beach near the airstrip and transported by truck to Sola station.

Adoption of both options will result in the need to transport people to the reception site from either the Sola airstrip or Mosina. The following table summarizes the current availability of vehicles at Sola available to assist such transport.

**Table 11: Vehicles at Sola**

Owner/Gov Dept	No of vehicle
Public works	1X 4 x 4
Public Works	1 X tractor
Jimmy Jones	1 X 4X4
Diocese	2 X 4X4
Health	1 X 4X4
Atkinson	1 X4X4
Total	6 vehicles

### 6.3 TRANSIT CAMP SITE PLAN

**Concept:** The Transition Camp is intended for use only as very short-term shelter from when around 2,700 IDPs arrive at Sola to the time when they are able to take up re-settlement either with host communities (on Vanua Lava or other nearby islands) or at the planned camp proposed at Vatop. The preferred option for relocation to host communities should allow people to move on very quickly, hopefully within 24 to 48 hours while the barge(s) and other water craft may still be available after having been used for the evacuation from Gaua. People moving to the camp at Vatop would presumably have a longer stay in the transition camp (assuming the camp has not been made ready for use). Any proposal to maintain the Transition Camp for a longer period (pending preparation of the camp at Vatop) must include provision for a redesign of the camp to comply with minimum Sphere standards.

Meals will be distributed to IDP families from a central kitchen area. Conditions in the transition camp are expected to be too crowded to allow individual family cooking fires.

**Area:** Unfortunately the site is very constrained, providing an area of only 2.2 ha. The minimum Sphere standard of 30 Square meters per person would normally require an area of 8.1 ha. Some additional clearing of approximately 0.7 ha has been partially completed in preparation for the Vanuatu National Games planned for May 2011, however a lot of work still remains to remove stumps, complete leveling and allow for ground compaction and grassing.

**Services:** The site is situated within Sola, with good access to all the services enjoyed by the population of Sola. The offices of the Torba Provincial Government are also close by.

**Topography:** Slope of the site is quite flat, which will result in drainage issues given the high rainfall experienced on Vanua Lava and despite the porous nature of the soils. Prolonged rain will completely flood the area. Runoff drains cut along the roads and paths adjacent to plots will be required to alleviate the issue.

**Water:** Sufficient water can be made available to the site – see further detail below.

**Vegetation / Construction materials:** Heavy forest exists to the rear of the site. The shelter strategy (see below) will need to rely on families being able to take at least two end poles from this forest to erect distributed tarpaulins. The only alternative to this would be to arrange for the poles to be pre-cut and stored. However, this would require a significant effort to cut and store the poles for a use that may never be required, and if eventually required there is a risk that they may have deteriorated in storage.

**Environmental Impact:** The use of the nearby forest for cutting shelter poles will have a significant impact. However the impact will be once only. The proposal to distribute meals will mean that there will be no pressure on the surrounding forest for fuel wood.

See below for impacts resulting from sanitation and solid waste.

**Environmental Health:** The transition camp could become very crowded very quickly and there will be significant risks from vector borne diseases. This will be exacerbated by a large pond adjacent to the site. Consideration should be given to removing this pond in conjunction with the current earthmoving activity to extend the sporting fields.

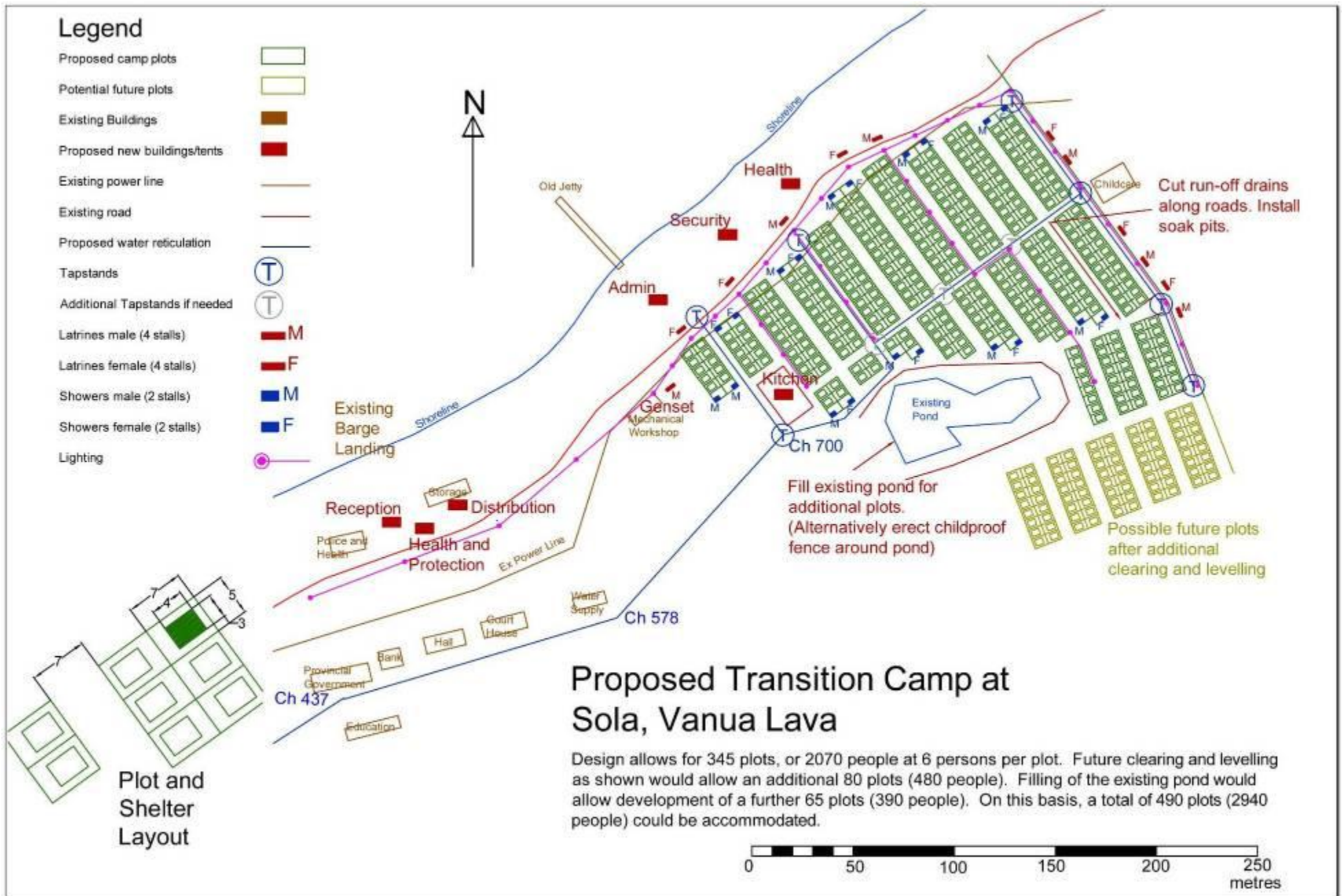


Figure 7: Proposed transit camp lay-out

**Design:** The proposed design for the Transition Camp is shown in Figure 7 above. Given the preferred use of the site as very short-term protection where the majority of people will be accommodated for less than 48 hours, a reduction in standards as follows is considered acceptable. Details follow:

- Shelter size: 4m x 3m. This allows 2 m<sup>2</sup> per person for a family of 6. As noted above, it is not proposed that any of this space would be used for cooking.
- Plot size: 7m x 5m. Allows 2m separation between shelters.
- Paths: The design provides paths 7m wide at right angles to the existing track that is parallel to the shore line. This is proposed to facilitate views into the camp and assist security. Two paths with minimum 5m width are provided to assist access to the camp kitchen and WASH facilities.
- The Camp Kitchen and Servery is sited on the existing basketball court concrete slab. This will require the erection of a temporary shelter using poles from the adjacent forest and tarpaulins.
- Administration tent(s) are located near the entrance to the camp on the beach side of the main track. The tent should be at least 7m x 6m to accommodate around 7 staff (see below).
- A Health Services tent is located near the centre of the camp on the beach side of the main track. This tent should also be at least 7m x 6m.
- Effective management of safety for the camp will be imperative, given the cramped living conditions. A security tent is located between the Administration tent and the Health Services tent. Infrastructure and staffing for security should be available in conjunction with the relocation of the EOC from Gaua.
- Three blocks (a total of 42 family plots) are designated for vulnerable families at the entrance to the camp – opposite the administration tent and adjacent to the kitchen.

This design would accommodate around 345 families (2070 people at 6 people per family). Completion of clearing of the area towards the rear of the site would allow space for an additional 80 families (480 people). Further sites could also be made available if the existing pond was to be filled (as recommended below under Protection to reduce the likelihood of vector-borne health problems).

If an evacuation is required before the additional clearing is completed then it may be necessary to erect several collective overflow shelters. These are discussed in further detail below (see section 6.5 Overflow planning). They will need to be constructed from local bush poles and tarpaulins. There is sufficient space for location of the overflow shelters on the lawns surrounding the Sola administrative buildings (including the hall, court house and water supply offices). However, the need for provision of these shelters will significantly complicate the response to an evacuation and can be avoided by completion of the clearing and leveling of the sporting fields.

## **6.4 SHELTER**

### **IDP Reception**

There are a number of existing administrative buildings at Sola Station which can be used to assist with the initial response. These buildings are summarized as follows:



### **1. Provincial Offices**

The provincial Office could be used as the main co-ordination centre for the management of the Sola Transition Camp.

### **2. Red Cross Office**

The Vanuatu Red Cross are currently constructing a Torba branch office as an extension to the Torba provincial office. While this office is small, it could serve as a useful administrative centre out of which the Vanuatu Red Cross could conduct its operations to support the Sola camp and provide support for Host Families.

### **3. Meeting Hall**

The TORBA provincial office, have offered part of the meeting hall for the storage of food in preparation of the disaster. The meeting hall serves an active purpose for the residents of Vanua Lava, should the offer of this space be rescinded than it is suggested that a lockable shipping container(s) be used for this purpose instead. The shipping containers should be located in close proximity to the administration buildings to provide passive surveillance.

The meeting hall could serve a function during an evacuation where it might be used to provide temporary accommodation for government and NGO staff supporting the operation of the Camp. Some tarpaulins could be used to provide some privacy and to create living spaces.

### **4. Police**

The TORBA province police currently operate out of a small office at Sola. This structure could be expanded to provide additional capacity for the expected 20 strong protection force. It is understood that NDMO is already looking to expand this building in readiness.

### **5. Warehouse NFI Storage and Distribution**

The existing warehouse by the shore measures approximately 22m x 7m. This warehouse could be used to store and distribute NFIs from. If properly stacked, the warehouse would provide sufficient storage volume for the list of NFIs (including Shelter Kit items) refer Section 6.1.2 NFI Distribution - Household support and Section 6.1.3 NFI distribution - Shelter Support for further details.

## **New Temporary Structure Required for Reception**

### **1. Covered Waiting Areas**

Covered waiting areas would be required to accommodate arrivals from Gaua while they wait to be registered. The covered areas would provide protection from the sun and rain as IDPs are likely to be exhausted after their journey to safety.

Similar to the discussion above regarding shade structures for the evacuation sites, either a structure utilizing local bush materials and shelter kits or a commercially available marquee could be used to provide covered waiting areas. For similar reasons as discussed above it is recommended that the collapsible marquee style shelters are procured and pre-positioned in Sola for fast assembly.

Using an aluminium frame will reduce the number of bush poles that will be required.

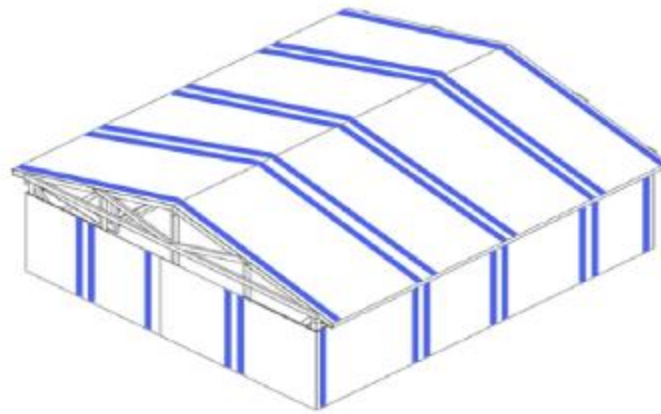
## 2. Reception & Health Checks

There are two options available for the two structures required to support registration and health checks.

### ***Option 1 – Low cost, Local Materials***

A closed in temporary structure constructed of locally sourced bush poles, two shelter kits plus additional tarpaulins, measuring 7m x 6m will be able to house 6 officers who will register each new arrival. A second structure will house medical officers who will perform a basic health check on new arrivals. Additional Plastic Sheeting can be used to provide some privacy.

The design is based on a standard 2 bay timber framed structure in accordance with the Emergency Relief Infrastructure Guidelines prepared by the Shelter Project. Local bush poles have been substituted for sawn timber as these can be sourced from the local area.



**Figure 8: 42 sqm shed structure using tarpaulin and bush timber**

### ***Option 2 – High Cost, Long Procurement Time***

Standard 45m<sup>2</sup> Multipurpose tents can provide a similar amenity to the structure in Option 1, however the tents cost approximately CHF2500 ex factory. It is understood that these tents take approximately 2.5 months to manufacture when an order is placed. Some NGO's stockpile these tents for rapid deployment, however given that these structures are required in the first stages of an evacuation, it will be necessary to stockpile these tents in Sola.

These tents have an aluminium frame reducing the demand for local timbers and can be erected by a team of 8 people in under 2 hours.



**Figure 9: Standard multi-purpose tent (45sqm)**

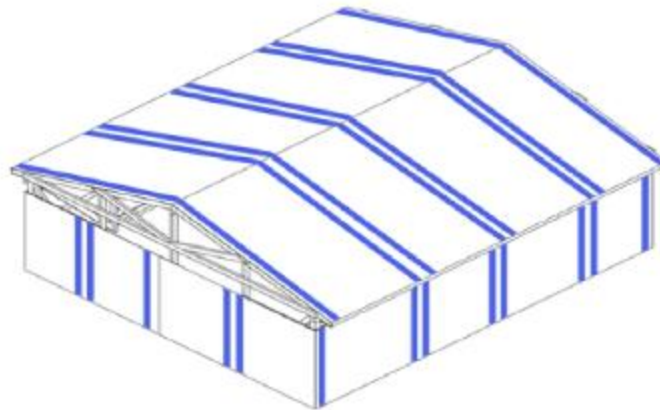
In the short term Option 1 is preferred as the shelter kits and tarpaulins can be procured quickly and the materials are versatile. If funds are available it is recommended that the multi-purpose tents be procured for pre-positioning in the longer term.

## **Camp Support Buildings**

### **1. Administration & Health Services**

A closed in shed structure measuring 7m x 6m will house 7 administration staff who will tend to the operation of the camp.

A second structure of the same size will accommodate medical officers who will provide health services to camp residents. Additional Plastic Sheeting can be used to provide some privacy.



**Figure 10: Admin and Health Services shed structure (42sqm)**

The design is based on a standard 2 bay timber framed structure in accordance with the Emergency Relief Infrastructure Guidelines prepared by the Shelter Project. Local bush poles have been substituted for sawn timber as these are readily available in the area.

A complete listing of materials is provided in APPENDIX 6: MATERIAL LIST FOR TARPAULIN STRUCTURES of this report.

## 2. Food Distribution

Given the high traffic volume associated with food distribution, it is recommended that food be distributed to the Sola camp residents from a shade structure erected on the netball court concrete slab. Given the planned short stay at the transition camp it is not intended that hot food will be provided.

The marquee style shade structures can be used for this purpose. Initially 2 of the 8x4m structures could be erected, with the other two shade structures erected at the entrance to the camp progressively moved across once they are no longer required for this purpose.

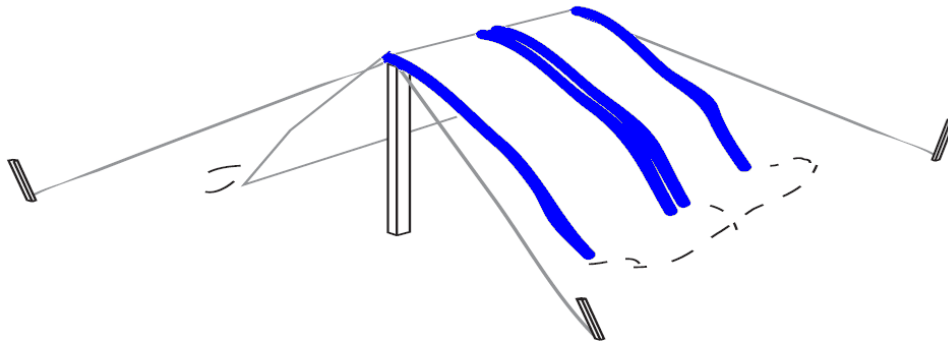
## Family Shelters

The immediate shelter needs for the majority of evacuated Gaua residents following arrival on Vanua Lava should be addressed through the distribution of shelter kits with tarpaulins. In a very short space of time evacuees could construct a very simple shelter that will be sufficient for a short stay in the transition camp.

It is considered preferable to distribute shelter kits rather than tents because the tarpaulins can form part of the longer term shelter needs of the IDPs as they transition to more permanent forms of shelter. Tents while able to offer immediate shelter to evacuees will soon be put aside as more permanent shelters are constructed. The tools included in the shelter kit can also be used by IDPs in gardening.

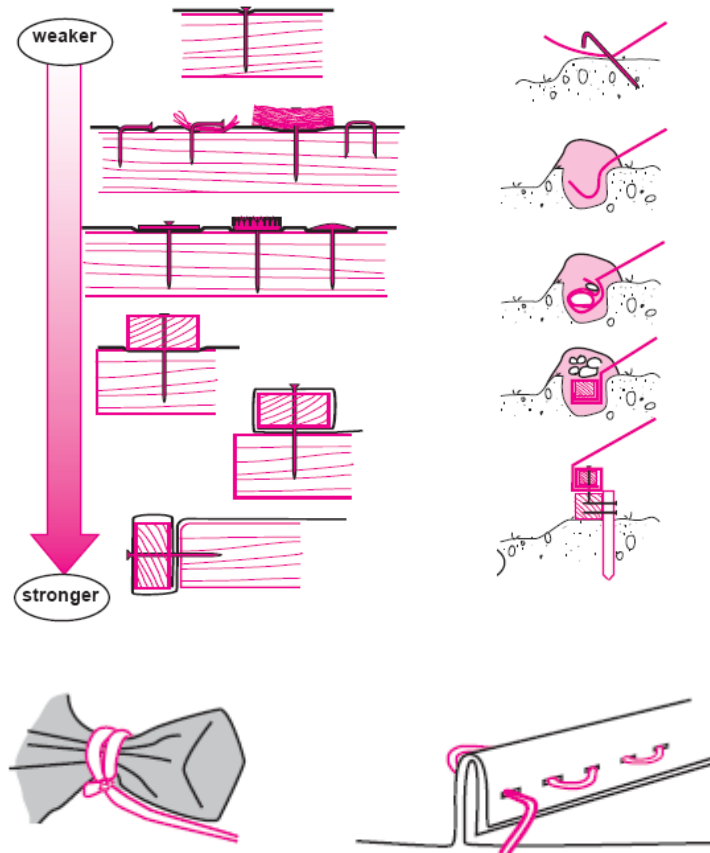
Given the small size of available land at Sola, the family plots will be very small (5m x 7m) to maximize the number of people that can be accommodated. Consequently the size of shelters will be significantly constrained. A shelter that is around 12m<sup>2</sup> will provide 2m<sup>2</sup> of space per person assuming a family size of 6 people. While this is significantly lower than the Sphere minimum standards for covered shelter, given the expected short stay, the limited personal belongings that the IDPs will have with them and the fact that food will be centrally provided, it is considered that this amount of space will be adequate. If the stay at Sola were to be extended beyond the 2-3 days currently planned for, these small shelters will likely contribute to social and health problems.

