O le Nu’u o le Ao:
Polynesian Domestic Archetypes in Auckland.

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Acknowledgements

I wish to thank my supervisor Mike Austin for his patience, encouragement and inspirational speeches. My roomies Pete and Sue, sorry about the mess. My Mum, Keith, Sam and Cameron for being so supportive and most importantly my beautiful daughter Maia who I will spend more time with now.
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Abstract

This project starts with the assumption based on personal experience, that Pacific Islanders often think differently to Pakeha New Zealanders. This leads to the question: Why do Polynesian families not quite fit into our houses? This project considers the different attitudes of Polynesian families to domesticity and space.

Auckland is the largest Polynesian city in the world with every Pacific island nation represented. Many live in social housing situations. Can their spatial assumptions, attitudes and domestic ideologies be introduced and integrated into the provision of housing? Would this improve the fit into New Zealand society? This paper isolates and compares four aspects of domesticity, Dwelling, Site, Community and Ownership. The thesis investigates one housing development in particular using the site as a foundation for a new proposal. The proposal is a design in which Polynesians are able to inhabit urban Auckland in a way, which is more suited to a Polynesian worldview. The potential benefits of this are increased home ownership, a feeling of belonging to the larger society, and a more young Polynesians fulfilling their potential in New Zealand.

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Fig.1 Princess Te Puea outside a hybrid house built on a Land Development Scheme in Ngaruawahia Tanira Kingi. 'Ahuwhenua – Māori land and agriculture', Te Ara - the Encyclopedia of New Zealand, updated 27-Sep-11 URL: http://www.TeAra.govt.nz/en/ahuwhenua-maori-land-and-agriculture/2/2

Rationale

Christian Norberg Schulz proposes that architecture’s primary functions are to “orient” and “identify”. He says that architecture tells us where we are and who we are.² He goes on to describe the Non-Place “If a place can be defined as relational, historical and concerned with identity, then a space which cannot be defined as relational, or historical, or concerned with identity will be a non-place.”³ From my personal observation, as a member of Samoan culture there appears to be a distinct difference between the way that European and Polynesians define home. This leads to very different aesthetic and practical ideals, which are particularly apparent when these cultures are forced to live alongside one another. The imposition of European culture has all but eliminated the traditional Maori architecture and manner of living in New Zealand. However in other islands of the Pacific such as Samoa and Tonga they still retain their traditional village plan and way of life. Polynesians who have retained the majority in islands such as Samoa and Tonga, have had a far less unsettling transition into modernity when compared to Maori in New Zealand. This has enabled them to integrate European technology into their own way of living and building instead of the reverse. Although there are many recognisable foreign architectural elements present in modern villages; it could be argued that most European elements that have been integrated into Samoan architecture have been adopted by aesthetic choice, ease of use and availability instead of through colonial pressure. The result is that this has allowed architecture to become hybridised.

This investigation is about whether a similar form of hybridised architecture can be utilised in New Zealand in an urban situation.

The possible benefits of this proposal are an innovative method of land ownership

3 Ibid.
and house design more aligned to the extended Polynesian family. It is suggested that through the building process Polynesians are able to express their own identity and not be forced, through legislation, to assimilate to the standard western aesthetic generally accepted as “normal” in New Zealand. In New Zealand an early example of attempts to integrate Maori technology into domestic architecture was through the work of Princess Te Puea of Tainui during the 1930’s when the government allocated money towards a housing initiative to enable Maori to become self sufficient. Money was allocated to certain iwi to develop land for farming. The iwi were also expected to provide housing for themselves. The style the Te Puea chose was a version of an English cottage clad in raupo, in the typical style of the Maori whare. This may have come about not only as a cost cutting device but also a familiar aesthetic using existing skills. However this does show that given the means there is more than one solution to a housing problem and allowing the occupants more autonomy often brings a more satisfactory and interesting result.

More recently Housing New Zealand has recognised there is an issue regarding the Polynesian family structure and the problems experienced when occupying the current housing stock. Housing NZ have published various studies and documents attempting to address these issues such as the ‘Pacific Islands Housing Guide’. These reports outline possible changes to existing European style state houses to create more Polynesian friendly spatial arrangements. While this document is useful in its recognition of the shortcomings of the current housing it does not address the fundamental issues of the difference between Western and Polynesian spatiality, as it predominantly deals with a single building, and is still operating using western aesthetic and construction processes.