The design as shown in Figure 11 requires 2 bush poles in addition to the tools and materials included in the shelter kit (Refer section on Shelter Support Item distribution for more details). These bush poles will need to be sourced by each family from the surrounding bush. There will need to be some management of this activity to minimize environmental degradation of the bush surrounding Sola. An area of land close to Sola should be agreed in advance for this purpose. However these materials are readily available.



**Figure 11: Basic family shelter constructed using shelter kit and 2 bush poles (12sqm)**

The Plastic Sheeting Booklet 2007 prepared by Red Cross and Oxfam provides some useful technical advice as to how to use tarpaulins in constructing shelters. Figure 12 shows extracts from this booklet on how best to connect tarpaulins to the ground or other materials. This information needs to be provided to families as they are constructing their shelters.

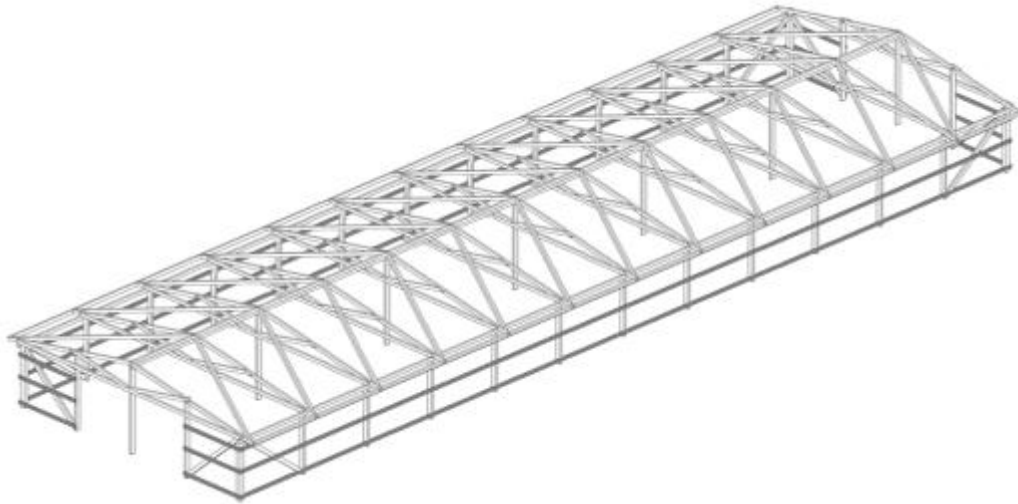


**Figure 12: Construction detailing of plastic sheeting (Red Cross & Oxfam 2007)**

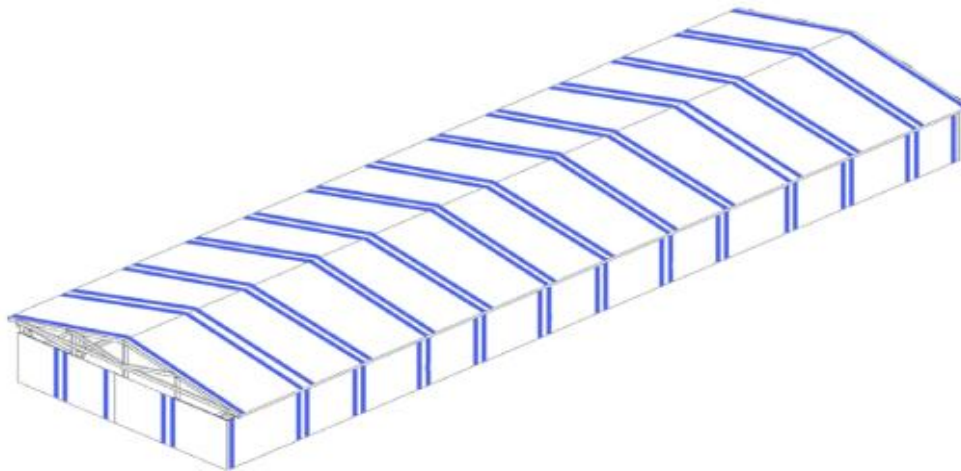
## 6.5 OVERFLOW PLANNING

Should the partially cleared land at the rear of the football fields not be available for incorporation into the camp, then it will be necessary to accommodate some of the evacuees in larger collective tents. Given the time to construct these structures this should be considered as an overflow once the space for family plots has been exhausted.

Given the very short term need for these shelters a very basic structure should be provided. Also to maintain parity with people accommodated on family plots, the same  $2\text{m}^2$  of space should be provided per person in the collective structures.



(a) Frame of Structure



(b) Completed Structure

**Figure 13: Short term collective accommodation 6 x 21m**

In the instance of an emergency evacuation these structures will need to be available within a couple of days after the decision to evacuate has been made. This will require the materials for the structures to be available locally in

Sola. Procuring and storing of large tents with a limited storage life, is an expensive way to prepare for an event that might not eventuate for many years or indeed may never happen. It is therefore advised that these large shelters be constructed using a frame of local bush poles and tarpaulins.

This provides some flexibility to be able to accommodate families in either individual tarpaulin shelters or collective shelters. The materials can also have a longer term use in a number of different ways. Once IDPs have departed the transition site at Sola, these shelters can be pulled down and either re-erected as additional classrooms on Vanua Lava or broken down into component materials for distribution to IDPs for use in transitional family shelters.

The design is based on a 6 bay timber framed structure in accordance with the Emergency Relief Infrastructure Guidelines prepared by the Shelter Project. Local bush poles have been substituted for sawn timber as these are readily available in the area.

The collective accommodation structures require a total of 250 timber members of varying sizes and lengths to create the frame. The availability of this timber needs to be confirmed with the TORBA province so that if this material is not available, sawn timber can be brought in from elsewhere.

A complete list of materials is included in APPENDIX 6: MATERIAL LIST FOR TARPAULIN STRUCTURES.

## 6.6 WATER SUPPLY & SANITATION

### 6.6.1 Water Supply

The community at Sola is already fed by a spring fed water supply system. This system is in need of improvement and extension to both the south and northern areas of the town. Generally, the community does not drink the water from the piped system and prefer water from rainwater tanks for this purpose. Without extensive bacteriological testing the reasons for not drinking the spring fed water supply cannot be determined and the practice maybe based on cultural rather than practical requirements. The catchment area above the spring is known to be uninhabited and any pollution sources are likely to be animal based rather than human.

**Table 12: Rainfall data TORBA Province**

Seasonal data regarding spring flow is unavailable however if it is based on rainfall patterns then minimum and maximum flows would occur during August and April respectively. Average rainfall figures by month for Sola are shown in Table 12.

The rainfall data also provides a guide to potential problems with flooding and increased vector risks (note the small standard deviation).

Month	Rainfall (mm/month)
Jan	395
Feb	350
Mar	400
Apr (Max)	425
May	380
Jun	310
Jul	230
Aug (Min)	225
Sep	275
Oct	350
Nov	350
Dec	345

Fourteen water points will be installed (7 x 2 taps) with allowance for an additional three water points if required depending on the history of the camp population. It was considered that installing taps and concrete splash pads on the football field proper should be avoided (difficult to excavate after decommissioning the camp). The number of taps complies with a permanent camp population of 1,400 (SPHERE).

GoV Standard tap stand designs are to be utilized including concrete splash pads and soak pits (ideally pits would be excavated and beach coral utilized for soak fill – prefer basic classification and washing of coral as sand will tend to block soaks quickly).

The existing spring catchment will need to be extended and a new 63 mm HDPE pipe connected to run parallel with the existing pipe. Install gate valves on both pipes to isolate flow to enable maintenance. Duplication of the existing 63 mm pipe from the catchment will allow system redundancy and reduce pressure losses. The new pipe will be installed all the way to the opposite side of the football field without changing the diameter. It is envisaged that this pipe could then be extended to the areas of south Sola yet to be connected to the water supply (after dissolution of the camp in the future).

The water required for a permanent SPHERE population of 1,400 is some 16.8 m3. Given that water quality cannot be confirmed to meet WHO standards an 8,000 Liter tank has been included in the design to act as a break tank and to allow ‘batch’ disinfection through chlorination (for a population of 1,400 - two disinfection runs per 24 hours). Note that in the future this tank would be used for local water points only and most of the flow would be directed through the main pipe to allow higher pressures to reach the system extremities.

An alternative to using the tank to provide disinfected water to the camp on a 24 hr basis is to batch fill the tank overnight with chlorine and instruct the camp population to obtain drinking water in the morning by filling containers (when chlorinated) and access water for other purposes in the afternoon (un-chlorinated water direct from spring).

Basic pressure loss calculations indicate the following;

**Table 13: residual pressure figures**

	<b>Max flow</b>	<b>Pressure at final tap stand</b>
DIRECT PIPE	1.5 L/s	27
FROM BREAK/DISINFECTION TANK	1.2 L/s	10

In either case the pressure at the tap stands is adequate. The main 63 mm pipe will be buried and standard (or ad-hoc) location markers should be installed to facilitate future system expansion projects.

Note that the water used at the camp may sometimes exceed the maximum flow in the spring (cease to flow condition). The community needs to be consulted regarding this possibility as it was noted that the spring (just upstream of the road) was sometimes used for hand washing (an alternative site or supply may need to be determined).

In addition, it is intended to install another rainwater tank (5 m3) and connect it to the existing government building at Sola. The intent is to provide potable water for camp administration staff and to further strengthen the town’s water supply after the camp has been disbanded.



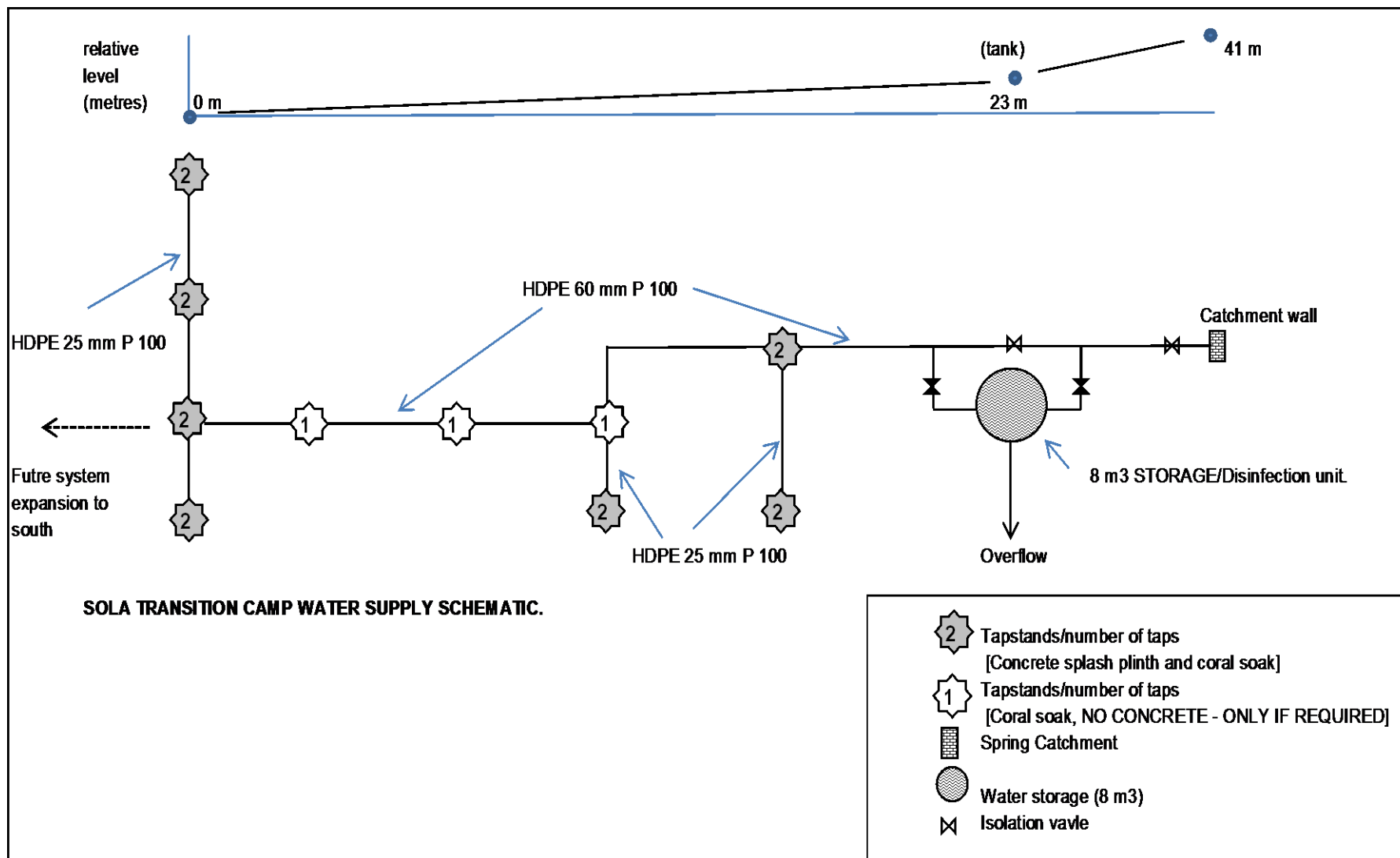


Figure 14: Water supply schematic for Sola transition camp. Note that pipe chainages are marked on the lay-out drawing (Figure 7)

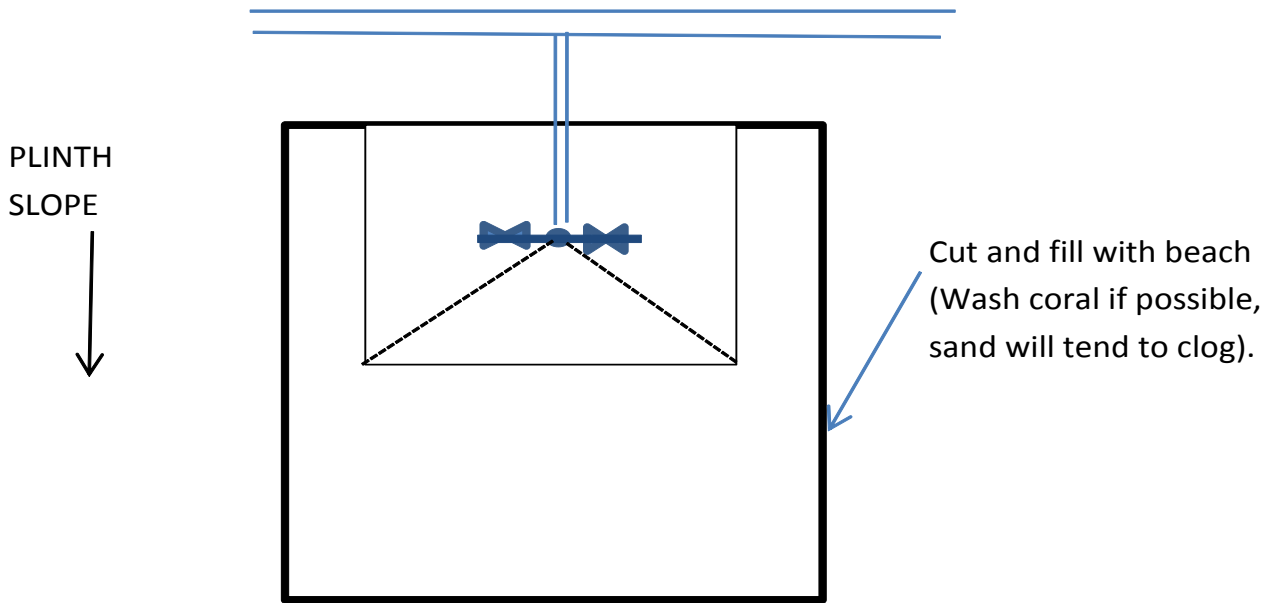


Figure 15: Suggested tap stand with soak (follow local design standards)

### 6.6.2 Sanitation

The Sphere standard for latrines in permanent camps is 20 persons per latrine. There is no strict standard for transit camps or temporary sites where people may only be staying for short durations of about 48 hours (in theory in any case). Although 2,700 people may transit the camp it is not known if there would be that number of people in the facility all at the same time (rather unlikely). For this reason and because of the short duration that it is intended for IDP's to remain at the transit camp the design figure is; 1 latrine per 50 persons (but this ratio will significantly reduce as IDP's move to alternative locations). A summary is provided in Table 14.

Table 14: Sanitation requirements Sola transition camp

Population	Latrines #	Latrines per person	Notes
2,700	56	50	For very short periods
1,120	56	20	Sphere (long term) compliant

Should the camp turn into a longer term solution for some of the IDP's then the number of latrines constructed will satisfy the needs of some 1,100 persons. Any need greater than this will have to be allowed for by constructing additional latrines as required.

The local population use toilet paper and not water for anal cleansing. In the absence of paper coconut husks are used as an alternative. The practice of hand washing is not strictly reinforced or followed. Hygiene education programmes should be undertaken which include the promotion of hand washing after toilet use, both at the camp and as a good practice in general. It is considered that people would wash their hands by soap/ bucket or at the tap stands after toilet use. No water will be provided (specifically) for each latrine.

The recommended type of toilet is a community 'pit latrine' design with plastic and bush-pole superstructure (plastic sheeting roof or corrugated iron) with a plastic squatting plate as the floor. Alternative bush materials can be utilized for flooring in the absence of squat plates.

A strict design for the latrines could be provided however given the skill of the local people in building their own latrines and structures this was considered counterproductive. It was considered that providing a strict design for latrines would only delay construction because; imported materials may not be available in time (if at all), local people are unfamiliar with different designs and require expert supervision and new designs could be used as a general excuse for not constructing the units in a timely manner as well as requiring imported labour for construction. For these reasons only a general design guideline is provided here, the local people are excellent craftsmen and can build suitable latrines out of local materials which are both fit for purpose and culturally appropriate and familiar to the people. The general design should include a vent pipe as in traditional VIP types (note that local latrines do not have vent pipes). An abundance of local bush materials is available on Vanua Lava.

Family pit-latrines are the accepted norm for Gaua and are totally made from bush materials. Community latrines are not culturally accepted except in specific circumstances such as at schools and clinics. It is recommended that plastic squat plates are used as they will be perceived as an improved alternative to the traditional bush-pole latrine floor (and are easier to clean).

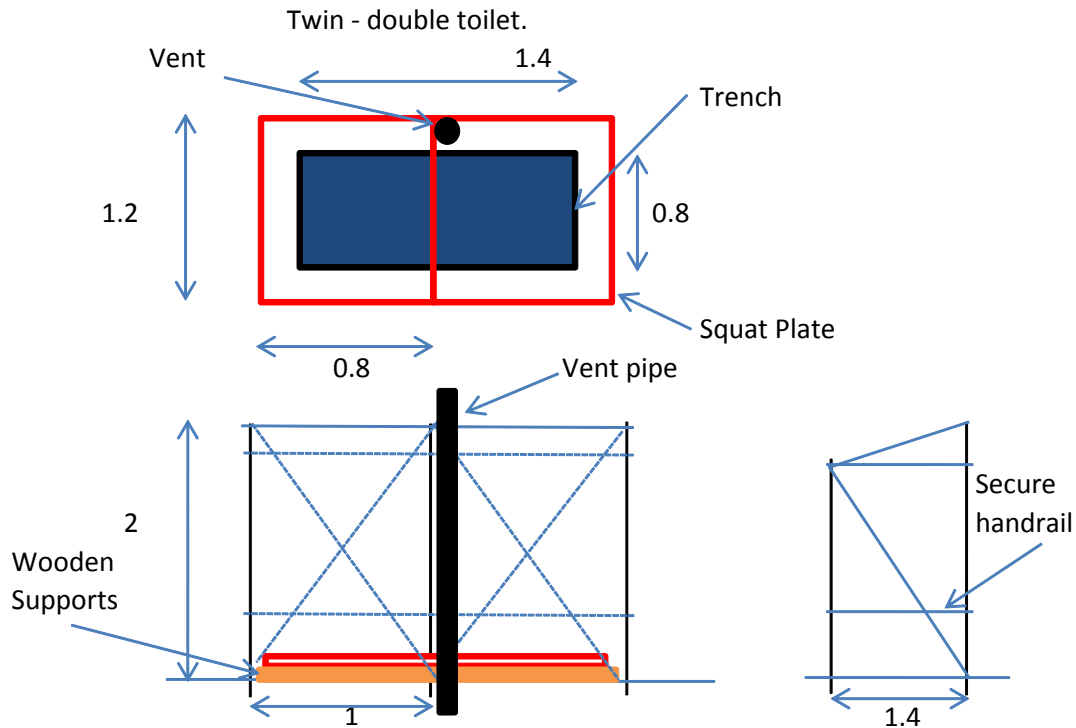
The superstructure should be easily and quickly constructed but will not need to be a permanent structure (in any case the nature of pit latrines in terms of filling up with use negates the use of more durable materials).

A general drawing of a double latrine has been provided to show the key elements required (including a hand rail) but it is deemed easier for the construction manager on site to construct the structures to as high a degree as possible given the available bush materials. Plastic, nails, tools, spades, plastic pipe and perhaps sheet metal will be supplied (Standard VIP latrine where possible). Some photos have been included to show the general construction concept for plastic sheeting for superstructure walls and wooden flooring materials. The roof for the latrines can be made from plastic sheeting or shortened sections of corrugated iron.

Presume a minimum 2 meter minimum depth for the pit (depending on water table level). The material requirements and locations of the latrines (and washrooms) are shown on the camp site plan and BoQ. Latrines need to be located no more than 50 meters away from dwellings.

40 washrooms will be provided in the camp, these are superstructures with soak floors which provide privacy for personal bathing. Water would be carried to the washrooms in buckets. The washrooms are considered as simpler structures. A shallow trench is required and filled with classified and preferably washed coral (the soak). Washroom structures constructed in Gaua were of a simple screen design with no roof. The number of washrooms is purely a notional one, no standards exist for washrooms, and 40 are considered more than adequate for this purpose.

Physical construction requirements are provided in the BoQ as a guide.



**Figure 16: Twin toilet schematic**

No specific infrastructure is to be provided for clothes washing. It is considered that the tap stands would be used for laundry purposes and should the IDP's remain at the camp for extended periods then an alternative washing site should be determined in consultation with the local community. (for example downstream washing in local creeks which are currently used for this purpose).

Latrines will be signposted as either male or female. Female latrines will be given priority positioning near to lighting and good access areas.

The soil structure at Sola is considered good and the chance of collapse is small however some shoring of the pit maybe required, this can be achieved using bush poles and corrugated iron as required.

The following need to be considered for the operation and maintenance of the water and sanitation systems;

- Provision of essential NFI's such as; toilet paper, cleaning tools, buckets, disinfectant and cleaning aids (latrines),
- Buckets for bathing and hand washing
- Tools for pipe and tank maintenance,
- Determination of community water and sanitation committees, and
- Provision of spares, taps, plastic sheeting etc.



**Figure 17: Latrine floor utilizing timber. The design of the latrine floor is flexible; it need only be able to support the plastic floor plate**



**Figure 18: Locally constructed timber floor**



**Figure 19: plastic sheeting used for latrine and washroom walls (Jordan 2003)**

### **6.6.3 Solid Waste**

No solid waste collection or disposal is undertaken on Vanua Lava. Because of the relatively cramped conditions and the immediate influx of additional population at the Sola camp, solid waste collection and disposal must be prepared for. The justification for solid waste management is to prevent vectors and health problems and to protect the site from long term contamination.

The proposal is to provide solid waste containers in and around the camp; approximately 24 bins would be needed for an ultimate population of 2,700. The containers need to be positioned with the following two criteria in mind; each container should not be closer than 15 m's from a family dwelling, and there should be (minimum) one 100 Liter container for each 50 persons.

It is proposed that 44 Gallon drums (200 L) be used for camp collection purposes. Each 44 gallon drum needs to be cut in half. Drums may already be available for this purpose as observed at the back of the Government's Public Works workshop located on the road to Mosina.

The Government needs to identify and develop a solid waste disposal site which covers the following general criteria;

- It should be well above the groundwater table,
- Should be surrounded with cut-off drains to prevent surface water ingress, and
- It must be located near to the Sola-Mosina road for ease of access.

The Sola site requires a bulldozer to clear additional land for the camp. With this in mind it is proposed to utilize the same vehicle to prepare the temporary solid waste site.

During the transit camp occupation a solid waste collection and transport team needs to be provided. This will include;

- Payment of wages for clean-up crews
- Provision of protective clothing for clean-up crews
- Provision of transport to disposal site for the 100 Litre half drums and return to the camp.

There is an existing tractor and trailer at Sola which could be used for this purpose otherwise an alternative truck would be needed.

### **6.6.4 Sola High School**

There are two high schools located on the Banks islands, one at Gaua, the other at Sola on Vanua Lava. The facilities at the Vanua Lava site are less than adequate. Should the population of Gaua be evacuated then the only high school facility on the Banks islands will be at Sola and for that reason the facilities there should be improved, if possible, immediately.

No detailed survey and design has been undertaken for this site however it can be summarized as follows;

- Survey water resource and construct spring catchment,
- Install piped water supply system,
- Construct (at least) 8 latrines for students, septic tank design with water supply for hand washing, and
- Undertake inspection of electrical system to determine the need to upgrade the current power supply (4000 watt gen set).

## 6.7 LIGHTING

The transit camp requires some lighting to improve access and provide additional security at night time. Even if no public lighting is the norm for such island communities, it is unacceptable for sites where IDP's are housed at such high densities. Lighting is essential for general night time access in unfamiliar surroundings for reasons of security and to provide a safe environment for vulnerable persons.

It is envisaged that a new 6,000 Watt diesel generator will be required to provide limited lighting and some additional power for admin purposes.

There is an existing government gen-set (4,000 Watt) already onsite. This gen-set could be used as a back-up or to provide additional power for lighting if required (gen-set not currently used at night). This existing gen-set is currently rated as too small to properly satisfy the current day-time demand.

An existing covered area with a half wall has been identified to house the gen-set. Sound proofing should be seriously considered.

The team members assessing the site did not include any professional expertise in terms of electrical engineering. A basic power and lighting design was undertaken with assistance from the electrician at Sola (Robert Manliwash, ph. 7743634). The design described in this document is a notional one, it must be re-assessed and approved by an electrical engineer provided by the GoV.

The lighting layout allows for 5 meter bush poles to support individual 36 Watt fluorescent lights at 20 meter intervals along the length of the wire. Inclusion of 1.5 mm wire in the BoQ is to provide connection of power for other purposes if and when required.

The design of the lighting system is shown in the Sola transit camp site plan and a breakdown of elements shown in the bill of quantities.

## 6.8 HEALTH & NUTRITION

- no text submitted by team member- The Vanuatu Government needs to make sure that the contingency plan includes Health and Nutrition.

## 6.9 PROTECTION

Sections of the camp have been designated for vulnerable groups, these areas can be used for either individuals (single women or mothers for example) or for vulnerable or handicapped persons and their families. Special care would be provided to these groups as well as setting up this part of the camp with good access and lighting.

Special latrines will be constructed near to the vulnerable groups for sole use. At least every third latrine will be constructed with a knee high horizontal cross structure to allow support for people with disabilities using the latrines.

Lighting will be provided near to all female latrines and designated wash rooms (although it is expected that washing would be undertaken during the daylight hours).

The camps will have a well lit corridor for night time access. In the case of Sola this will be the existing road which will have lighting all the way down to the existing police building. It is recommended that a 24 hr guard station be provided near this site so that help can be obtained if needed.

The philosophy of the transit camp and housing options there-after is to provide a dignified, safe and secure environment for all:

- In both the camp scenario and later housing options great pains should be made to locate like with like, that is; communities located next to each other on Gaua should be similarly housed locally within the camp (and the same for host communities). This is to minimize tension and potential conflict between different communities who may share cultural differences.
- Significant protection issues predicted due to crowding and the general state of anxiety which comes with such disasters, immediate psycho-social support is to be provided.
- Strong security presence required but these units must be mindful of peoples civil rights and should be provided with training in this regard.
- Lighting to be provided in key areas; salient latrines serving vulnerable, camp periphery and access route to police/protection officers.
- Specific areas of the camp have been set aside for vulnerable; two blocks at the entrance as well as use of the school for special cases (note that families will not be split up).
- The Gaua community will be involved in finalizing the camp design (plots, WASH, kitchen and reception arrangements). Chiefs, other community representatives, and the 'cavaw' organization. Will all be involved in the decision making process. Community meeting structures will be provided for this purpose..
- A play area for children (supervised) is to be set up near the beach, equipment for this site could be provided by a local charity/NGO.
- The existing pond area next to the camp is of concern. The site poses a vector risk as well as a direct risk for children who could fall into the water. This site needs to be filled in by a bulldozer and cut-off drains provided to divert surface water away from low lying areas.
- The camp is located along a road which provides excellent vehicular access to disabled persons, in addition the area is flat and there are no specifically dangerous zones in terms of rocky ground or drop-offs.
- Specific latrines are to be positioned next to the 'vulnerable' camp area for sole use (close proximity and well lit), in addition some latrines will be constructed with extra cross bracing providing hand grips for disabled persons. In special cases access to western toilets will be provided.

## **6.10 CAMP MANAGEMENT**

The International Organization for Migration (IOM) and UNHCR are leads for the Camp Coordination and Camp Management Cluster (CCCM). IOM leads the cluster for natural disasters and UNHCR for conflict situations. The CCCM Cluster seeks ways to improve living conditions in camps and advocates for durable solutions to end camp life. It is important to note that the CCCM cluster does not advocate for creation of camps, stressing that camps are temporary sites that should only be established as a last resort.

The National Disaster Management Office (NDMO) will oversee the Transition Camp Site at Sola. The NDMO may seek the support of the CCCM Cluster (IOM) in requesting deployment of international experts to assist implementation though informing identification of needs and delivery of best management practices.

Effective management of the Transit Camp will be vitally important, given that it will be significantly overcrowded, with IDPs unsettled, ill at ease and possibly still panicked.



It may be very difficult to arrange adequate staffing in emergency circumstances; however every effort should be made to deploy the following minimum camp management resources:

- A Camp Manager with overall responsibility for the safety and protection of the IDPs;
- Two Protection Officers (one male, one female);
- Camp Planning and Shelter Officer (to demarcate plots, manage plot allocation and assist with erection of shelters);
- Water, Sanitation and Hygiene Officer (arranging latrines, water supply, lighting, drainage);
- Kitchen Manager and (say) 12 staff (cooking and serving meals);
- Logistics Officer (obtaining necessary materials, tools, equipment).

The Camp Manager should be supported by a Medical Director (outlined above in 'Health and Nutrition') with supporting medical staff.

As noted above, strong camp security should be provided by an increased Police presence. Presumably these additional resources would be available from the Officers already deployed at the EOC on Gaua.

In summary, emergency staff accommodation will be required for the following:

- Camp Management: Camp Manager and 6 staff
- Health Services: Medical Director and medical staff (number of staff to be determined)
- Camp Kitchen: Kitchen Manager and 8 staff
- Security: staffed from the EOC, relocated from Gaua and as described below.

The current police strength at on Sola is three. This will be unable to cope with the influx of approximately 2,700 IDPs at the Transition Camp should there be an emergency operation. Police will also be facing other challenges including communication, absence of police transport (truck or motor bike), fuel, lubrications, office space, office equipments, materials and supplies.

Accordingly, the success of the Transit Camp operation will require additional resources. The existing police presence in Sola will need to be strengthened by an additional 20 police/VMF officers during the period to assist in:

- Providing visible security coverage 24 hours around the clock;
- Increase foot and mobile patrol;
- Attend to complaints and investigate criminal cases;
- Resolve social conflicts between groupings or family and potential SGBV issues;
- Lay criminal charges against suspects;
- Conduct awareness and educational programs on crime, Christian and traditional values;
- Ensure the safety of vulnerable people i.e. old people, disabled, children and women ;
- Draw up mitigation programs that limit physical, psychological and health issues ;
- Carry out instructions as deemed fit and proper by the Police and National Disaster Management Office;
- Extend mobile patrolling to the remote areas where camps or host centers are being implemented.

## **6.11 COMMUNICATION**

There are existing communication challenges in Gaua and Vanua-Lava that need to be urgently addressed.

These include:

- TVL mobile phone network on Vanua Lava is regularly disrupted;
- TVL Land Line telephone network on both islands is regularly disrupted;
- Most of the Tele-radios are out of service, with the remainder needing servicing;
- The Digicel Mobile Company is attempting to provide communication service to the Torba Province, but work is still continuing to erect their towers;
- Most of the villages on both islands have no effective means of communication. The only currently available links are mainly via boat access, with land transport to some communities. This presents a significant challenge;
- Most of the remote rural communities are without basic communication devices such as portable Medium Wave, Short Wave 1 and Short Wave 2 radios.

The following table provides details of the current status of communications equipment together with recommendations for improved services:

**Table 15: Existing communication equipment Vanua Lava**

Type of equipment	Quantity	Location	Portable radios required	Current Condition	Power situation/Signal Situation	Recommendation to improve service
VHF Tele-radio	1	Provincial HQ	4	Very Good	Current generator and Solar could not generate enough power	Needed a strong generator to supply power /Solar panel
VHF Tele-radio	1	Sola Police	4	No Sound	Okay	Send a technician to fix the radio
VHF Tele-Radio	1	Vatop	4	Good	Needed relevant power source	Send a technician to check radio
TVL Mobile Network		Mota Lava			Continuation of network disruption	TVL to fix
TVL Land Line Telephone		Mota Lava			Continuation of network disruption	TVL to fix

## 6.12 CAMP CLOSURE

It will be important to ensure that the site for the transit camp is left fit for use by the Sola community and Torba Provincial Government. The proposed use of the sporting field for the camp should be formally agreed by the Provincial Government and the agreement should include details on the condition of the site after the camp has been closed. Issues that should be addressed in this agreement could include:

- Closing pit latrines and waste pits and ensuring removal of any contaminated soils;
- Rehabilitating any environmental impacts on the surrounding area;
- Re-leveling and if necessary re-grassing the site for continued use as a sporting facility;
- Removing any structures, water points, other facilities that may have been provided – in consultation with the local community;
- Cleaning up waste and discarded rubbish.

The IDPs are expected to take with them the materials they were provided with to make the temporary shelters (especially the tarpaulins). Any other usable tents, lighting, generators, materials, equipment, tools and other transportable items should be considered for use at the proposed camp at Vatop (if it is decided to proceed with establishment of the camp).

All records taken by the Camp administration and Registration processes need to be transferred to Government.

### 6.13 PREPOSITIONING

To ensure a rapid response is possible, prepositioning of various items is necessary. Development of an effective prepositioning strategy requires adoption of a number of assumptions. A principal assumption is the desirability of developing a whole-of-country prepositioning approach designed to allow the NDMO to make the best use of prepositioned materials, allowing efficient management as well as effective warehousing. The cooperation of Vanuatu Airlines as well as privately owned shipping would be required to allow the strategy to work.

The assumptions adopted in developing the prepositioning recommendations outlined in Table 16 are as follows:

1. A whole-of-country strategy is developed to allow for fast, efficient deployment of prepositioned emergency response materials to any point in Vanuatu within 24-48 hours.
2. Implementation of the above strategy allows the bulk of prepositioned materials to be warehoused at either Port Vila or Luganville.
3. The strategy also allows for materials prepositioned at either Sydney or Brisbane to be flown to Port Vila and subsequently deployed to the site of an emergency within the adopted 48 hour timeframe.
4. Following declaration of an emergency on Gaua, all evacuees will be taken to Sola
5. The evacuation will take place over several days
6. Within the first 24 hours up to (say) 100 families will transfer to Sola. The majority of the remainder of the Gaua population will follow over the next 48 hours.

If the above assumptions are adopted, then sufficient materials for only 100 families need to be prepositioned at Sola. The remainder could be sourced via the warehouses at Port Vila and/or Luganville.

Prepositioning of materials for an evacuation of Gaua is mainly related to the need to be able to urgently establish the evacuation points on Gaua and to set up the transition camp at Sola. The following Table 16 provides indicative details.

**Table 16: Prepositioning**

Item	Report Section	Number Required	Where Prepositioned		
			Gaua (Arowor School)	Vanua Lava (Sola)	Port Vila (or Luganville)
<b>SHELTER</b>					
Shade marquee for Lembal Evacuation Site, 32m <sup>2</sup> , Gaua	5.2	1	1		
Household NFIs	6.1.2	450		100	350
Shelter NFIs	6.1.3	450		100	350

Item	Report Section	Number Required	Where Prepositioned		
			Gaua (Arowor School)	Vanua Lava (Sola)	Port Vila (or Luganville)
Shade marquee for Sola reception, 32m <sup>2</sup>	6.4	2		2	
Reception tent, (Multi-purpose tent 45m <sup>2</sup> ), Sola	6.4	1		1	
Health Check Tent, (Multi-purpose tent 45m <sup>2</sup> ), Sola	6.4	1		1	
Sola Camp Admin Structure, 6m x 7m Tarpaulins Rope Nails (70mm)	6.4	1 8 (3mx4m) 2 (7mx4m) 500m 500		8 (3mx4m) 2 (7mx4m) 500m 500	
Sola Camp Health Structure Tarpaulins Rope Nails (70mm)	6.4	1 8 (3mx4m) 2 (7mx4m) 500m 500		8 (3mx4m) 2 (7mx4m) 500m 500	
Sola Camp Food Distribution, marquee, 32m <sup>2</sup>	6.4	2		2	
<b>WATSAN AND LIGHTING</b>					
Diesel Generator	6.7	1 (6,000 Watt)			1 (6,000 Watt)
Fluorescent Lights (36 Watt)	6.7	50		50	
Wire for Lighting	6.7	100m (4mm)		100m (4mm)	
		100m (2.5mm)		100m (2.5mm)	
		100m (1.5mm)		100m (1.5mm)	
Switchboard	6.7	1		1	
Latrine Squat Plates	6.6.2	50		10	40
Latrine plastic sheeting	6.6.2	240m <sup>2</sup>		240m <sup>2</sup>	
Latrine pvc vent pipe 80mm, 3m long	6.6.2	12		12	
Washroom plastic sheeting		200m <sup>2</sup>		200m <sup>2</sup>	

## CHAPTER 7: HOST COMMUNITIES

### 7.1 SHELTER

#### *Traditional Housing*

Village houses in Torba Province are typically constructed by each family, of local building materials, using techniques passed down from father to son. Sourcing and preparation of building materials and construction is undertaken by all members of the family.

Traditional houses suit the tropical environment well; they provide a good level of protection against the numerous hazards prevalent in this area, including earthquakes, cyclones and ash fall. Being lightweight they provide passive ventilation and minimize heat gain. The high pitched roofs shed rainwater and prevent the buildup of ash, however given the high flammability of the thatch; hot ash may set the roof alight.

The designs allow for fast construction (small sized houses can be erected within 2 weeks once materials have been collected) and while continuous maintenance is required, repairs can quickly be made following violent storms.

House frames are typically constructed of namamao timber bush poles (a straight timber which is readily available) or of bamboo. The poles forming the frame are buried into the earth. Different diameter poles are used to suit the different loadings on the structure, with the largest timbers used for the four corner posts. Bamboo is typically used for the roof due to its light weight, with natangura leaves used as thatched waterproof covering. The walls are made of woven bamboo matting.

Connections between members are typically made using rope/vine with nails also common.

Most houses have an earthen floor, while others are low set or elevated. Elevated houses appear to be the preferred approach where the ground is steep or uneven or where houses are situated in flood prone areas.

A "House" is typically comprised of a number of buildings each serving a different function. Sleeping quarters are separate from the kitchen and eating building and a separate toilet.

Termite resistance is typically achieved by soaking timbers and bamboo in saltwater for a period of time before they are used in construction.

Local knowledge is used to orient the houses to take advantage of breezes and to maximize resistance to cyclonic winds. The wind direction is consistent throughout the year blowing in a westerly direction.

Other community structures such as churches, aid posts or meeting halls (nakamals) are also typically constructed of local materials using more substantial trusses and larger diameter bush poles to support larger spans.

Government offices, schools, hospitals and government employee housing are typically constructed of more durable materials such as hollow concrete blocks, reinforced concrete, sawn timber trusses and corrugated iron sheeting.