Currently territorial authorities and central government are strictly influenced by central government legislation which is based on the on the nuclear family structure. However the nuclear family has been diminishing in size over generations and the amount of 1 and 2 person households growing.

For Pacific Islanders however there are often more children and the household often includes extended family members.

Fig. 2  Graphs from Pacific Progress Report Statistics NZ 2001

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Origins of Spatiality

Michel Foucault and Genealogy

Foucault’s genealogical project is an attempt to provide a “history of the present” through the analysis of the interplay of power and knowledge.\(^6\)

The archaeological approach isolates and analyses an event in history without considering its context or evolvement from a relational stance. The genealogical approach links these events into a sequence or process. This can then be used to dissect current ideologies.\(^7\)

Using Foucault’s method Polynesian domesticity can be reconnected with the present. At present Polynesian architecture and notions of domesticity are analysed using what Foucault calls the archaeological approach, where Polynesian civilisation is viewed as an isolated historical period romanticised and unrelated to the present day. This can be seen in architecture that repeatedly refers to historical examples creating an architectural parody where the fale becomes one of the curious archetypes such as the igloo, the tepee, and the bivouac.

What Foucault is describing in his genealogical approach very closely relates to the Polynesian view that all events in time are interrelated. The art of tracing connections is a common practice in Polynesia – Maori call it “whakapapa” It means that people do not exist independent of one another and their histories, but instead rely on one another for their existence.

Claude Levi Strauss

French anthropologist Claude Levi Strauss’ book ‘The Savage Mind’ is useful in describing the opposing mindset of western and “primitive” civilisation. Strauss, refers to these two groups as the Bricoleur, and the Scientist. The Bricoleur operates in the world of mystical thought working with what already exists around him. To order his life he applies signs to these components and reorders them as a means to understanding. The Scientist operates by contrast, in concepts and specialises in


\(^7\) Powell, “Foucauldian Gerontology: A Methodology for Understanding Aging,”
speculation. However the scientist does not engage directly with his environment instead endeavours to develop a dialogue defined by his own culture and time period. This can be seen as just as limiting as the bricoleur who has chosen to engage with the environment directly.8

For this project an analogy is being drawn between the Polynesian way of thinking as (the Bricoleur) and the European (the Scientist.) The bricolage mentality has served Polynesians well enabling them to push out from the boundaries of their western domiciles. It is the intention of this study to legitimize this practice as a genuine means of dwelling. The proposal is that this way of operating could and should be accepted in modern suburban settings.

After the earthquake and tsunami that devastated the southwest coast of Upolu in September 2009 entire villages were left homeless with only the debris they had around them. This image shows that despite there being terrible devastation Samoans are more than able to house themselves using whatever materials were returned to the shore after the tsunami hit. Well before aid agencies had arrived on the scene villages had banded together and created shelter, a skill, which thankfully is still operating in their culture. Though these were not traditional structures using traditional natural materials – Samoans have proved the adaptability of their methodology by applying the same bricoleur mentality regardless of the materials that are available and using what current construction knowledge is at hand.9

A Tongan form of Bricolage stemming from a practice called Inasi10 is about the collection of parts of European building components, and reassembling them for a house in Tonga. Inasi in essence, is the practice of giving ones best, in regards to gifs of produce, craft, or animals. This is to maintain the status and pride of the family or village. These reconstituted dwellings defy the original style for which the parts were intended but have become a new, highly valued composition.

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9 Ibid.
10 Ibid.
Va

The Polynesian self is described as reliant on relationships that are occurring in the va, or space between.

From a Tongan perspective, Helu-Thaman (cited in Coxon, 2007) states that: “Because the cultural identity formation of most Oceanic people is relational rather than individualistic, it follows that the spaces or va between and among persons, or between a person and his/her environment, together with the frameworks that determine such relationships, must be nurtured and protected. Understanding the significance of the notion of va educating for its continued nurturance and maintenance are central to any discussion about education for intercultural understanding in Oceania, if not globally.”

Mila-Schaaf, suggest that: “Va is closely associated with balance and harmony in relationships and natural order and aesthetic of human interconnections and relationships. The va is used interchangeably to describe aesthetic balance in art and architecture as well as aesthetic balance in relationships” (Mila-Schaaf, 2006:8)

Va – the space between, is instrumental in shaping Polynesian Society. In architecture it influences the position of buildings, their orientation, size and structure. An example would be not to build a fale bigger or more elaborate than the high chief in the village as this would be an insult to his stature. In order to maintain good relations all villagers adhere this implicit set of rules. The maintenance of the va can be traced through familiar and tribal lines much the way as the genealogy concept by Foucault.

The Spatial organisation of the village also dictates the intensity of movement and activity. The periphery of the village is the place of hard work and exertion, such as working the plantation or fishing. Activity becomes slower, more considered, more formal as one approaches the centre of the village to the point where all movement stops at the paepae where the matai sits or women are weaving mats.

“At the border between the household ring (‘aufale) and the malae the work of

The aufale is the formal threshold to the complex and the place of initial encounters. The formality of buildings also diminishes as one progresses to the rear of the complex into the bush or outer limits.

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Tufuga Guild

There are two main formal traditional buildings in Samoa, the fale tele – round house, meeting house, or big house and the fale afofou – long house, guest house. The most recognisable example in Samoa is the “Fale Tele” (Big House) built atop a stone platform, ‘paepae’” the building has no walls supported only by poles at the edges of the roof and a trabeated pole structure in the centre. The rounded ends for which these buildings are renowned, is formed by creating a series of curved rafters made of spliced timber pieces which fan from the centre of an arc forming a double curvature. The roof is then lashed and clad in either traditional sugar cane leaves or more commonly corrugated iron. A significant amount of manual labour and skill are needed for the complex design of the dome shaped roof of the Samoan fale. This goes beyond the complexity necessary for shelter, indicating the fale is also fulfilling social and cultural needs.

The fale afofou or guest house is an elongated version of the fale tele with the rounded ends of similar construction and the centre extended. The design also makes provisions for a much larger fale by widening the bay, the centre posts are taken to outer edge creating a ring of posts closer to the now secondary ring of posts (pou lalo).

With all this mystique and significance attached to the fale tele what is often overlooked is the fale tele is the pinnacle in of a series of buildings rated in a hierarchy from sacred to profane.

Tufuga or experts (in the art of fale construction) are commissioned by the village to undertake the construction of these iconic buildings. A price is agreed – fine mats pigs and other commodities were traditionally used as currency, nowadays, predominantly the exchange is monetary. The village then caters for the men feeding them and providing shelter for the duration of construction. This group of men are said to have powers and skill beyond that of everyday man. They are said

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to exist between man and heavens performing work of the gods. Tufuga are a guild – and are politically neutral, operating outside village regulations. Tufuga are often without a village – living a nomadic lifestyle travelling around the islands solely employed to construct meeting houses. 14

A study of the compound where my family live in Paia, Savaii, Samoa shows the procession of spaces, from the front to the rear of the site.

<table>
<thead>
<tr>
<th>Fale Tele</th>
<th>meeting house</th>
<th>Tufuga</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fale Afolau</td>
<td>guest house</td>
<td></td>
</tr>
<tr>
<td>Fale O’o</td>
<td>dwelling house</td>
<td>Village</td>
</tr>
<tr>
<td>Fale Kuka</td>
<td>food preparation</td>
<td></td>
</tr>
<tr>
<td>Fale Umu</td>
<td>cook house</td>
<td></td>
</tr>
<tr>
<td>Fale Va’a</td>
<td>boat house</td>
<td></td>
</tr>
<tr>
<td>Fale Vao</td>
<td>outhouse</td>
<td></td>
</tr>
</tbody>
</table>

14 Ibid.
Extended Family - Compound Components

- Malae: Courtyard
- Paepae: Stone Platform
- Fale Afolau: Long House
- Fale O’o: Sleeping house
- Fale Kuka: Kitchen
- Fale Umu: Shelter over umu (earth oven)
- Fale Vao: Bathroom

Fig. 10 Masae family compound, Paia.