A gradual shift is underway whereby new houses particularly in more built up areas are using more durable construction materials. However traditional houses are still the most common type of housing.

The thatched roofs prevent the roofs from harvesting rainwater, which is growing in prevalence as a primary drinking water source in villages.

## Building Back Better

The main areas for improvement in the performance of traditional structures to respond to hazards concern the detailing of connection from the roof to the frame and the use of bracing. Metal straps could be used to more effectively tie the roof to the frame, to minimize the likelihood for cyclonic winds removing roofs. Bracing is infrequently used in traditional house structure. Bracing of the walls and roof could be used to improve the rigidity of the structure to better resist lateral forces from winds and earthquakes.

Given the ready supply of local building materials and the local knowledge of the population, self build would appear the most suitable shelter construction response. Unlike other natural disasters, where there is a concerted effort made to 'Build Back Better', improvements in the standards of shelter will not be able minimize the need for relocation should there be future increases in volcanic activity. However, given the needs for shelter reconstruction to take place on a relatively large scale, it is considered appropriate that information materials, be developed to help educate householders in how to improve the traditional shelters through better construction details.

## Transitional Shelters

The transitional shelters for displaced Gauans should over time develop into traditional style housing adopting local construction methods and materials. Technical support will assist families to construct structures with improved durability. Families should be supported to construct their own shelters as is typical in Vanuatu. Where families are not capable of constructing their own shelters due to disability or lack of technical skills, IDPs/Host Families can be paid to assist. Shortly after arrival a needs assessment should be carried out to identify which families will require additional assistance.

Families should be free to construct to their own designs, using techniques that they are comfortable with of a size to suit their family needs within the constraints of available land.

Tarpaulins could be incorporated initially to provide roofing and walls, while more durable local materials are being sourced. In this way the structures can be improved over time.

### Phase 1

Initially structures could be based on the simple tent like design proposed for the Transition Camp at Sola. Figure 20 shows the Phase 1 Basic Structure. It can be constructed using the contents of the shelter kit and two short lengths of timber.

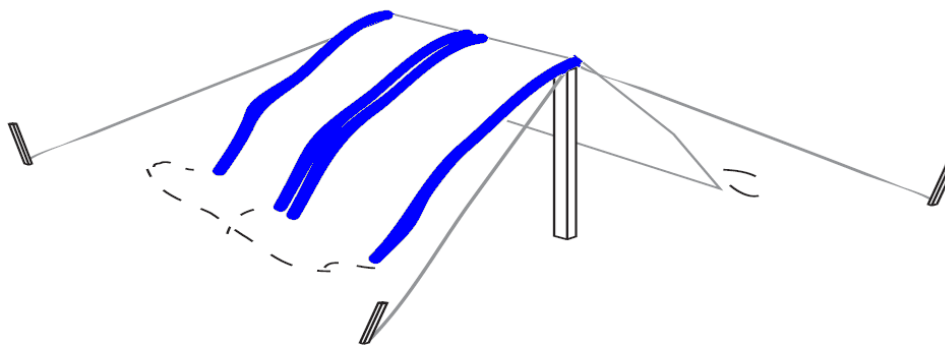
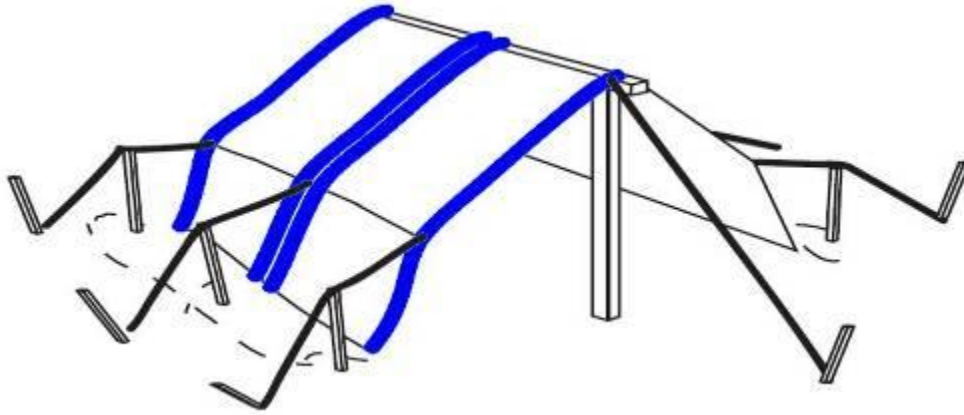


Figure 20: Phase 1 - Basic tent like structure - using shelter kit and 2 bush poles

### **Phase 2**

The Basic Tent can be improved using some short lengths of timber attached via tensioned rope to wooden stakes, to provide some additional height within the tent.



**Figure 21: Phase 2 – Enhanced Basic Structure - providing more usable space –uses additional bush poles**

### **Phase 3**

As more local timber is sourced when land is cleared for gardens, the timber can be used to form a frame to elevate the roof. Refer Figure 22 which shows a basic covered shelter constructed of tarpaulins and a bush pole frame.



**Figure 22: Basic Shelter Structure 3.3m x 4.4m**

Privacy could be improved by using tarpaulins to form walls.

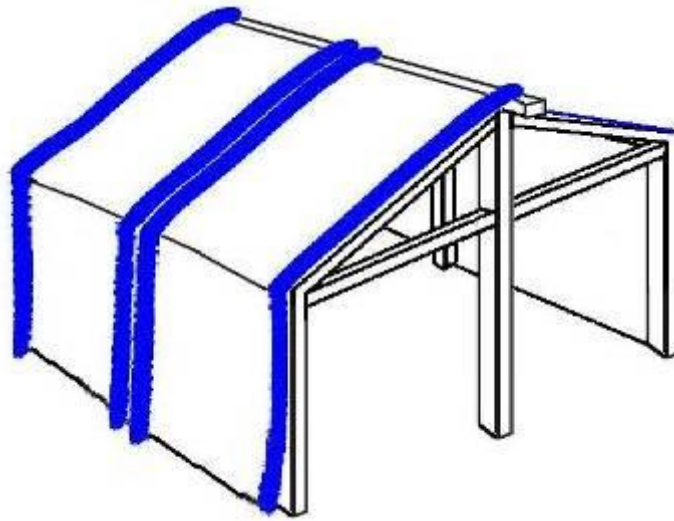


Figure 23: Phase 3 –Framed Structure - Tarpaulins used as walls and roof

**Phase 4**

In time the tarpaulin elements could be progressively replaced with local building materials such as bamboo matting for the walls.

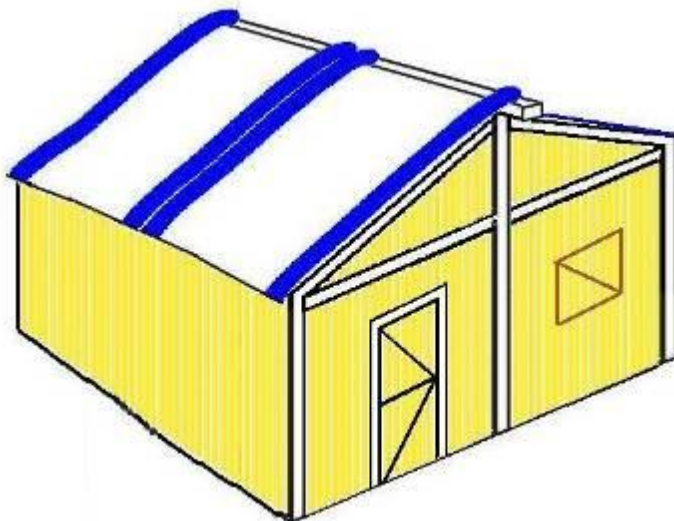
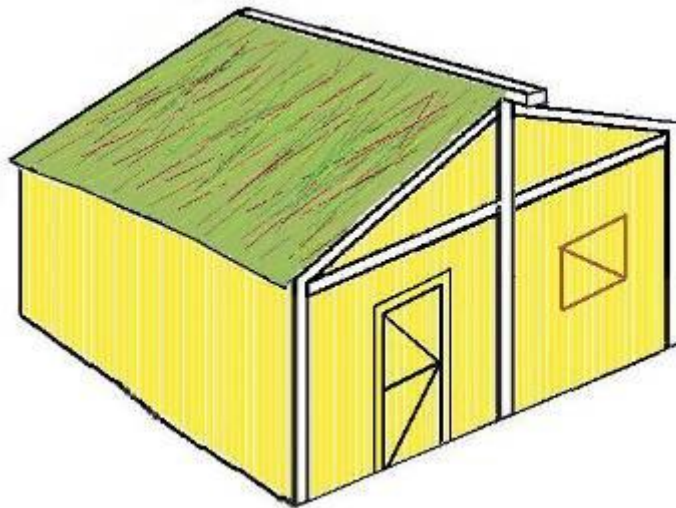


Figure 24: Phase 4 – Traditional Style Sleeping Hut – Bamboo walls with a tarpaulin roof



## **Phase 5**

After some weeks the first families will have converted the basic tent like structure into a traditional style bamboo, thatched hut.



**Figure 25: Phase 5 – Traditional Style Sleeping Hut - Complete with a Natangura thatched roof**

In addition to the sleeping hut, families will require a separate kitchen building. The kitchen could follow a similar development path to the sleeping hut where it improves over time. A size of 2m long by 3.5m wide would fit with observations of hosted families from eastern Gaua. Plastic sheeting should not be exposed to an open flame. A layer of palm fronds can be placed over a basic frame to provide some protection to a tarpaulin placed over the top. The structure could use off cuts from the tarpaulins used to construct the house.

Relying on local materials to construct houses post disaster can severely deplete the natural resources of the settlement surrounds. Refer to APPENDIX 6: MATERIAL LIST FOR TARPAULIN STRUCTURES for a list of local building materials required to complete a standard 3.5m wide by 4.0m long sleeping hut. A total of 81 timber members are required although the majority of them are only small in diameter.

In the case of Hosting, this shouldn't be a significant problem because families will be dispersed throughout existing villages. The building materials can be sourced from bush land cleared for gardens. The materials used in the traditional houses are typically fast growing and are replenished quickly with the possible exception of natangura which is less common. Given that this is the final stage of the transition from tent to hut this provides sufficient time to source additional natangura from other parts of Vanuatu.

A large population residing at Vatop will place a heavy burden on the bush to provide sufficient building materials for house construction. A lot of the material can come from the land cleared to make way for the camp and land cleared for gardens.

The situation will need to be monitored closely and alternative sites identified for building material harvesting if the degradation is too significant.

## **7.2 WATER SUPPLY & SANITATION**

The situation at each host family site will vary considerably depending on topography and local materials availability. No water and sanitation intervention is planned at host community sites. Once families have moved to the new sites then it is recommended that the conditions be reviewed and where possible install infrastructure will be of mutual benefit to both parties.

## **7.3 PROTECTION**

The protection risks faced for both the host and hosted communities will be numerous, including:

- An initially unsafe environment resulting from competing demands on the surrounding area for forest resources, fuel wood, construction materials, etc.
- Risks for SGBV as two communities come together, especially given that the host community may perceive a position of greater power as it has provided land and facilities for the hosted community.
- The IDP communities will have been deprived of their lands and many of their possessions. As a result they will have lost their main source of physical and economic security. Loss of livelihoods will have significant implications for income, food security and the means to pay for education and health care.
- IDPs may be suffering from psychological impacts of the evacuation and subsequent resettlement.
- When first deployed to host communities, the IPDs may face major issues for safe drinking water, shelter and basic sanitation standards.

As previously noted, these protection risks can only be effectively addressed through the ongoing management of an Agency appointed to be responsible for looking after the IDPs and Host Communities – in the same way that an appointed manager looks after the functions of a large IDP/Refugee Camp. The Agency would need to employ officers specifically responsible for protection that would regularly visit each Host community to assess the level of risk and develop specific protection strategies.

## **7.4 HEALTH & NUTRITION**

- no text submitted - The Vanuatu Government needs to make sure that the contingency plan includes Health and Nutrition.

## **7.5 EDUCATION**

- no text submitted - The Vanuatu Government needs to make sure that the contingency plan includes Education.

## **7.6 INCOME GENERATION/LIVELIHOODS**

Please refer to Section 8.8 Income generation/livelihoods regarding income generation/livelihoods for IDPs.

## **7.7 HOST COMMUNITY SUPPORT/MNGT**

The Guiding Principles on Internal Displacement<sup>7</sup> “identify rights and guarantees relevant to the protection of persons from forced displacement and to their protection and assistance during displacement as well as during return or resettlement and reintegration”.<sup>8</sup> Guiding Principles 18, 19, 21 and 23 identify economic, social and

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<sup>7</sup> *Guiding Principles on Internal Displacement*, UN OCHA, 2<sup>nd</sup> Edition, September 2004.

<sup>8</sup> *Ibid.*, Principle #1.

cultural rights that apply to displaced people. The following notes are informed by the ‘Handbook for Applying the Guiding Principles on Internal Displacement’<sup>9</sup>

The Guiding Principles make clear that regardless of whether IDPs live in camps or are dispersed in host communities, they must have access to essential food and potable water, basic shelter and housing, appropriate clothing, and essential medical services and sanitation.

In addition, special attention should be given to assisting vulnerable groups (disabled persons, elderly, unaccompanied children, single heads of households) who may have difficulty in obtaining food and shelter.

The Guiding Principles seek to ensure that all internally displaced persons have access to primary health services that include necessary immunizations, sanitation services, supplementary feeding programs and reproductive health care services. Wounded, sick and disabled IDPs should receive the medical care required as quickly as possible. Access to mental health services is also essential, given the expected high incidence of posttraumatic stress and other psychological reactions.

Women need to be actively involved in planning and distributing basic supplies provided to IDPs. In particular, their input should be sought regarding the make-up of the food basket and the design and layout of camp facilities and other shelter.

The ability for IDPs to generate income is particularly important and effective support is required to facilitate income generating activities.

IDPs need to be assured that their existing property rights are guaranteed on Gaua. Guiding Principle #21 notes that “Property and possessions left behind by internally displaced persons should be protected against destruction and arbitrary and illegal appropriation, occupation or use”.

Finally, every IDP has the right to education. The Guiding Principles state clearly that internally displaced children should receive free education at the primary level. While not mandatory under human rights laws, the Guiding Principles urge authorities to make educational services and facilities available to internally displaced adolescents and adults as soon as conditions permit. As well, there needs to be full and equal participation of women and girls in educational programs.

As noted above, the tour of the Torba Islands by representatives of the NDMO, Torba Government and others to develop the hosting strategy needs to be equipped with a clear statement of the level of support to be provided to the IDPs and the Host communities. This statement must be informed by the Guiding Principles and should include the following for both IDPs and Host communities as a minimum:

- Provision of food security for a defined period to allow development of subsistence gardens by IDPs
- Provision of adequate infrastructure for delivery of potable water
- Relocation terms
- Free access to primary health care and psychosocial services
- Free education for children to at least primary level;
- Subsidized education to secondary level should also be provided for a defined period
- Provision of necessary tools to IDPs for shelter construction and establishment of subsistence gardens
- Free provision of any basic necessities for development of income generating activities, such as fishing nets, drums for drying copra, etc., and

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<sup>9</sup> ‘Handbook for Applying the Guiding Principles on Internal Displacement’, UN OCHA, 1999.

- A commitment to IDPs that the Government will seek to ensure that their properties on Gaua will be protected against illegal appropriation or theft through regular security visits where possible.

Development and ongoing support of the Community Hosting option will require significant effort and commitment. An agency/organization/NGO needs to be appointed by Government to undertake this. The role of the Agency should encompass all of the functions normally managed by a typical IDP/Refugee Camp Manager. Including:

- Coordination
- Protection
- Distribution (Food and NFIs)
- Registration/Tracing, etc
- WASH
- Camp setup, maintenance
- Healthcare
- Education
- Livelihoods
- Participation (with the camp population)
- Security, and
- Environment

## **CHAPTER 8: VATOP CAMP**

### **8.1 ACCESS & LOGISTICS**

The proposed IDP camp at Vatop will have two potential landing sites. One option is to construct a new road adjacent to the existing village to provide access to the bay at Vatop. The other is to use the bay to the east of Vatop with the possible need to construct a causeway across a watercourse at the western side of the beach. These works would allow both bays to be used by cargo barges (such as MV Brisk and other vessels) to offload IDPs, logistics and food supplies.

If it is decided to proceed with development of the camp at Vatop, the Government through the Torba Provincial Authority should seek commencement of these access works as soon as possible.

Access to the proposed camp will also require significant bush/forest clearance. This will require the deployment of a bulldozer to remove stumps after initial clearance by the communities. Tools that would be required by the communities to carry out this work include: 30 X bush knives (machetes), 10 X knife files, 2 X drum gasoline, 12 X 2 stoke oil X 4 liters each, 50 liters X chainsaw oil, 4 X Chainsaws, 4 X axes, 4 X yam spades, 1 X generator.

There will also be a need to preposition a banana boat at the village to help with transportation of logistics to the area and to deal with other aspects of this operation. The boat would be under the management of the Torba Provincial Authority (Secretary General).

### **8.2 SITE PLAN**

Vatop was assessed as the only site largely complying with the criteria for IDP camp (see APPENDIX 2: GENERAL SITE SELECTION CRITERIA). It was measured by GPS as an area of approximately 8.2 Ha. The location of the site in relation to the village of Vatop is shown in Figure 26. The site features thick forest that will require clearance of stumps and re-leveling by bulldozer. Access can be obtained either via a new track from the bay at Vatop cut parallel to the existing community, or from the adjacent bay to the east. However (as noted above) the second option may require development of a causeway to provide access for vehicles across a nearby creek (in the event that the identified barge landing west of the creek is not available). Low lying swampy land exists to the north of the site. This may present an issue for vector-borne diseases.

The issue of land ownership for Vatop is not clear and this requires formal verification before any steps are taken to develop the camp.



Figure 26: Vatop camp location

### ***Vatop Camp Design***

Following observation of common practice as well as discussions at the community meetings on Gaua, it is clear that people require separate shelter structures for cooking/eating and for sleeping. In order to accommodate average family size of 6 people, a shelter of 3m x 4.5m is proposed for sleeping, with an adjacent structure 3m x 2.5m for cooking and eating. This represents total space of 3.5sqm per person (complying with the Sphere minimum standard). A plot size of 8m x 15m for each family shelter is proposed, sufficient to allow a total of 5m between adjacent houses. The design allows for 16 plots to form a community, with an internal space of 10m x 64m for shared kitchen gardens and child-friendly space. Each community will have 2 latrine stalls and 2 showers for females with the same for males, separated by a screen. See Figure 27 for further detail.

This camp design will allow accommodation for around 217 families, or 1302 people at an average of 6 per family. This provides an area of 62sqm per person, which is above the Sphere minimum standard of 45sqm per person. The constrained shape of the site is such that increased accommodation density is not considered possible or desirable.

The main access is proposed via a new track to be cut parallel to Vatop village. The design allows for this access to be extended through to the adjacent bay for a possible additional landing site. Buildings will be required as a minimum for Camp Reception, Administration, Health Services and Storage/Distribution and generator. Space for a Community Hall/Nakamal is allowed in the design. The community of Vatop is keen that the existing school site be utilized for additional education infrastructure. The proposed Camp design is shown in Figure 27.

It is important to note that each family will require access to an additional 1 ha of land to allow development of a subsistence garden. This means that if the camp is fully utilized for 217 families, at least 217 ha of further land will need to be made available in the vicinity.