Fig. 11 Aerial photo, Paia village, Savaii, Samoa
The Significance of the Village Plan

Bradd Shaw describes two complementary planning principles in the Samoan village. The first is concentric dualism where formality radiates from the malae (most formal) to the bush or sea (least formal). This model can be used both in a village situated on the coast or inland as the same formality applies to the sea – outer reef comparable to inland bush. The other model is diametric dualism, which divides the village laterally into tai (seaside) and uta (inland), which can also be read as light and dark, formal/informal, extroverted/introverted. The tai or seaside is seen as the place of public formal interaction while the uta is seen as private informal. Through these devices Samoans have managed to create spatial hierarchies without the need for walls and fences.

Shaw also noted that the road that leads to almost all villages passes the malae either through the middle or tangentially. My original assumption was that these roads leading to the malae were introduced after the car and therefore not a traditional planning device. However, anecdotally some inland villages have suggested that prior to the car these roads were smaller pedestrian paths and would have played some part in the spatial planning of the village.

Fig. 12  Diametric Dualism

Fig. 13  Concentric Dualism

16 Ibid.
Another means of dividing space in Samoa is brother sister avoidance, which creates an architectural order by using a pre-existing social hierarchy. This leads to important divisions of space at both village and house level. The brother/sister avoidance concept describes how intra family relationships are controlled through tradition. The main driver behind this is seen as to protect family honour and the fear of incest between family members. The tradition uses separation of the genders through assignments of tasks and responsibilities. This endows each gender with equal yet very different powers.

Anthropologist Bradd Shore described these two powers as Formal and Instrumental. Formal power being allocated to the sister as, the figurehead for the family; preservation of their dignity is of the utmost importance. The sisters’ behaviour is constantly monitored. They are kept in a place of high visibility to ensure their safety from potential suitors and to display their virtue to the entire village.

Mata’ifale: looking into your own fale

This is the Samoan definition of incest. Incest in the western world is a “crime against nature” with potential offspring believed to be the victims of genetic disease and mutation. In the Samoan mind it is the defiance of social order that is seen as the greater crime. When lines of the tamatane (brother) and tamafafine (sister) are crossed this upsets the structure of interdependent power. Punishment

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for such a crime is often large fines to the whole family or in more serious cases banishment from the village (fa’ate’a), often for life. This severing of the “va” is the most severe reprimand in a Polynesian society.

The Brother Sister relationship comprises the following practices

1: respectful service
2: avoidance – of conversation
3: rigid sleeping separation
4: protection from other boys
5: mutual air of suspicion

Architecturally and spatially this manifests itself in the physical separation of the genders. The unmarried women are kept close to the centre of the malae constantly in view while the young men are kept well back at the periphery. The young women of the village are seen to be the upholders of dignity for the village. Their virtue is to be displayed in front of the malae. The young men perform the task of maintaining that dignity.

Young men and young women are separated into two distinct groups each with their own duties and responsibilities. The young women join the Auluma the young men the Aumaga. There are varying configurations of these groups with regard to title and stature i.e. these two groups may be subject to further stratification however the separation of the genders is always upheld.
Fig. 16  The distribution of space in the Fale tele
Fig. 17 Cross Section through Fale tele
Spatial Overlays: Model Villages

At the commencement of WW1 the New Zealand armed forces were the first to claim enemy territory when they overthrew the German Administration in Samoa. In 1923 General George Spafford Richardson was appointed commissioner to the newly acquired state. An early incident of Samoan ambivalence to the Western worldview is General Richardson’s regime of model villages launched in suburban Apia. The model villages were a result of General Richardson on behalf of the New Zealand Government attempting to apply town-planning theory to the organisation of land and creation of public space. Two villages close to Apia were chosen for re-organising Vaimoso and Lepea. Lepea is the only village that retains the original ‘model village’ configuration.

The intention was to create a formal parade ground in the centre of the village with all fales arranged in a square or oval shape around this space. Richardson, as a military man felt a great desire to rationalise the apparently haphazard layout of Samoan villages. Trees were cleared and fales pushed back from a central space and located into individual lots. This caused great disharmony because although the spatial arrangement in a Samoan village may seem haphazard it is formed through the structure of relationship with other family members in the village and food resources.

This is also part of the ‘Va’ concept that entities are interlinked and layouts defined by their relationships. The inference of these model villages is said to have being the catalyst for a political uprising and rebellion known as the Mau, which lead to repression and bloodshed. Though appearing to be passive the Samoans were incensed that their very logic of existence was being overridden.

Suburban Auckland and Overcrowding

In the urban context, functions and ownership are not separated by space and hierarchy but by walls and fences. In the typical suburban house spaces are linked via a hallway and all rooms face outwards towards the boundary.

The central hallway, perhaps a descendant from the 19th century villa, acts as an armature grounding the spaces. However it is not occupied but rather transitional space.

The problem that arises with this situation is when an extended family occupies such a dwelling; privacy and hygiene are not activated through the physical separation of spaces into individual buildings or through orientation.

This is a factor in the perception of overcrowding. Traditionally one nuclear family would occupy one space – a fale. A single building. This would be functionally separate from the formal fale tele; the food preparation areas; and ablutions.

It is this separation of spaces that allows many family members to occupy one-site and share facilities without over crowding. Each family has their own house and belongings in that space but the compound belongs to the extended family as a whole.

When these spaces are clustered together around a hallway in the traditional urban Auckland house, activity is intensified and internal, it is easy to see how the mismatch of ritual and dwelling can lead to illness and dissatisfaction.

According to Housing New Zealand there are three methods to assess overcrowding (ref. appendix.) Most important for Polynesian families is the suggestion that a
In Samoan cultural practice the parents share the same room as the children. As infants they sleep with the mother and father and as they become older they may move to another fale to sleep with grandparents or older siblings. This made good practical sense in Samoa, as a house without walls requires the security of parents. However, 3 or 4 occupants in a bedroom, in a house in New Zealand, is considered overcrowded. This is with good reason as the potential for cross contamination greatly increases, particularly in winter when more time is spent indoors.

One illness whose spread has been attributed to overcrowding is Rheumatic fever and subsequent Rheumatic Heart Disease. Rheumatic fever sometimes develops after being infected by a highly contagious strain of streptococcus bacteria. This bacterium thrives in closed overcrowded situations. New Zealand has one of the highest rates of RF in the developed world and much of this can be attributed to the presence of Pacific Islanders who have a 40 times greater chance of contracting the disease than the rest of the population. Rheumatic fever is also now very prevalent in Samoa – however this was not the case 40 years ago when traditional open dwellings were the norm. It could be argued that the introduction of the fale palagi (which has a more limited airflow) had encouraged the spread of the disease.

Therefore I would argue that overcrowding is not only a poverty driven condition but also, and perhaps more importantly, a cultural one, leading to many consequences both social and physical.

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First Iteration.

The first attempt at a proposal for a new architecture was based on the physical separating out of the functions and spaces in a dwelling. The complex is designed to house an extended family on an 800sqm site in suburban Auckland.

The family is housed in units that contain their own bathroom. Cooking and dining facilities are shared, as is the formal lounge area at the front of the complex. The series of units is connected by a covered way that is semi open to the outdoors but protected from the rain.

Unlike the tropics where the sun shines down at a steep angle producing little shadow in temperate areas the angle of the sun’s path rises and falls with the seasons and is always in the north. The prevailing southwesterly winds that dominate New Zealand must also be taken in to account. On this proposal there is extensive glazing to the northern facades of the building that can be adjusted in summer. All outdoor-living space is oriented north, and solid walls to the south of the site protect from the wind.

The planning is in accordance with Samoan spatial theory and the brother sister avoidance concept. The plan shows vertical as well as horizontal spatial hierarchies. The front dwelling being the most formal is on an elevated foundation or paepae. This not only raises the status of the building and the occupants it also obscures the less formal dwellings and activities to the rear of the site.

The order of the complex is, from front to back: Malae – front grassed area; Formal living space – for elders and visitors; Dining and Kitchen Space serving the whole complex; then family dwellings that consist of a living/sleeping space and bathroom. Finally at the back of the section, are the living quarters for the young
Fig. 24  Site plan of original dwelling showing rooms clustered around hall

PaePae elevates fale tele open semi formal space able to covered on special occasions covered walkway

Fig. 25  First Iteration - Roof Plan

main living space and sleep area for guests and elderly members

Family dwelling young mens’ house to the rear of the section
guest bathroom kitchen dining bathrooms

Fig. 26  First Iteration - Floor Plan
Fig. 27  Main building showing transparency.