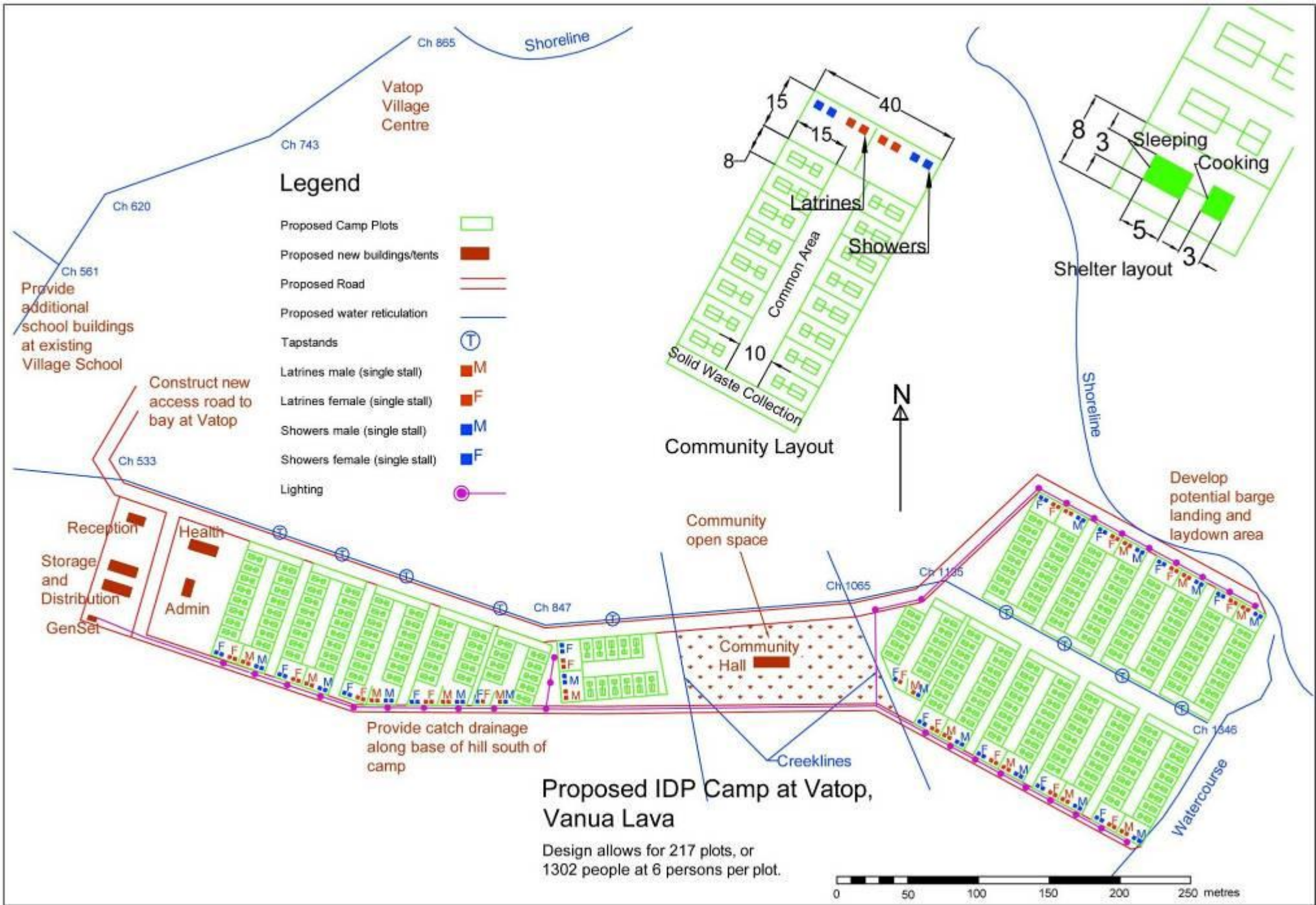


Figure 27: Vatop camp site plan

## 8.3 SHELTER

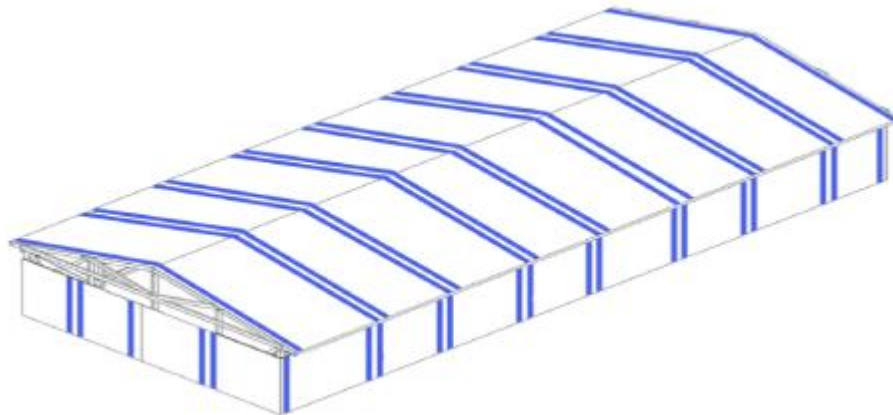
### *Vatop Camp - Administrative Buildings*

The camp at Vatop will require a number of administrative buildings to cater for the 1300 population capacity. The existing community buildings that serve the residents of Vatop are somewhat limited. The school has 4 class rooms and a single teacher's residence. Additional class rooms will be required to cater for the children residing at the camp. The Department of Education has scoped the construction requirements for temporary class rooms, this is included in Section 8.7 Education of this report.

#### **1. Health Post**

A Health Post is required to deliver health services to the residents of the camp. Being a relatively large population living in cramped conditions mean that the health needs will be much more significant than the current population of Vatop. Given that the needs of the camp community are different to the adjacent Vatop community, it is considered preferable to provide a dedicated camp health post within the confines of the camp.

Figure 28 shows a 6 x 14m Tarpaulin Structure using bush poles for the frame. This structure can progressively be upgraded if the camp remains in operation for an extended period of time. Upgrades would include the installation of solid bamboo walls the addition of a corrugated iron roof. A concrete floor could be retrofitted to improve hygiene.



**Figure 28: Temporary 6 x 14m Tarpaulin Structure for Health Post**

The design is based on a 4 bay timber framed structure in accordance with the Emergency Relief Infrastructure Guidelines prepared by the Shelter Project. Local bush poles have been substituted for sawn timber as these are readily available in the area.

#### **2. Camp Administration and Reception**

Camp administration and reception can be operated out of the Multi-purpose tents used at Sola to provide initial registration and health screening. Refer to Section 6.4 Shelter, for details on the Multi-purpose tents.

#### **3. Food + NFI Warehouse**

A large volume of storage space is required during the initial phase of the camp operation to store food which the camp population will be dependent on until food production can be obtained from local



gardens. The standard 240m<sup>2</sup> warehouse tent shown in Figure 29 is considered sufficient for this purpose. It can also be used to store any perishable NFI's that will need to be distributed over time.



**Figure 29: Warehouse Tent 10 x 24 x 3.35m (240m<sup>2</sup>)**

Being such a large tent it requires a trained technician to assist with its erection. An estimate of the cost of the tent is CHF17,000. This item is stocked at major disaster relief warehouses. Although heavy and therefore expensive to move it can be transported direct from the warehouse to Vanuatu if required.

#### **4. Food and NFI Distribution**

Food and NFIs can be distributed from the 4 collapsible marquees erected in Sola to provide waiting space and food distribution. Being collapsible the marquees can be stored in the warehouse and erected as required.

#### **5. Generator Shed**

A simple corrugated iron semi-enclosed structure is required to house the generator. The structure needs to provide protection from the elements but be open enough to provide suitable ventilation. A concrete floor with a bund is required to prevent any fuel leakages. Sufficient space will need to be provided to store diesel in 44 gallon drums.

#### **6. Community Hall – Nakamal**

Whilst not required initially, over time a community hall can be erected by the camp residents in the open space in the middle of the camp to provide a centre where camp meetings can be staged. The structure will be constructed of local materials as is the custom of Vanuatu. The IDPs involved in the construction may be paid to stimulate livelihoods.

#### **7. Staff Accommodation**

The staff who will operate the camp will need to be provided with suitable accommodation. It is preferable for fostering good relationships between staff and camp resident that staff accommodation is located outside of the camp. Negotiations should commence with the Village chief to discuss where the staff can be housed. It may be preferable to encourage the village or individual families to construct housing and rent these out to provide accommodation for camp staff, to provide lasting benefit for the host community.

## 8.4 WATER SUPPLY & SANITATION

### 8.4.1 Water Supply

No existing water supply system exists at the site (some haphazard pipe work only). It is intended that a water supply system to the camp and to the community would be provided. The system design includes the following;

- Spring catchment at approximately 57 m elevation (site already established),
- Single pipe feed to a double tank site (actual site needs to be re-evaluated),
- Interconnection of double tanks for flexibility,
- Off-takes from each tank to separate community and camp supplies,
- Tap stands as indicated.

The use of double tanks allows some flexibility in terms of supply distribution and also allows for disinfection using the same methodology as at the Sola site. No rainwater collection systems have been considered. The community pipe line extends all the way to the beach and branches off up until the existing creek site across which there are 4 dwellings are located.

No solid waste infrastructure exists at Vatop. Solid waste disposal at such a site is problematic due to access restrictions. There are no roads or options for vehicular transport.

It is proposed that long term solid waste disposal options be pursued through the Vatop community. A similar collection system as per the Sola site would be envisaged (see above). A local disposal site will need to be determined however removing the waste by barge should also be considered.

### 8.4.2 Sanitation

The same type of latrine and washing structures as described in section 6.6.2 (Sola) are relevant for the Vatop site. The site is semi-permanent one and will comply with Sphere standards for number of latrines (see table below).

**Table 17: Toilet requirements Vatop camp**

Population	Latrines #	Latrines per person	Notes
1,200	60	20	Sphere (long term) compliant

Unlike Sola, the latrines and washrooms will be designated for specific community use. The site plan shows locations of community blocks. Each block would be responsible for cleaning and maintaining their own washrooms and latrines.

The number of washrooms was determined by the number needed for each community block (60 total).

A suitable location for laundry washing will need to be identified in consultation with the local community if the tap stands are not deemed adequate for this purpose.

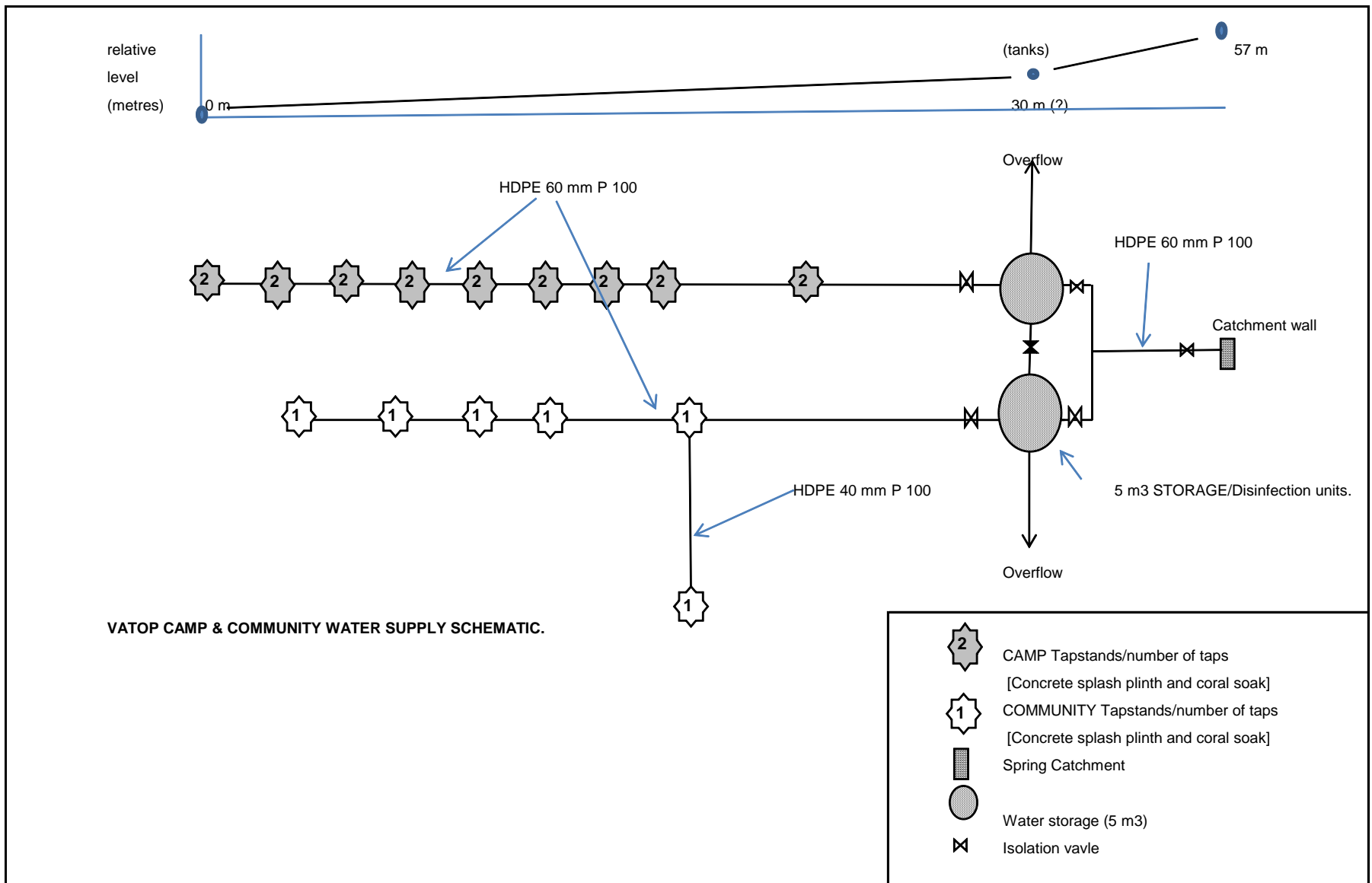


Figure 30: Water schematic for Vatop

## **8.5 LIGHTING**

Development at Vatop is dependent on the decision to transfer the remaining IDP's at Sola to a newly developed (although smaller) camp at that site. During the transfer it is important to maintain power and more importantly, lighting at Sola. To achieve this it is intended to dismantle part of the lighting network (remaining lights not lighting existing IDP dwellings) and transfer the gen-set to Vatop whilst at the same time using the existing government 4,000 Watt generator to provide lighting at Sola during the evening until all IDP's have been transferred (this smaller gen-set can easily be man-handled and moved twice a day to provide power for night time only whilst still providing power to the office areas during the day if needed).

The gen-set would be set up at Vatop (see site plan for location) and the lighting system incrementally expanded as the infrastructure at Sola is disbanded. It is an easy enough task to construct bush-poles and lighting on an as needs basis (the nature of this heavily wooded area prohibits provision of a detailed design for the light poles in this respect).

A notional design for the lighting at Vatop is shown in Figure 27. The final design adopted for lighting should use the following criteria:

- Access to and from the camp is well lit,
- Areas where vulnerable groups are residing are well lit,
- The Vatop community is consulted, and
- The gen-set should be positioned away from resident dwellings as far as possible.

## **8.6 HEALTH & NUTRITION**

- no text submitted - The Vanuatu Government needs to make sure that the contingency plan includes Health and Nutrition.

## **8.7 EDUCATION**

- no text submitted - The Vanuatu Government needs to make sure that the contingency plan includes Health and Education.

## **8.8 INCOME GENERATION/LIVELIHOODS**

The displacement of people from their existing communities will naturally impact on the ability of these people to generate income. The provision of food and services can ease the financial burdens of diminished income; however this is not sustainable over the longer term and may instead contribute to a loss of identity, control and purpose. Prolonged periods of inactivity may lead to increasing tensions and a high prevalence of physical, drug and sexual abuse that may have long term ramifications. It is therefore important to support IDPs to restart income generating activities as soon as possible.

It is understood that a major source of revenue for Gauans is through the production of copra from coconut plantations. The experience of north eastern villages of Gaua hosting west Gauans has shown that a lack of income generation is a significant burden on both the hosts and the hosted population.

The uncertainty as to how long the displacement may last and the desire of the displaced to return quickly to their home communities has led to a delay in establishing gardens for crop self-sufficiency and efforts to re-establish income generation. Whilst this was predicted at the time of displacement, the lessons from this experience reinforce the need for a detailed plan to address this should the Gauan population be displaced from Gaua.

Part of the process to assess potential host capacities across Vanua Lava should include an assessment of the employment opportunities available at each site. This would include identification of surplus coconut plantations whose produce might be shared with hosted IDP's so that they can make copra.

The re-establishment of livelihoods will be even more difficult in a camp situation, where the large density of population will compete for land to grow subsistence and cash crops. The need to develop alternative income generating opportunities will therefore be even more pressing. Opportunities may include fishing, camp management and retail. So that the population can take advantage of new fields of work they will require training and support. The otherwise idle population might also be engaged in constructing improved infrastructure that will in turn benefit the camp residents and have a residual benefit for the host population.

Such projects may include:

- the construction of a new road from Vatop to Sola,
- works to improve the harbour at Vatop,
- Upgrade of the airstrip to reduce its vulnerability to being washed out and
- The construction of more permanent structures within and to service the camp.

Realizing these projects will involve considerable expense and demands on technical support, however the lasting benefit that could be achieved for the host population and the ability for the hosted population to generate income are sound reasons for considering these options further.

## **8.9 PROTECTION**

Generally the same protection conditions apply for Vatop as they do at Sola with the following additional considerations;

- There will be protection issues generated by women and girls venturing into the adjacent forest for firewood and construction materials – also for the potential long walks to gardens.
- A strong security presence is required as well as well organised cooperation between camp community groups and the local host community .

Similar infrastructure such as lighting at night will be provided at Vatop (see section above ‘Protection Sola’).

## **8.10 CAMP MANAGEMENT**

The International Organization for Migration (IOM) and UNHCR are leads for the Camp Coordination and Camp Management Cluster (CCCM). IOM leads the cluster for natural disasters and UNHCR for conflict situations. The CCCM Cluster seeks ways to improve living conditions in camps and advocates for durable solutions to end camp life. It is important to note that the CCCM cluster does not advocate for creation of camps, stressing that camps are temporary sites that should only be established as a last resort.

An early pre-requisite for establishment of a camp at Vatop will be to seek the support of the CCCM Cluster (IOM) in requesting deployment of international experts to assist implementation though informing identification of needs and delivery of best management practices.

Subject to more detailed assessment from involvement of IOM, the following minimum camp management resources would be required at Vatop if the camp is to proceed:

- A Camp Manager with overall responsibility for the safety and protection of the IDPs;
- Two Protection Officers (one male, one female);
- Registration Officer to maintain camp records;

- Camp Planning and Shelter Officer (to demarcate plots, manage plot allocation and assist with erection of shelters). This role would only be required at the commencement of the camp;
- Water, Sanitation and Hygiene Officer (arranging latrines, water supply, lighting, drainage, camp maintenance);
- Logistics Officer (obtaining necessary materials, tools, equipment).
- Two Distribution Officers to manage the stores and arrange camp distribution.

The Camp Manager should be supported by a Medical Director (outlined above in section 8.6 Health & nutrition) with supporting medical staff.

As noted above, strong camp security should be provided by an increased Police presence at Vatop.

In summary, staff accommodation at Vatop will be required for the following:

- Camp Management: Camp Manager and up to 8 staff
- Health Services: Medical Director and medical staff (number of staff to be determined)
- Security: 20 Police.

### **8.11 COMMUNICATION**

Communication equipment used at Sola will be reused at Vatop camp.

### **8.12 CAMP CLOSURE**

At some point a decision will be taken to no longer support an IDP camp at Vatop. A significant investment will have been made in the area starting with the clearing of the forest and including the development of all the infrastructure: administration buildings, houses, community hall, latrines, water supply, etc.

There may be value in thinking about some form of ongoing purpose for the infrastructure. Part of the camp has an ocean frontage that could be an ideal location for tourist accommodation. The cleared area and associated infrastructure should at least become available for expansion of the village of Vatop. Presumably a proportion of the resettled people from Gaua may wish to stay in the area and merge with the Vatop community.

At the outset there needs to be a formal agreement with the Vatop landowners regarding the eventual closure of the camp site. Issues that should be addressed in this agreement could include:

- Closing pit latrines and waste pits and ensuring removal of any contaminated soils
- Rehabilitating any environmental impacts on the surrounding area
- Re-leveling and if necessary re-grassing the site for an agreed future use
- Removing any structures, water points, other facilities that may have been provided – in consultation with the local community
- Cleaning up waste and discarded rubbish.

All records taken by the Camp administration and Registration processes in conjunction with the operation of the camp need to be transferred to Government.

## CHAPTER 9: RECOMMENDATIONS & ACTION POINTS

### 9.1 RECOMMENDATIONS

The mission developed the following recommendations:

1. Adopt evacuation sites on Gaua at Losalava, Kaska, Lembal, Biam and Kuro;
2. Adopt community hosting as the principal, preferred resettlement strategy for IDPs;
3. Provide increased awareness in Gaua Communities of the current status of the volcano and actions needed should evacuation of the island be required;
4. Undertake further consultations between stakeholder groups (including women and youth) to discuss identified options and develop recommendations for the effective evacuation of Gaua. This may be done through the Technical Advisory Groups (TAG) that includes representatives of the various groups.
5. Actively engage women in the contingency planning process. The National Council of Women (NCW) appears to be no longer active but the Vanuatu Women's Centre is. VWC has 'Committees against Violence against Women' (CaVaW) on most islands around Vanuatu, including Gaua and Vanua Lava. VWC also has a 'Male Advocates Program' which works with male community leaders. Every CaVaW has at least one male advocate. A good starting point for the engagement of women in the contingency planning process would be to facilitate discussion between the Gaua CaVaW and the Vanua Lava CaVaWs.
6. Provide psychosocial support to the people and communities on Gaua to assist coping with the continuing day-to-day uncertainty and fear of the volcano erupting (as recommended in previous assessment reports).
7. Appoint an Agency/NGO to be accountable for the ongoing support and management of IDP and Host Communities on Gaua Island as well as planning for Host Communities on Vanua Lava and other Torba Islands.
8. Preposition materials and proceed with partial construction of a Transition Camp at Sola as soon as possible.
9. Support the Chiefs of Gaua (with NDMO representatives) to travel as soon as possible to Vanua Lava and other Torba Islands to meet with the Island Council of Chiefs and ensure appropriate respect for future IDPs from Gaua.
10. Develop a clear statement of the support to be provided through Government to IDPs and host communities. (See discussion in Section 7.7 Host community support/mngt of this report).
11. Implement consultation by Torba Provincial Government, NDMO, Gaua community representatives and relevant NGOs to communities on Vanua Lava and other Torba Islands to identify overall hosting capability of the communities.
12. Develop a whole-of-country prepositioning strategy.

## 9.2 ACTION POINTS

The following specific actions should be undertaken as soon as possible to assist implementation of the above recommendations:

**Table 18: Action points Gaua**

No.	Action	Who By
A	Appoint an Agency/NGO to manage the community hosting operation on Gaua and to plan for host communities on Vanua Lava and other Torba islands in the event of an evacuation of Gaua (see recommendation #7)	Government, NDMO
B	Undertake increased awareness activities for the people of Gaua. These sessions to include discussion on the status of the volcano, evacuation points, what to take in the event of an evacuation (clothes, etc.), protection issues during an evacuation, what to expect on Vanua lava, community hosting issues (recommendation #3 refers)	Appointed Hosting Agency (see recommendation #7)
C	Conduct psychosocial assistance workshops to provide people with the means of coping with the daily uncertainties associated with the active volcano (see recommendation #6)	Health Department
D	Arrange for improved communication between the EOC and Guau communities, particularly the communities adjacent to proposed evacuation sites at Kaska, Lembal, Biam and Kuro. Arrange for distribution of radio receivers. Encourage development of mobile phone reception.	NDMO
E	Facilitate a tour by the Chiefs of Gaua to visit the Island Council of Chiefs on Vanua Lava and other islands (see recommendation #9)	NDMO
F	Arrange for identification of community hosting options on Gaua and other Torba islands, including consultation between representatives of the Island communities and people of Gaua (see recommendations #4, #5 and #11)	Appointed Hosting Agency (see recommendation #7)
G	Review the operation of the EOC to ensure effective community consultation and planning for evacuation	NDMO
H	Deliver first aid training to the communities adjacent to the evacuation sites along with deployment of first aid materials and equipment.	Health Department/Other agency
I	Construct and install new rainwater catchment system at Lembal	DGMWR
J	Issue instructions and printed material advising how to protect rainwater catchment tanks from ash threats	DGMWR



**Table 19: Action points Vanua Lava**

No	Action	Who By
A	Pursue and fine-tune all available options for transport of people from Gaua to Vanua Lava in the event of an emergency evacuation	NDMO
B	Finalise identification of health and education requirements (materials and staffing) for development of the Transition Camp at Sola and the IDP Camp at Vatop	Education and Health Departments
C	Finalise clearing of the sporting fields at Sola, fill the existing pond, compact soil and grass	Torba Provincial Government
D	Select and prepare a site for solid waste near Sola	Torba Provincial Government
E	Construct new water supply system to service the Transit Camp at Sola ,complete with tap stands	Provincial Government/ DGMWR
F	Preposition all required materials and equipment as identified in Section X of this report. Consider development of a whole-of-country prepositioning strategy.	NDMO
G	Construct new infrastructure at the Sola High School (water supply and latrines)	DGMWR

## APPENDICES

## APPENDIX 1: ACTIVITIES

The team conducted detailed site assessments using GPS, water quality testing and other equipment. Numerous consultations were held with communities, individual families, Chiefs and others. A record of the consultations completed during the assessment is provided below:

<b>Date</b>	<b>Place</b>	<b>Activity</b>	<b>Present</b>
21 May 2010	Sola, Vanua Lava	Meeting, Provincial Administration	Shadrack Welegtabit, Lawrence Kithome, Reynolds Surmat, Salathiel Nava, Melchior Atkin, Frank Dinh, Manua, Nolen, Ron Tamtam, Simon Turner, Andrew Mills, Ken Collis, Piter Visser
<p><i>A program for site assessments was agreed, including discussion of equipment and logistics required for the inspections on both Vanua Lava and Gaua. Discussion also centred on concerns that the proposed area of land available at Leon's Bay would be too small to accommodate the expected number of IDPs from Gaua. Recommendations related to the previous assessment were also reviewed. It was noted that the Provincial Government had identified the Sola sporting field as a preferred site for the transition camp (no issue of land ownership). Issues regarding potential IDP livelihoods were discussed as well as options for shelter for the IDPs.</i></p>			
21 and 22 May 2010	Sola, Vanua Lava	Inspection, Transition Camp	Assessment Team
<p><i>Inspected proposed site for reception of IDPs and development of Transition Camp. Assessed requirements for transition camp and evacuation reception.</i></p>			
23 May 2010	Mosina, Vanua Lava	Inspections	Assessment Team
<p><i>Inspected conditions at Mosina for possible evacuation landing for barges (closer to Gaua). Also reviewed facilities at the Torba Provincial Government workshop on the Mosina road. Inspected Sola water source and (inoperative) generator.</i></p>			
24 May 2010	Waterfall Bay	Meeting, Vanua Lava Island Council of Chiefs	Assessment Team, Daniel Golow (Chairman of Island Council of Chiefs and Appointed Member Torba Provincial Government), Wilfred Erislomkab, Graham Mumeg, Elifield Malau, Kerelie Malau, Norman Colton
<p><i>The team provided the Council of Chiefs with background to the assessment, including the proposal for use of the land identified at Leon's Bay and the need for additional land to cater for Gaua IDPs. The option for a camp at Tanmat was also discussed. Issues associated with large camps were discussed and there was agreement that a preferred option is to arrange for hosting of IDPs by different communities. It was also</i></p>			

<b>Date</b>	<b>Place</b>	<b>Activity</b>	<b>Present</b>
<p><i>agreed that there should be a program of awareness on Vanua Lava with each community being visited to see how many families from Gaua could be hosted. The Chiefs advised that it should not be a problem to find additional land at Leon's Bay if it is to be used as a camp.</i></p>			
24 May 2010	Leon's Bay	Inspection	Assessment Team
<p><i>The proposed site at Leon's Bay was inspected. Found to be only 2.3ha. It featured very thick forest with large white wood trees throughout (part of previous forestry plantings). The site was also steeper than desired in some places and dissected by small depressions for runoff. Access to the site was also problematic with a wide reef exposed at low tide, making delivery of goods and materials for development and operation of the camp very difficult. In light of this, the team agreed that Leon's bay was not a suitable candidate for a large camp.</i></p>			
25 May 2010	Leon's Bay	Community Meeting	Assessment Team, approximately 40 adults and youth (not including young children)
<p><i>Landowners at Leon's Bay advised that an additional 6Ha land could be made available adjacent to the site for establishment of an IDP camp if required. It was indicated that this land is similar to that inspected on the previous day. The community was advised that the issue of developing a large camp was receiving further consideration. A favourable reaction was received to the idea of community hosting, with one landowner indicating that he would be prepared to host up to 10 families from Gaua.</i></p>			
26 May 2010	Vatop	Meeting with Landowners, Inspection	Assessment Team, Landowners at Vatop
<p><i>Following an overnight stay at the village of Vatop, the principal landowners advised that they were prepared to allow an area of land adjacent to the village to be used for development of a large camp for IDPs from Gaua. The proposed site was then inspected and the location and area measured by GPS. The area was found to be thick forest with an area of around 9Ha on gently sloping land with several small creek lines. Access is available either through the existing village or via the large bay to the east. The area to the north of the site (towards the coast) was low-lying. Overall, the team agreed that the site appeared to fulfil many of the criteria for selection.</i></p>			
27 May 2010	Sola	Meeting Torba Provincial Govt	Assessment Team, Torba Government

Date	Place	Activity	Present
<p>A review of outcomes from the inspection around Vanua Lava concluded that the Leon's Bay site is not suitable for selection as an IDP camp. Three other sites were discussed: South Sola, Mosina, Vatop and north of the Vanua Lava airstrip. It was agreed that Vatop should be pursued as an option and the other 3 sites inspected. However most sites appear to have significant issues for identification of non-contested land ownership. Hosting was identified as the preferred option for accommodation of IDPs. A survey of Vanua Lava and other Banks islands is needed as soon as possible to identify the number of families that can be hosted. This should include the Council of Chiefs, NDMO, line agencies and Red Cross. Such a survey would take around 1 month.</p>			
27 to 28 May 2010	Sola	Inspections	Assessment Team, Landowners
<p>Possible IDP camp sites were inspected at South Sola and at Mosina. The South Sola site was found to be located on land that would be too steep for a camp. Even so, a landowner in the vicinity (Mr Dudley Kerepuah) advised the team that he would be very happy to host up to 10 families from Gaua on his land.</p> <p>While the land appeared suitable at Mosina, representatives of the local landowners advised that they were reluctant to allow it to be used for an IDP camp. However they indicated that they would welcome up to 50 families from Gaua to settle in the area as hosts of the community.</p> <p>The Health Centre at Sola was inspected. Staff currently includes one Nurse-in-charge, 1 nurse aide, 2 volunteers and 1 microscopist. The Torba Health Office staff includes an Administrator, Executive Officer, A TB/Leprosy Officer and a Malaria Supervisor. The health centre currently has 20 beds and includes a women's ward, labour ward, maternity room, general ward and laboratory. Patients requiring a doctor are transferred to Santo. The team noted that spare storage space existed at the hospital if required for prepositioning of emergency equipment if necessary.</p> <p>The Team inspected the School at Sola and met with Secondary School Principal Dick Hopkins, Deputy Principal Albert Ruddley and Primary School Head Teacher Kavick Bertrand. There are currently 143 children attending the secondary school (6 classes using 7 classrooms) of which 64 children are boarding at the school. The Primary School has 188 students (16 composite classes using 8 classrooms). Teaching includes both Anglophile and Francophone streams. The Secondary School has 11 teachers and the Primary School has 8 teachers. The School has dormitories with a total of 70 beds, together with a kitchen (and cook) and a large dining room. The Principal advised that the School would be able to make the dining room and classrooms available for temporary shelter for IDPs from Gaua in the event of an emergency.</p> <p>It was noted that the secondary school population would double if the existing school on Gaua was to close. This would require at least an additional 6 classrooms to be provided, with additional toilets and washroom facilities. The existing school generator would also need to be augmented. Additional water capacity would also be required. The Principal advised that significant additions to the school are due to be</p>			

<b>Date</b>	<b>Place</b>	<b>Activity</b>	<b>Present</b>
<i>commenced within the next 12 months.</i>			
28 May 2010	Gaua, EOC	Meeting Geohazards, EOC, Agriculture, Gaua Chief	Assessment Team, Barry Wobur, Roy Mahit, Julian Daniel, Gordon Vanai, Jimmy Loic, Freddy Seip, Daniel Nenet, Worwor Athanase, Chief Victor Wetias, Barton Bisiwei, Shadrack Welegtabit, Henry Jackson, Esline Garaebiti
<i>Geohazards advised that while volcano seismic appeared to be slowly increasing over the last few months, there was no indication that the situation was significantly deteriorating. Degassing and ash activity remains fairly constant. It was noted that further seismic measurements would be taken over the next few days. The meeting was advised of the objectives of the Assessment and a program of inspections together with required logistics and timing was arranged.</i>			
29 May 2010	Biam, Kuro	Inspection and Meeting at Biam	Assessment Team, Geohazards, Biam community, approximately 50 adults and youth (not including young children)
<p><i>People advised that ash sometimes falls on the community (last time in March), requiring them to wash vegetables and manage water supplies. The marine life in fresh water streams has apparently died. A representative from Kuro advised that the situation is the same there, although the water in streams has turned a milky colour. It changed colour around March. People were remaining healthy, although some had flue. There was emphatic agreement that there was no need to move out of either Biam or Kuro at the present time.</i></p> <p><i>There is no radio receiver in the community. The only means of communication with EOC (apart from banana boat) is to walk for 2 days. The nearest landline is near Lembal.</i></p> <p><i>There is a first aid post at Biam, but no training has been provided for more than a year. There are some medicines, but no-one is trained to administer.</i></p> <p><i>The assessment team noted that access from the bay at Biam will be very difficult at low tide due to exposed reefs. There is a preferred landing area for barges at the beach at Kuro.</i></p>			
29 May	Ontar	Inspection	Assessment Team, Geohazards

Date	Place	Activity	Present
2010			
<p><i>The abandoned village of Ontar was inspected, as well as the adjacent seismic monitoring station. Evidence of previous mud flows from the volcano onto the beach below Ontar was noted.</i></p>			
30 May 2010	Losalava Harbour, Namasari	Inspection and meeting at Namasari	Assessment Team, Namasari community, approximately 70 adults and youth (not including young children)
<p><i>The proposed Losalava Harbour evacuation site was inspected and found to be suitable for access by barges and other craft at both high and low tides. Shelter and water availability found to be acceptable. Health clinic nearby also a plus.</i></p> <p><i>A meeting was subsequently with the Namasari community. The following issues were discussed:</i></p> <ul style="list-style-type: none"> <li>• <i>People were advised of the objectives of the Assessment. A typical shelter size for a large camp was marked out using a tape measure and rocks for delineation. People expressed concern about the small size of the shelter and the cramped conditions.</i></li> <li>• <i>Many people at the meeting were from West Gaua. They were asked how they felt about being hosted in the local community. They advised that they were being looked after well. Their main problem was lack of ability to earn an income. This means that they have no money for soap and clothes or the materials that children need for school such as books, pencils, calculators, etc.</i></li> <li>• <i>People indicated that (after seeing how crowded a camp could be) they would prefer to be hosted if an evacuation to Vanua Lava is required. However several spoke about their concerns for 'nagamal' (witchcraft). Apparently many people died after returning from Vanua Lava following the previous evacuation in 1973.</i></li> <li>• <i>It was agreed that one way to reduce the threat of nagamal would be for the Chiefs of Gaua to visit the Chiefs on the other islands to ensure respect for IDPs.</i></li> <li>• <i>People wanted to know if they would be given land on the other islands.</i></li> <li>• <i>Many people wanted to know more about what was happening with the volcano. They suggested that there was need for a bigger awareness effort among the community.</i></li> <li>• <i>It was suggested that the health centre was significantly under-resourced, with only one nurse and not enough medicines. There was a report that a baby had died five days previously because there was insufficient medicine at the health centre.</i></li> <li>• <i>People are still being required to pay for school fees, even though they were told that fees would not be required. The mission schools still require fees to be paid. People cannot afford the fees because they have no means of earning an income.</i></li> <li>• <i>The EOC is now also charging people from West Gaua for the cost of fuel to visit their villages.</i></li> </ul>			

Date	Place	Activity	Present
<ul style="list-style-type: none"> <li>Many people from West Gaua still haven't finished preparing their gardens (because they expect to be able to return to their villages). This has put more pressure on the host communities to find food for the IDPs and there is insufficient food to go around as a result.</li> </ul>			
31 May 2010	Aver	Meeting	Assessment Team, Family from Aver
<p>An informal meeting was held with people from one of the families at Aver, with the following outcomes:</p> <ul style="list-style-type: none"> <li>People have separate houses for sleeping and for cooking/eating. There should be at least 2metres between the sleeping and cooking shelters to reduce the risk of fire.</li> <li>A typical arrangement for a group of families is to provide around 2 toilets for 3 families.</li> <li>Each family needs at least 0.5 to 1.5 Ha of land to develop a garden to provide enough food for daily needs.</li> <li>Additional area for coconut plantations is needed to earn a living from copra.</li> <li>Winds have blown ash from the volcano onto Aver only once so far this year. This was in February.</li> <li>When people were evacuated to Vanua Lava in 1973 everyone was given a week's notice to prepare.</li> </ul>			
31 May 2010	Aver/Lembot	Meeting with Gaua Chiefs & Senior representatives	Assessment Team, Gordon Vanai, Endgel Weding, Chief Victor Wetais, Eric Sheprack (President Torba Province), Silas Marav, Peter Tar (Deputy Principal Losalava Secondary School), Frank Wemen, Harry Leui, Paul Vulgar, Simon Turlens, Noellem Kaban, Sylvester Mera, John Wendor, Noel Wuwut, Adria Aris, Chief Edwin Justin
<p>Following an in-depth discussion of the need to enforce 'no-go' zones on Gaua, the meeting was advised about the objectives of the assessment. The following issues were discussed:</p> <ul style="list-style-type: none"> <li>Three chiefs at the meeting were from villages that were hosting people from West Gaua. They noted that there have been challenges in managing the task, but all of the challenges had been overcome; every IDP family has its own house, water systems are adequate, things are generally OK.</li> <li>The issue of problems with the IDP livelihoods was raised, specifically regarding the need to purchase drums for heating copra. If the IDPs were provided with drums (cost around 700 VuV each then this would allow some families to start earning an income.</li> <li>Apparently the water supply at Lemoka is inadequate – a survey was recently carried out but nothing has been done as yet.</li> <li>Issues of nagamal were again raised. It was agreed that the Chiefs of Gaua should go to Vanua Lava and the other Banks islands as soon as possible. At least 4 chiefs should go on this trip, the President of the Gaua Island Council of Chiefs, the Chairmen of the two Area Councils and Chief Victor.</li> </ul>			