Fig. 28  First Iteration
- boys house
- dwelling
- covered walkway
- dwelling
- kitchen dining
- main building
men of the family. The quality of construction and building would also become less formal or constrained as they move to the rear of the site.

The buildings are sitting on piles. Aesthetically they are a warped version of a fale with recognisable elements such as the pou (posts) visible through the glazing and the cladding resembling the layered effect of the pola (traditional coconut frond screens). The roof is steep; the shaped corrugated iron a skill imported from Samoa. The colour is a reference to the bricoleur quality of the Pacific Islanders’ ability to improvise with whatever materials may be available to them and then appropriating them as part of their culture. There are many examples of this in handicrafts.

This proposal also examines the notion of transparency – that the front most formal building is the most transparent whilst moving back through the section the buildings become more enclosed. This means that the occupants to the rear of the site would be afforded more privacy. However after subsequent readings I realised that despite the buildings at the front being the most open to scrutiny closing in the buildings further back privileged them, which could be read, as inappropriate, as the notion of privacy is one that is achieved outside the building – or in the dark not by hiding behind walls.

On reflection this first iteration has addressed spatial planning within a typical suburban site but does not allow for the full operation of a village. A larger site would be able to address the complex issues of neighbourly relations and how the site would interface with the surrounding community.

After some investigation a site of appropriate size and complexity was found. This site is also a typical example of the current housing trends advocated by HousingNew Zealand.
Ventura Street Houses. 2006

The Ventura Street development was constructed out of a need to increase housing density by Housing New Zealand.

“Garages are placed next the living areas, allowing them to be used as a secondary living space, which again directs the gaze out onto the street and promotes a community feeling.”

The garage is used as a living space only because it is the only part of the house in which the people may interact with the street whilst still in their home. While this practice is common in many Pacific Island homes in Auckland it should be seen as a “make do” solution which occurs when housing design is inadequate for the ritualistic needs of the family. It would be more fortuitous to include this ground level connection with the street in the actual architecture of the dwelling instead of offering up a poor substitute to be modified by its occupants.

Modern day townhouses or terrace houses in New Zealand are essentially a descendant of the Georgian townhouse where the concept was used as a means to share a street frontage by as many tenants as possible for trading purposes.

Terrace houses are a “House in town” as opposed to “country house”, (examples of which are the villa and bungalow.) Terraced housing developed in the late 17th century was introduced to Australia in the 19thC

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24 Ibid.
The Ventura St houses are constructed using a light timber frame on a concrete slab with a flat roof and parapet walls. The exterior is clad in fibre cement plasterboard with some decorative timber battening. The roof is profile metal with internal gutters. All exterior joinery is powder-coated aluminium with single glazing to all windows. The majority of windows are awning hung thus limiting the amount of opening and potential for people inside the house to openly interact with people outside.

After conversing with some of the residents it became clear that the standard of construction of these houses had not met their expectations. Many complained of the houses being cold and difficult to heat. Anecdotally there is one case of a child contracting a fungal lung infection which some of the residents believed was due to the poor state of the housing. In 2010 a new scupper detail was retrofitted to all units due to the flat roofs of the complex leaking.

The “homezone” which was intended to be a pedestrian prioritised area has traffic calming treatments such as lane narrowing and cobbles to deter motorists from speeding through the development. Unfortunately the lane has become a shortcut for residents residing in other streets, as there are not sufficient visual clues to suggest that the lane is pedestrian prioritised.

Therefore the street has very little use as an outdoor playing area as the residents feel that they have no control over the traffic in the street.

The narrow closed off design of the townhouses acts as blinkers preventing neighbours interacting. What may have been the intention is to give the impression of owned space appears to have resulted in alienated space.
Fig. 32  Tagata Way - homezone

Fig. 33  Open space bisected by fence
Defensible Space

The premise behind the Ventura Street project was to use the planning principles of ‘Crime Prevention Through Environmental Design’ a theory created by architect and city planner, Oscar Newman. The theory intention is to create a sense of security in a neighbourhood by controlling people’s behaviour in public spaces.