Date	Place	Activity	Present
<ul style="list-style-type: none"> <li>• There was a suggestion that Church representatives should accompany the Chiefs on the above trip.</li> <li>• The problem of the requirement to continue to pay school fees was raised.</li> <li>• Concerns were expressed about the ability of the health centre to respond to health issues.</li> <li>• There is an urgent need for an increased awareness campaign for all the people on Gaua regarding the status of the volcano, and the arrangements during and after evacuation.</li> <li>• The Deputy Principal of the Losalava Primary School advised his concern that older children (age 11 to 16) were becoming harder to manage, with many refusing to do as they're told, not completing homework, not attending classes, etc. He related this to the continuing day-to-day uncertainty about the volcano erupting and the need for evacuation to other islands.</li> </ul>			
31 May and 1 June 2010	Lembal and Kaska	Inspection	Assessment Team
<p>The assessment team travelled south to Lembal to inspect the proposed evacuation site. Access for water craft (including barges) at all tides was found to be good. Unfortunately the closest available shelter for a large number of people is approximately 1 kilometre away from the site at the Aworor School. Additional provision for water will also be required for assembled evacuees near the site. There is no first aid post at Lembal.</p> <p>An inspection was also carried out at the proposed evacuation site at Kaska Bay. Good access at both high and low tides is available. A small scramble is required for people to get down to the water level, but this should not represent a major challenge. Good shelter and water are available at the Santa Maria School, approximately 500 metres from the site. There is no first aid post at Kaska.</p>			
1 June 2010	Aver/Lembot	Meeting	Assessment Team, Aver and Lembot communities, approximately 60 adults and youth (not including young children)
<p>A meeting was held with representatives of the Aver and Lembot communities. The following matters were discussed:</p> <ul style="list-style-type: none"> <li>• The meeting was advised of the objectives of the assessment. People were specifically asked to help the team to develop plans for a possible IDP camp on Vanua Lava.</li> <li>• A shelter area corresponding to Sphere standards was drawn on the floor of the meeting hall (approximately 5m x 4m). People advised that this could be (just) OK for 5-6 people to sleep but was much too small to allow cooking.</li> <li>• All agreed that a separate cooking area about 3m x 2m would be needed and there should be at least 3 metres between the sleeping shelter and the cooking shelter.</li> <li>• There was also significant concern over the need for the family plots to be placed so close together in a planned camp. People agreed</li> </ul>			

Date	Place	Activity	Present
<p><i>that community hosting is a much better option than a camp arrangement.</i></p> <ul style="list-style-type: none"> <li>• <i>There was agreement that people would be able to make their own shelters, provided that the following materials and equipment were provided: (This list also includes suggestions for household and livelihood NFIs.)</i> <ul style="list-style-type: none"> <li>○ <i>Shelter NFIs</i> <ul style="list-style-type: none"> <li>▪ <i>Tarpaulins for roof, Hammer, Nails, Saw, Rope, Knife, Axe, Shovel, Spade, Crowbar, Pick</i></li> </ul> </li> <li>○ <i>Household NFIs</i> <ul style="list-style-type: none"> <li>▪ <i>Lighter, Torch + long life battery, Sleeping mat, Pillows, Kitchen Set (incl. 4 pots and kettle), Hygiene Kit, Mosquito net, Water containers (20l and 10l), Dish for washing, Bucket, Crossed wires for fire grill, Needle and thread, Washing brush</i></li> </ul> </li> <li>○ <i>Livelihood NFIs</i> <ul style="list-style-type: none"> <li>▪ <i>Chicken wire, baking tins, fishing nets/lines, copra drums</i></li> </ul> </li> </ul> </li> <li>• <i>Problems of paying school fees were raised, specifically noting that the church school still requires fees to be paid.</i></li> </ul>			
1 June 2010	Lemanman	Meeting	Assessment Team, Lemanman community, approximately 50 adults and youth (not including young children)
<p><i>A meeting was held with representatives of the Lemanman community. The following issues were discussed:</i></p> <ul style="list-style-type: none"> <li>• <i>The meeting was advised of the objectives of the assessment. People were specifically asked to help the team to develop plans for a possible IDP camp on Vanua Lava.</i></li> <li>• <i>It was noted that 16 families from West Gaua are living with the Lemanman community.</i></li> <li>• <i>People generally concurred with the conclusions of the meeting with the Aver and Lembot communities (see above); especially indicating significant concern about the close spacing of families in a planned camp situation. One man asked “why are you putting us in a jail?”.</i></li> <li>• <i>It was noted that the people from West Gaua are not making their gardens – putting pressure on the whole community for food security.</i></li> <li>• <i>One man from West Gaua noted that “I only have half a garden and have only built half a house while I have been here. Now you tell me that I might have to go to another island. Why should I do anything?” This clearly illustrates the urgent need for the people on Gaua to receive psychosocial support to assist them to cope with the daily uncertainty from living with the volcano.</i></li> <li>• <i>A number of people noted that both the IDPs from West Gaua and the host communities are not being properly looked after – promises are being broken, they have to pay for school fees, they are not being provided with food, health care is very poor and they have no access to their properties in West Gaua. No assistance is being given to assist people to earn some money. So they asked why they should trust the Government to look after them if they are required to evacuate to another island. People insist that they have been embarrassed by the way the Police have treated them.</i></li> </ul>			

<b>Date</b>	<b>Place</b>	<b>Activity</b>	<b>Present</b>
1 June 2010	Lembot/Namasari	Inspections of Health Centre and School	Assessment Team
<p><i>The clinic on Gaua has 2 staff. The nurses that worked (on rotation) at the EOC have long since left (the EOC clinic got merged with the Gaua clinic). The clinic is short on medication with the Torba Health Officer in charge reluctant to process requests for medication outside normal procedures. The nurse indicated that if the Health Officials told her to relocate, she would do so.</i></p> <p><i>School: School functioning ok but could use some improvements. Buildings can be used in case of emergency. Students can continue their studies at Sola if the facilities there are expanded.</i></p>			
2 June 2010	Gaua, EOC	Meeting	Assessment Team, EOC Officers, Geohazards, Chief Victor, SG Torba Provincial Government
<p><i>A final briefing session was held at the EOC to review the findings from the meetings and inspections on Gaua. Geohazards provided an update on the status of the volcano – advising that there has been no significant change in status from that previously advised.</i></p> <p><i>It was agreed that there was an urgent need to increase the level of awareness efforts for the Gaua communities, as well as delivery of psychosocial counseling.</i></p> <p><i>The proposed tour by the Chiefs of Gaua to the other Banks Islands to instigate development of a community hosting strategy as a core component of evacuation planning was also agreed as an action that should take place as soon as possible.</i></p>			
2 June 2010	Gaua Airstrip	Meeting	Assessment Team, Approximately 50 adults and youth at the Gaua Airstrip shelter
<p><i>An opportunity was taken to address a large gathering of people at the airstrip (while the team was waiting for flight back to Port Vila) and facilitate improved awareness. People were advised that:</i></p> <ul style="list-style-type: none"> <li>• <i>The volcano is still active with ash plumes and there is no sign at this stage that conditions may improve</i></li> <li>• <i>A contingency plan is being prepared for evacuation of Gaua in the event that conditions deteriorate, and</i></li> <li>• <i>Evacuation points have been identified at Losalava, Kaska, Lembal and Biam/Kuro.</i></li> </ul>			

## APPENDIX 2: GENERAL SITE SELECTION CRITERIA

Criteria for Site Selection	Description
<b>Political and Security Issues</b>	Proximity to border clashes, political insecurity, terrorist attacks, concern for political destabilisation and other impacts on host communities
<b>Natural Hazards</b>	Exposure to tidal waves, flooding, earthquake, landslide, active volcano
<b>Social, Legal and Cultural Issues</b>	Local concerns, impacts on farmers and herders. Why is nobody already using the land? Formal and traditional land ownership. Issues for seasonal use – for farming/grazing. Distance to existing settlements.
<b>Services</b>	Proximity to services: markets, health, education, communications, electricity
<b>Area of Site</b>	Needs to be enough space for the planned population, with at least 45m <sup>2</sup> per person. For 20,000 people this requires a site of 90Ha (900,000m <sup>2</sup> ) or (950mx950m). This is meant to include land for necessary infrastructure but specifically excludes land for agriculture (crops and livestock). Also no allowance for recreation areas, cemeteries, future expansion as a result of population growth and non-usable space (physical features).
<b>Access</b>	Provision of all-weather access to the site for food, fuel, shelter materials, markets. Bridges and water crossings accessible in wet seasons, etc. Where all-weather access not available, additional area may be required for storage.
<b>Topography</b>	Gentle slopes – 1% min and 5-6% maximum with natural drainage. Orientation of slope relative to proposed infrastructure and land use. Avoid swamps, depressions, riverbanks, lake shores.
<b>Climate</b>	Sun angles, prevailing winds, average temperatures, exposure to frosts
<b>Soil Type / Geology</b>	Permeable, sandy soils. Avoid fine clays, black cotton soils, underlying rock masses. Capability of supporting agriculture. Suitability for pit latrines. Suitability for road and building construction. Water table not high.
<b>Water Source</b>	Close enough to avoid tankering. Sufficient water of reasonable quality readily available all seasons. (Water table implications for water source as well as sanitation issue)
<b>Vegetation</b>	Cooking fuel, shelter construction materials, grazing potential, shade, protection for soil erosion, source of shade, reduce exposure to dust, wind. Possible grazing for livestock.
<b>Fuel Wood</b>	Second most important day-to-day need after water. Ready availability a key factor. (Competition for fuel wood may cause friction if site too near to existing settlements.) Protection issues for collection.
<b>Construction materials</b>	Availability of materials for construction: wood, stone, sand, other customary shelter materials
<b>Environmental Impact</b>	Potential for degradation of natural environment through rapid deforestation, soil erosion, water contamination. Litter. Can effects be mitigated?
<b>Environmental Health</b>	Potential for malaria, other health issues. Impacts on water sources downstream
<b>Other</b>	Any other dangers or shortcomings?

### APPENDIX 3: BoQ Water & Sanitation

		Name	Unit	No	Unit Cost (VuV).	Cost (VuV)	Cost (A\$)	Subtotal (A\$)	Subtotal (VuV)
<b>SOLA</b>	<b>Site Preparation</b>	Cut-off drains (0.25 m3/m)	m	500	500/m	250,000	2,860		
		Soaks for drains - Cut	m3 (say 3 soaks)	9 (3 x 3)	1000/m3	9,000	103		
		Soaks for drains - Coral fill	m3	9	2000/m3	18,000	206		
		Clear remaining site (bulldozer)	Ha	1.2	300000/Ha	360,000	4,118		
		Labour	hr	100	150/hr	15,000	172		
		Fill swampy area	Ha	0.5	300000/Ha	150,000	1,716		
								\$9,174	VUV 802,000
	<b>Power/Lighting</b>	5 m bush poles	Item	50	1000	50,000	572		
		Fluoro light (36 Watt)	Item	50	15 AUD	65,565	750		
		Wire (4 mm)	100 m (roll)	5	1,200 AUD	524,520	6,000		
		Wire (2.5 mm)	100 m (roll)	4	800 AUD	279,744	3,200		
		Wire (1.5 mm)	100 m (roll)	1	650 AUD	56,823	650		
		Generator 6,000 Watt (Prefer Yamaha).	Item	1		335,588	3,839		
		Screws and Cable clips.	Item	100		5,682	65		
		Yam spade and shovels	Item	6 (3 of each)		27,974	320		
		Nails (5")	Item	200		8,742	100		
		Element protection/water-proofing (!??)	item	50		26,226	300		
		SwitchBoard with/2 Double ball circuit breakers 2 x 16, 2 x 20 amps	Item	1		218,550	2,500		

	<b>Construction Labour</b>	- manpower(ten man team)	man hour	300	1000	300,000	3,432		
		- supervisor	man hour	30	1500	45,000	515		VUV
						1,944,415	22,242	\$22,242	1,944,415

		Name	Unit	No	Unit Cost (VaV).	Cost (Vatu - VuV)	Cost (AUD)	Subtotal (AUD)	Subtotal (VuV)
	<b>Latrine, 2 PER BLOCK</b>	Squat Plate	Item	2	5420	62	124		
		Bush Poles	15 (say)	15	1000	15,000	172		
		Timber for floor	item	40	1000	40,000	458		
		Nails	item	1	69936	800	9		
		Labour - Excavation	m3 soil	5	1000/m3	5,000	57		
		Labour - Superstructure Construction	man hours	8	1,000 VaV / 8 hrs	1,000	11		
		Plastic sheeting	m3	10	\$1.1 AUD/m2	9,616	110		
		pvc riser (vent pipe) 80 mm 3 m	item	1		2,797	32		
		Screen material (for pipe)		1		874	10		
		Concrete (vent pipe)	kg	5		437	5		
			TOTAL LATRINE BLOCKS	4		75,587	988	\$3,952	VUV 302,348
	<b>Latrine, 4 PER BLOCK</b>	Squat Plate	Item	4	\$62 AUD	21,680	248		
		Bush Poles	item	15	1000	15,000	172		
		Timber for floor	item	80	1000	80,000	915		
		Nails	item	1	0	800	9		
		Labour - Excavation	m3 soil	10					
		Labour - Superstructure Construction	man hours	16	1,000 VaV / 8 hrs	2,000	23		

		Plastic sheeting	m3	20	\$1.1 AUD/m2	19,232	220		
		pvc riser (vent pipe)	item	1		2,797	32		
		Screen material (for pipe)		1		874	10		
		Concrete (vent pipe)	kg	5		437	5		
			TOTAL LATRINE BLOCKS	8		142,821	1,634	\$13,070	VUV 1,142,570

		Name	Unit	No	Unit Cost (VaV).	Cost (Vatu - VuV)	Cost (AUD)	Subtotal (AUD)	Subtotal (VuV)
	<b>Wash rooms (double).</b>	Excavation for soak	m3 soil	4	1000/m2	4,000	46		
		Coral fill for soak	m3	4	1000/m3	4,000	46		
		Plastic sheeting	m3	10	\$1.1 AUD/m3	9,616	110		
		Bush Poles	item	15	1000	15,000	172		
		Labour - Superstructure Construction	hrs	16	1,000 VaV / 8 hrs	2,000	23		
			TOTAL WASHROOMS	20		34,616	396	\$7,920	VUV 692,324
	<b>Solid Waste</b>								
		44 Gallon (210 L) drums	unit (each cut in half for use as container)	13	7,000 VuV	91,000	1,041		
		Deliver drums.	item	1		8,742	100		
		Protective equipment;							
		Over-alls	item	4	1000	4,000	46		
		Gloves (pair)	item	4	1000	4,000	46		
		Excavate disposal site.	item	1		218,550	2,500		
			TOTAL SOLID WASTE	1		326,292	3,732	\$3,732	VUV 326,292

	<b>Water (Camp)</b>	62 mm HDPE pipe class 100	100 metre roll (?)	9	690 AUD	542,878	6,210		
		25 mm HDPE pipe class 100	200 metre roll	2	344 AUD	60,145	688		
		20 mm (self closing, if available) taps.	item	14	15 AUD	18,358	210		
		20 mm Gal pipe to taps	2 m	7	20 AUD	12,239	140		
		Miscellaneous fittings	item	1		43,710	500		
		9 m3 "Tuffa" or similar pre-made tank [Chlorination tank]	item	1		201,066	2,300		
		Clearing and grubbing - compacting tank base	m2	30	500	15,000	172		
		62 mm isolation valve	item	3	60 AUD	15,736	180		
		(pipe sections and overflow pipe from main)	item	1		13,987	160		
		If available float/TWL activated close valve.	item	1		21,855	250		
		Trench excavation	m	1000	150 V/metre	150,000	1,716		
		Cement - spring catchment/tapstands	25 kg bag	10	20 AUD	17,484	200		
		Labour	hrs	300	150/hr	45,000	515		
			TOTAL WATER	1		1,112,458	12,725	\$12,725	VUV 1,112,458

		Name	Unit	No	Unit Cost (VaV).	Cost (Vatu - VuV)	Cost (AUD)	Subtotal (AUD)	Subtotal (VuV)
	<b>Rainwater tank (admin bld).</b>	5 m3 "Tuffa" or similar pre-made tank	item	1	2000 AUD	174,840	2,000		
		Nails - 3 " standard	item	1	15 AUD	1,311	15		



		Guttering (Gal)	6 m	5	28 AUD	12,239	140		
		PVC Internal downpipe, elbow x 2, 80 mm	Item	3	10 AUD	2,623	30		
		PVC transfer pipe.	3 m length	2	32 AUD	5,595	64		
		Two standard taps, lockable	item	2	15 AUD	2,623	30		
		Tanks base, elevated compacted earth with metal iron sheet metal walls and concrete pad OR timber support base.	item			87,420	1,000		
			TOTAL WATER	1		286,650	3,279	\$3,279	VUV 286,650

		Name	Unit	No	Unit Cost (VaV).	Cost (Vatu - VuV)	Cost (AUD)	Subtotal (AUD)	Subtotal (VuV)
<b>GAUA</b>	<b>Rainwater Collection System, Lembal</b>								
		5 m3 "Tuffa" or similar pre-made tank	item	1	2000 AUD	174,840	2,000		
		Roofing Iron 1 m x 3 m	unit	10	2033	20,330	233		
		Nails - roofing	item	1	15 AUD	1,311	15		
		Nails - 3 " standard	item	1	15 AUD	1,311	15		
		Guttering (Gal)	6 m	5	28 AUD	12,239	140		
		PVC Internal downpipe, elbow x 2, 80 mm	Item	3	10 AUD	2,623	30		
		PVC transfer pipe.	3 m length	2	32 AUD	5,595	64		
		1.1 plastic tank, Tuffa or similar	unit	1	400 AUD	34,968	400		
		Bush-poles (roof support).	item	18	1000	18,000			
		Two standard taps, lockable	item	2	15 AUD	2,623	30		

		Tanks base, elevated compacted earth with metal iron sheet metal walls and concrete pad OR timber support base.	item			87,420	1,000		
			TOTAL WATER	1		361,260	3,927	\$3,927	VUV 361,260

		Name	Unit	No	Unit Cost (VaV).	Cost (Vatu - VuV)	Cost (AUD)	Subtotal (AUD)	Subtotal (VuV)
<b>VATOP</b>	<b>Site Preparation</b>	Cut-off drains (0.25 m3/m)	m	1500	500/m	750,000	8,579		
		Soaks for drains - Cut	m3 (say 3 soaks)	9 (3 x 3)	1000/m3	9,000	103		
		Soaks for drains - Coral fill	m3	9	2000/m3	18,000	206		
		Clear site (bulldozer)	Ha	6	300000/Ha	1,800,000	20,590		
		Labour	hr	600	150/hr	60,000	686		
		Fill swampy area	Ha	0.25	300000/Ha	75,000	858		VUV
			TOTAL	1		3,216,270	36,379	\$36,379	3,216,270
	<b>Water</b>	62 mm HDPE pipe class 100	100 metre roll (?)	20	690 AUD	1,206,396	13,800		
		40 mm HDPE pipe class 100	150 metre roll	2	522 AUD	91,266	1,044		
		20 mm (self closing, if available) taps.	unit	23	15 AUD	30,160	345		
		20 mm Gal pipe to taps	2 m	16	20 AUD	27,974	320		
		Miscellanaous fittings	item	1	1000 AUD	87,420	1,000		
		5 m3 "Tuffa" or similar pre-made tank [Chlorination tank]	item	2	2000 AUD	349,680	4,000		
		Clearing and grubbing - compacting tank base	item			131,130	1,500		
		62 mm isolation valve	item	5	45 AUD	19,670	225		

		(pipe sections and overflow pipe from main)	item	1		17,484	200		
		If available float/TWL activated operating valve.	item	2		43,710	500		
		Trench excavation	m	2000	50 V/metre	100,000	1,144		
		Cement - spring catchment/tapstands	25 kg bag	16	20 AUD	800	320		
			TOTAL	1		2,105,690	24,398	\$24,398	VUV 2,105,690
	<b>Solid Waste</b>								
		Transport drums equipment from Sola	Item			131,130	1,500		
		Excavate disposal site.	item	1		218,550	2,500		
			TOTAL SOLID WASTE	1		349,680	4,000	\$4,000	VUV 349,680
	<b>Latrines</b>	Double latrines		30		75,587	988	\$29,640	VUV 2,267,610
	<b>Washrooms</b>	Double washrooms		30		34,616	396	\$11,879	VUV 1,038,486
	<b>Power/Lighting</b>	Relocate and re-house electrical infrastructure from Sola	Item	1		655,650	7,500	\$655,650	VUV 7,500