“A family’s claim to a territory diminishes proportionally as the number of families who share that claim increases.”25

Oscar Newman’s theory for creating defensible space was a reaction to increasing crime statistics in the United States. His proposition was that people in low socio economic areas needed more spatial security than the rest of society. A factor may be that social housing is not a chosen location – as it is with private dwellings. Most families are suffering some type of stress – financial, domestic, physical disability. Newman’s argument was that the lack of allocated space opened up a ‘no man’s land’ where the weak were vulnerable and the angry took their prey. He condemns the use of tower blocks for families as the buildings quickly become overrun with crime. Newman suggests that these towers may be more suited to the elderly who would feel safe amongst their own kind. His proposition was that instead of having tall towers with vast expanses of open ground not belonging to anyone to instead cover more of the ground with buildings and lower their height. The remainder would be allotted to tenancies – so as to limit the amount of interactions with strangers the residents must encounter. This would give the residents a feeling of security and familiarity and public spaces such as lobbies and courtyards would be included in the residents’ realm thus encouraging passive surveillance. Newman also mentions the need to cluster similar groups together either as a means to contain a problem or to exclude problems – usually associated with youth. He is a

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strong advocate of row housing as a medium density housing solution and that the notion of fenced off allocated space empowers residents.

“My interviews with residents, management, and police provide the following explanation for the correlation of these social factors and crime rates: A one-parent household headed by a female is more vulnerable to criminal attack; families with only one adult present are less able to control their teenage children; young teenage AFDC mothers are often victimized by their boyfriends; the criminal activity by the poor is tolerated, if not condoned, among the poor; the poor, and particularly the poor of racial minorities, are unable to demand much in the way of police protection; and the commission of crime against residents in ghetto areas requires minimal skill and risk.”

There undoubtedly are some valid arguments in Newman’s theory - one being that to spread a building over more of the site is often more effective than to build upwards and create ground space which is not utilized or owned. Secondly the anonymity afforded in some housing projects can be very dangerous. However his notion of ownership and spatial hierarchy is taken from a Eurocentric perspective. His notion that land should be divided among the number of people is the opposite to a Polynesian perspective where the notion of ownership is replaced with ideas of belonging and ones sphere of belonging increases with the number or people within their social familial circle.

26 Ibid.
Passive surveillance

Newman’s use of ‘Passive Surveillance’ can be seen as having its roots in the design of the Panopticon, a proposal by philosopher and social reformist Jeremy Bentham to enable the constant surveillance of prisoners. This scheme was able to be modified for schools, hospitals, and many institutions where there is a need for passive control. The similarities of passive surveillance and the Panopticon concept are the ability for the person to be observed without the subject knowing whom, if anyone, was watching them. This is a means of social control which creates mutual suspicion and breaking connections. Michel Foucault writes at length about the origins and repercussions of the passive surveillance concept and its role in the creation of a labour force for new capitalist ventures because of disengagement from other aspects of social life.

The row house can be said to be an extension of this. Passive surveillance is only possible where one party has a visual advantage over the other. This is created through devices such as net curtains over windows where the viewer is physically remote from the public space and the gaze enters the street. This is opposed to Samoan life where people occupy the public space, which is a security system based on mutual recognition rather than on suspicion and paranoia.

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28 Ibid.
Note: the above plans (not to scale) show planning devices aimed at preventing communication between neighbouring cells while being under constant surveillance. While this may be considered appropriate for a prison it is the antithesis of the Samoan village plan.
Village Security – Mutual Recognition

What many tourists find endearing and sometimes annoying, is the unrelenting friendly greetings experienced in many Pacific Islands.

What may be interpreted as a friendly gesture and overt curiosity is actually the village security system at work. It operates on a pre-emptive basis, the stranger is greeted in a jovial manner before suspicion sets in.

Tofa, Malo

“I tell that man walking through my village that I know he is coming by, that he is here in my village, and welcome, and I know him, and his coming through my village” 29

“and when I travel somewhere, I call out too, because I want them to know I am a good person passing their house, and not a ta’a boy or an aitu (evil spirit or being)” 30

One major reason for these pleasantries is that, they are representing their entire extended family and village, and to misbehave would bring shame. Reparations for crimes committed by an individual are the responsibility of the aiga (extended family). This extra burden of liability is usually sufficient to ensure good behaviour in the more public, formal parts of the village however the back parts of the village give anonymity.