## APPENDIX 4: IFRC SHELTER KIT

 International Federation of Red Cross and Red Crescent Societies			
<b>THE SHELTER KIT</b>			
Specificarions	Quantity per kit	Units	Indicative picture
<b>TARPAULINS</b> , woven plastic, width 4m, length sheet of 6 m. Weight 170gm <sup>2</sup> +/- 5%, plus 10% for the reinforcement bands under ISO 3801. HSHETARPW406 (packed separately from Tools below)	2	pc	
<b>ROPE</b> , polyester, diameter: 12 mm, 30m, in roll, preferred colour: black / dark green	1	roll	
<b>HAND SAW</b> , total length 750mm, for wood. Good Quality, tempered, hardened and set teeth. Unbreakable handle. Blade covered by protective cardboard (*Item code: ETOOSAWSW400 but length 750mm)	1	pc	
<b>ROOFING NAILS</b> , Capped, with attached rubber washer 75mmx3mm (3"), twisted and galvanised preferred, to be supplied in sealed bag.	0.5	kg	
<b>SHOVEL</b> , head only is hot forged carbon steel, hardened and tempered. HRC 35 min to 48 max. Supply with handle. With pointed head. Total length 100 to 110cms	1	pc	
<b>HOE</b> , head only is 230 x 175mm, 1,360g in forged steel, supply with varnished hard wood handle length approx. 110-120cm, supply blade covered by cardboard (*Item code: RAGRTOOLHOE1)	1	pc	
<b>MACHETE</b> , wooden handle. Blade sharpened for intended use supply blade covered by cardboard (*Item code: RAGRTOOLMAC1)	1	pc	
<b>TIN SNIPS</b> , for cutting tin roofing sheets, safety latch, good quality (*Item code: ETOOCUTTSH1)	1	pc	
<b>NAILS</b> , 0.5 kg Steel, 3 inches long (75 x 3mm), to be supplied in sealed bag.	0.5	kg	
<b>TIE WIRE</b> , Diameter 2mm, 6m long in roll (*Item code: EHDWWIRETR11)	1	roll	
<b>CLAW HAMMER</b> , Weight: 0.750 kg/pc. Replaceable Wooden handle. Forged head, not cast. Good Quality	1	pc	
<b>WOVEN SACK</b> , of synthetic material containing above items as kit. colour: white or gray, closed with string or wire. With International Federation logo in red	1	pc	

Table 20: IFRC shelter kit cost & volume

Item	Description	Cost	Volume	Qty/Family
Shelter Kit	Two 4x6m tarpaulins, tools and fixings	CHF 60	0.06m <sup>3</sup>	1
<b>Total for Gaua Population</b>	Based on 2700 people	CHF30K	29.4m <sup>3</sup>	

# APPENDIX 5: IFRC SHELTER ITEMS

Table 21: Standard IFRC Shelter Items from Emergency Catalogue with indicative prices

<p><b>TARPAULINS</b> 2000 gsm, 2000 gsm, with or without fly, 4x6m (length) x 3.0m (width) for Shelter Kit and 4x6m (length) x 3.0m (width) for Shelter Kit (with fly)</p> <p><b>ROPE</b> polypropylene, diameter 12mm, 12m, in roll, polypropylene black/white</p> <p><b>HAND SAW</b> 40cm length, 15cm wide, for metal, wood, plastic, for general use</p> <p><b>ROOFING NAILS</b> 30mm length, 3mm diameter, 1000 pieces</p> <p><b>SHOVEL</b> 100cm length, 15cm wide, for general use</p> <p><b>HOE</b> 100cm length, 15cm wide, for general use</p> <p><b>MACHETE</b> 30cm length, 15cm wide, for general use</p> <p><b>TIN SNIPS</b> 15cm length, 15cm wide, for general use</p> <p><b>NAILS</b> 30mm length, 3mm diameter, 1000 pieces</p> <p><b>TIE WIRE</b> 15cm length, 15cm wide, for general use</p> <p><b>CLAW HAMMER</b> 30cm length, 15cm wide, for general use</p> <p><b>WOVEN SACK</b> 15cm length, 15cm wide, for general use</p>		<p>SHELTER KIT, Two 4x6m tarpaulins, tools and fixings</p>	<p>CHF 60</p>	<p>20kg</p>	<p>0.06m<sup>3</sup></p>
	<p>TARPAULINS, woven plastic, 4 x 6 m, white/white, piece</p>	<p>CHF 15,00</p>	<p>4.6kg</p>	<p>0.01m<sup>3</sup></p>	
	<p>FAMILY, 16 m<sup>2</sup> double fly with ground sheet Polyester and cotton blend</p>	<p>CHF 310</p>	<p>55kg</p>	<p>0.28m<sup>3</sup></p>	
	<p>DISPENSARY, 5.5 x 5m = 27.5m<sup>2</sup> Polycotton</p> <p>Setting up requires 6 persons, and take 30 min</p>	<p>CHF 980</p>	<p>130kg</p>	<p>0.38m<sup>3</sup></p>	
	<p>MULTIPURPOSE, 7.5x6m = 45m<sup>2</sup>, Polycotton</p> <p>Setting up requires 8 persons, and takes 2 hours</p>	<p>CHF 2,500</p>	<p>194kg</p>	<p>0.68m<sup>3</sup></p>	

	<p>HOSPITAL, Rubbhall  5.5x16m = 88m<sup>2</sup>  PVC coated polyester  steel frame</p> <p>Setting up requires 8  persons, including one  technician and takes ½ day</p>	<p>CHF 5,000</p>	<p>850kg</p>	<p>1.7m<sup>3</sup></p>
	<p>TENT, WAREHOUSE,  10x24x3.35m=240m<sup>2</sup>  Cover made of PVC coated  polyester  steel frame</p> <p>Setting up requires 12  persons, including one  technician, and takes 2  days.</p>	<p>CHF 17,000</p>	<p>2660kg</p>	<p>5m<sup>3</sup></p>

## APPENDIX 6: MATERIAL LIST FOR TARPAULIN STRUCTURES

Material List for 3.5 x 4m Sleeping Hut

Timber (includes 500mm allowance for buried posts)

Elements	Length of timber	Size of Bush Pole	Quantity of timber for one shed
long uprights to support ridge	3.3m each	90mm Ø	2
corner posts	2.3m each	70mm Ø	4
uprights for sides	2.3m each	50mm Ø	2
diagonal bracing for ends	2.5m each	30mm Ø	4
diagonal bracing for sides	2.7m each	30mm Ø	4
ring beam: sides	4.0m each	50mm Ø	2
ring beam: ends	3.5m each	50mm Ø	2
ridge beam	4.0m each	40mm Ø	1
rafters	2.0m total	40mm Ø	6
tie beams	3.5m each	50mm Ø	3
diagonal bracing in truss	1.0m each	30mm Ø	6
cross bracing between rafters	2.8m each	30mm Ø	8
spacers	4.0m each	30mm Ø	3
batons for sides	4.0m total	30mm Ø	4
batons for ends	3.5m total	30mm Ø	4
purlins	2.0m total	30mm Ø	26
Total			81

### Fixing

Frame Material	Fixing	Quantity
For Timber Poles	Rope	100m

### Plastic Sheeting

Plastic Sheeting	Quantity	Size of Piece	Length of Plastic Required
roof	1	4m high x 4m long	4x4m
sides	2	1.8m high x 4m long	4x4m
Total			2x6x4m

### Thatching

Natangura	Quantity
1.8m Lengths	80

### Walls

Bamboo Matting	Quantity	Size
Side Walls	2	1.8m high x 4m wide
End Walls	2	1.8m high x 3.5m wide
Gable	2	1m high x 1m wide

## Material List for 6 x 7m Shade Structure

### Timber (includes 500mm allowance for buried posts)

Elements	Length of timber	Size of section		Quantity of timber members for one structure
		Sawn Timber	Bush Pole Equivalent	
long uprights to support ridge	3.2m each	50x100mm	120mm Ø	4
corner posts	2.5m each	100x100mm	150mm Ø	4
uprights for sides	2.5m each	50x100mm	100mm Ø	6
uprights for ends	3.0m each	50x100mm	100mm Ø	6
diagonal bracing for ends	2.5m each	50x100mm	50mm Ø	4
diagonal bracing for sides	2.4m each	50x100mm	50mm Ø	4
ring beam: sides	3.5m each	50x100mm	70mm Ø	4
ring beam: ends, 2 made from	3.1m each	50x100mm	70mm Ø	2
ridge beam, made from 2 pieces:	3.5m each	50x100mm	70mm Ø	2
rafters	3.5m each	50x100mm	50mm Ø	10
tie beams, each made from 2 pieces:	3.1m each	50x100mm	50mm Ø	6
diagonal bracing in truss	1.7m each	50x100mm	40mm Ø	10
cross bracing between rafters	3.8m each	50x100mm	40mm Ø	8
spacers	1.7m total	small (off-cuts)	40mm Ø	12
			Total	106

### Fixing

Frame Material	Fixing	Quantity	
For Sawn Timber	70mm long nails	500	
For Timber Poles	Rope	500m	

### Plastic Sheeting

Plastic Sheeting	Quantity	Size of Piece	Length of Plastic Required
Roof of Structure	2	7x4m	14x4m
		total	14x4m



## Material List for 6 x 7m Reception Structure

### Timber (includes 500mm allowance for buried posts)

Elements	Length of timber	Size of section		Quantity of timber members for one shed
		Sawn Timber	Bush Pole Equivalent	
long uprights to support ridge	3.2m each	50x100mm	120mm Ø	4
corner posts	2.5m each	100x100mm	150mm Ø	4
uprights for sides	2.5m each	50x100mm	100mm Ø	6
uprights for ends	3.0m each	50x100mm	100mm Ø	6
diagonal bracing for ends	2.5m each	50x100mm	50mm Ø	4
diagonal bracing for sides	2.4m each	50x100mm	50mm Ø	4
ring beam: sides	3.5m each	50x100mm	70mm Ø	4
ring beam: ends, 2 made from	3.1m each	50x100mm	70mm Ø	2
ridge beam, made from 2 pieces:	3.5m each	50x100mm	70mm Ø	2
rafters	3.5m each	50x100mm	50mm Ø	10
tie beams, each made from 2 pieces:	3.1m each	50x100mm	50mm Ø	6
diagonal bracing in truss	1.7m each	50x100mm	40mm Ø	10
cross bracing between rafters	3.8m each	50x100mm	40mm Ø	8
spacers	1.7m total	small (off-cuts)	40mm Ø	12
batons for sides	3.5m total	small (off-cuts)	40mm Ø	12
batons for ends	1.55m total	small (off-cuts)	40mm Ø	12
			Total	82

### Fixing

Frame Material	Fixing	Quantity		
For Sawn Timber	70mm long nails	500		
For Timber Poles	Rope	500m		

### Plastic Sheeting

Plastic Sheeting	Quantity	Size of Piece	Length of Plastic Required	
sides of shed (2 bays)	4	3m high x 4m long	12x4m	
ends of shed (2 pieces per end)	4	3m high x 4m long	12x4m	
roof of shed	2	7x4m	14x4m	
		total	38x4m	

## Material List for 6 x 14m Tarpaulin Structure

Timber (includes 500mm allowance for buried posts)

Elements	Length of timber	Size of section		Quantity of timber members for one shed
		Sawn Timber	Bush Pole Equivalent	
long uprights to support ridge	3.2m each	50x100mm	120mm Ø	6
corner posts	2.5m each	100x100mm	150mm Ø	4
uprights for sides	2.5m each	50x100mm	100mm Ø	14
uprights for ends	3.0m each	50x100mm	100mm Ø	6
diagonal bracing for ends	2.5m each	50x100mm	50mm Ø	4
diagonal bracing for sides	2.4m each	50x100mm	50mm Ø	4
ring beam: sides	3.5m each	50x100mm	70mm Ø	8
ring beam: ends, 2 made from	3.1m each	50x100mm	70mm Ø	2
ridge beam, made from 2 pieces:	3.5m each	50x100mm	70mm Ø	4
rafters	3.5m each	50x100mm	50mm Ø	18
tie beams, each made from 2 pieces:	3.1m each	50x100mm	50mm Ø	14
diagonal bracing in truss	1.7m each	50x100mm	40mm Ø	18
cross bracing between rafters	3.8m each	50x100mm	40mm Ø	16
spacers	1.7m total	small (off-cuts)	40mm Ø	24
batons for sides	3.5m total	small (off-cuts)	40mm Ø	24
batons for ends	1.55m total	small (off-cuts)	40mm Ø	12
			Total	178

### Fixing

Frame Material	Fixing	Quantity		
For Sawn Timber	70mm long nails	900		
For Timber Poles	Rope	900m		

### Plastic Sheeting

Plastic Sheeting	Quantity	Size of Piece	Length of Plastic Required	
sides of shed (4 bays)	8	3m high x 4m long	24x4m	
ends of shed (2 pieces per end)	4	3m high x 4m long	12x4m	
roof of shed	4	7x4m	28x4m	
		total	64x4m	

## Material List for 6 x 21m Collective Accommodation Structure

### Timber (includes 500mm allowance for buried posts)

Elements	Length of timber	Size of section		Quantity of timber members for one shed
		Sawn Timber	Bush Pole Equivalent	
long uprights to support ridge	3.2m each	50x100mm	120mm Ø	8
corner posts	2.5m each	100x100mm	150mm Ø	4
uprights for sides	2.5m each	50x100mm	100mm Ø	22
uprights for ends	3.0m each	50x100mm	100mm Ø	6
diagonal bracing for ends	2.5m each	50x100mm	50mm Ø	4
diagonal bracing for sides	2.4m each	50x100mm	50mm Ø	4
ring beam: sides	3.5m each	50x100mm	70mm Ø	12
ring beam: ends, 2 made from	3.1m each	50x100mm	70mm Ø	2
ridge beam, made from 2 pieces:	3.5m each	50x100mm	70mm Ø	6
rafters	3.5m each	50x100mm	50mm Ø	26
tie beams, each made from 2 pieces:	3.1m each	50x100mm	50mm Ø	22
diagonal bracing in truss	1.7m each	50x100mm	40mm Ø	26
cross bracing between rafters	3.8m each	50x100mm	40mm Ø	24
spacers	1.7m total	small (off-cuts)	40mm Ø	36
batons for sides	3.5m total	small (off-cuts)	40mm Ø	36
batons for ends	1.55m total	small (off-cuts)	40mm Ø	12
			Total	250

### Fixing

Frame Material	Fixing	Quantity		
For Sawn Timber	70mm long nails	1300		
For Timber Poles	Rope	1300m		

### Plastic Sheeting

Plastic Sheeting	Quantity	Size of Piece	Length of Plastic Required	
sides of shed (6 bays)	12	3m high x 4m long	36x4m	
ends of shed (2 pieces per end)	4	3m high x 4m long	12x4m	
roof of shed	6	7x4m	42x4m	
		total	90x4m	

## APPENDIX 7: BoQ COMMUNICATION & LOGISTICS

Suggested Improvement to the current police:

No	Item	qty
01	<b>Extension to the current Police sub post which includes;</b> Corrugated Iron sheets, cement, paint, labor, steel, nails and e.g.	1
02	Motor vehicle (1 X 4 wheel drive)	1
03	Motor Vehicle (Motor Bike)	1
04	Portable radios (Walkie talkies)	4
05	Loud Hailer	1
06	Police Tent	2
07	44 X gallon drums of diesel	8
08	44 X gallon drums of gasoline	8
09	Lubrication (No.20 oil)	50 liters
10	Lubrication (2 Stoke oil)	100 Liters
11	Computer set (including printer)	1
12	Portable Generator	1
13	Police reflector (vest)	23
14	Papers & stationeries	
15	Life Jackets	15
16	Fax Machine	1
17	Cooing Stove	1
18	Bottle gas	1
19	Plates	10
20	cups	10
21	Forks/spoons	10

Vatop prepositioned banana boat plus outboard motor is approximately 700,000 plus the shipment cost of 30,000 VT: Total = 730,000 VT.

Vanua Lava transport costs:

Owner/Gov Dept	No of vehicle	Departure point	Mosina Landing (cost p/trip)	Airport Landing Site (Cost per trip)
Public works	1X 4 x 4			
Public Works	1 X tractor			
Jimmy Jones	1 X 4X4	Sola	1,500	1,000
Diocese	2 X 4X4	Sola	1,500	1,000
Health		Sola		
Atkinson	1 X4X4	Sola	1,500	1,000
Total	6 vehicles			

Vanua Lava available banana boats:

Owner/Gov Dept	No of Boat	Passenger Capacity	Estimate Trips Per day to Gaua	Fuel Capacity Per trip	Time	Needed Life-jackets	Commercial boat (cost) p/trip to Gaua VT	Est. Trips To Mota-Lava p/day	Fuel Capacity Per Trip (ltr)	Cost Per Trip	Est. Trip To Mere-Lava	Cost Per trip	Cost per liter fuel
Education	2	7	2	100	2 hrs	15		4	40		200		300
Health	2	7	2	100	2hrs	15		4	40		200		300
Province	1	7	2	100	2	15		4	40		200		300
AOG	2	7	2	100	2	15	35,000	4	40	17,000	200	70,000	300
Police	1	7	2	100	2	15		4	40		200		300
Rural WS	1	7	2	100	2	15		4	40		200		300
Port Patson	1	7	2	100	2	15	35,000	4	40	17,000	200	70,000	300
Patrap	1	7	2	100	2	15	35,000	4	40	17,000	200	70,000	300
NDMO	1	7	2	100	2	15		4	40		200		300
PWD	1	7	2	100	2	15		4	40		200		300
Total	13			2,000		150							

Vanua Lava boats logistics to Gaua:

Owner/Gov Dept	No of Boat	Passenger Capacity	Estimate Trips Per day to Gaua	Fuel Capacity Per trip	Time	Needed Life-jackets	Commercial boat (cost) p/trip to Gaua VT	Cost per liter fuel
Education	2	7	2	100	2 hrs	15		300
Health	2	7	2	100	2hrs	15		300
Province	1	7	2	100	2	15		300
AOG	2	7	2	100	2	15	35,000	300
Police	1	7	2	100	2	15		300
Rural WS	1	7	2	100	2	15		300
Port Patson	1	7	2	100	2	15	35,000	300
Patrap	1	7	2	100	2	15	35,000	300
NDMO	1	7	2	100	2	15		300
PWD	1	7	2	100	2	15		300
Total	13			2,000		150		

Vanua Lava boats logistics to Mota Lava:

Owner/Gov Dept	No of Boat	Passenger Capacity	Est. Trips To Mota Lava p/day	Fuel Capacity Per Trip (ltr)	Cost Per Trip	Cost per liter fuel
Education	2	7	4	40		300
Health	2	7	4	40		300
Province	1	7	4	40		300
AOG	2	7	4	40	17,000	300
Police	1	7	4	40		300
Rural WS	1	7	4	40		300
Port Patson	1	7	4	40	17,000	300
Patrap	1	7	4	40	17,000	300
NDMO	1	7	4	40		300
PWD	1	7	4	40		300
Total	13					

Vanua Lava boats logistics to Mota Lava:

Owner/Gov Dept	No of Boats	Passenger Capacity	Est. number of Trips To Mere-Lava	Cost Per trip	Cost per liter fuel
Education	2	7	1		300
Health	2	7	1		300
Province	1	7	1		300
AOG	2	7	1	70,000	300
Police	1	7	1		300
Rural WS	1	7	1		300
Port Patson	1	7	1	70,000	300
Patrap	1	7	1	70,000	300
NDMO	1	7	1		300
PWD	1	7	1		300
Total	13				

Commercial vessels:

Name Vessel	Type Vessel	Travel Port Vila - Santo	Travel Santo - Gaua	Travel Gaua - Vanua Lava	Passenger capacity	Cost
MV Sabrina	Barge	n/a	11 hrs	4 hrs	50	Vt 118,000/hr
MV Belsaert	?	9 hrs	3 hrs	1hrs	100	Vt 105,000/hr

Available vehicles at Sola:

Owner/Gov Dept	No of vehicle	Departure point	No. of passengers:	Duration round trip (incl. loading off-loading): <b>MOSINA</b>	Mosina Landing Site (cost p/trip)	Duration round trip (incl. loading off-loading): <b>SOLA AIRSTRIP</b>	Airport Landing Site (Cost per trip)
Public works	1X 4 x 4	Sola		1 hr			
Public Works	1 X tractor	Sola					
Jimmy Jones	1 X 4X4	Sola		1 hr	1,500		1,000
Diocese	2 X 4X4	Sola		1 hr	1,500		1,000
Health		Sola		1 hr			
Atkinson	1 X4X4	Sola		1 hr	1,500		1,000
Total	6 vehicles						