30 Ibid.p88
Samoans do not deny the existence of bad behaviour. It is related to the duality of light and dark Sa and Taga (tapu and noa in Maori). In the light the public space is tapu certain behaviours are expected. However the dark noa outer reaches of the villages are lawless. So when people say there is nothing bad going on in their village that is essentially true - on the light side all is well. The dark is another realm the existence of which Samoans do not openly acknowledge, or celebrate but accept it as an integral part of Samoan society. In Samoa the day and night offer two different worlds and the slippage between is fleeting. The sunsets and sunrises occur rapidly in the tropics. When the dark sets in people cluster to their houses – or adventure into the darkness – if you are good you stay home.

Samoa has been influenced by European architecture for 200 years and the introduction of Christianity. Christianity has brought modesty – the need to cover your bodies to have privacy in the family home. European architecture through the imposition of these walls, doors windows, has bought pockets of darkness into the heart of the village.

Does this mean that what is needed is a recreation of the transparency of the village?
Notion of Ownership

It has long being documented that Polynesians have a different view of land ownership than Europeans. Land prior to the arrival of Europeans had no monetary value. And generally was not exchanged for bartered goods. This is still the case in Samoa where land is freehold (similar to New Zealand) or customary where ownership is assigned to an entire village. The land is then administered by the matais of that village. Should an outside entity wish to purchase land from the village they must reach a consensus with the entire fono of matais. This happens very rarely.

Consequently it could be argued that most Polynesians do not have the intention of their home being a financial asset that gains value – generally, it is not a priority to improve a property with the intention of capital gain. Traditionally the investment would be put into the Va or the maintenance of relationships as it is a way to ensure support when needed be it monetary or otherwise.

This places a very different emphasis on maintenance and construction methods, traditionally the functional buildings such as bathroom and kitchen would be very rudimentary whereas it seems western households concentrate a lot of money and design emphasis on these areas.

Presently, in Auckland, Pacific Islanders have little control over their own living environment.

The commodification\(^{31}\) of the land and the dwelling has led to Polynesians relinquishing control of the construction process. Territorial authorities have also endorsed the notion of the home being a financial asset and something that must be regulated from central government. At present the amount of money spent is often dictated by meeting the requirements of the territorial authorities.

As dwellings are often exchanged for money, the consumer must be protected.

Ideally the homeowner should be able to house their family in accordance with their immediate needs and financial capabilities. This affects the durability and life span of selected materials and the construction methods used.

A very simple set of details and specification could be drawn which would enable a building to be watertight and structurally sound. Any buildings under a certain size could be exempt from building consent to make dwelling construction more affordable.

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Housing Aspirations

Some Facts:

40% of housing New Zealand tenants are Pacific Islanders (HCNZ 1999)

Average Tenancy Tenure (HCNZ 1999)

77% Less than 10 years
60% Less than 5 years
25% Less than 12 months

The Pacific population in New Zealand is, on average, younger, poorer and growing faster than for New Zealand as a whole. Many Pacific households include extended family members and Pacific households are significantly larger than average.32

“Pacific people in New Zealand are almost four times more likely than New Zealanders as a whole to live in extended families, that is, in families where related parents, grandparents and children or siblings live together”33

“Pacific households are also larger than average, and include a higher proportion of extended family households”34

“...a significant proportion of members of the Pacific Community are born outside New Zealand, which means that some are less familiar with New Zealand housing patterns and more committed to replicating the housing and living patterns they are accustomed to in the Pacific.”35

It could be argued that to achieve a state of kaitiakitanga37 families must be embedded and invested financially and emotionally.

To do so requires seed families to ground a community, allowing some properties to be tenanted whilst permanent families take a lead in care and conduct in the community.

From the many reports by government agencies in New Zealand and Newman’s paper on defensible space it has become apparent that social housing in its current state is will not improve the lives of the occupants. As Newman has stated social housing brings people together through financial deprivation. With only their dire circumstances in common there is not enough cultural common ground to form a cohesive community. What may be useful is providing group housing which enable home ownership. There will always be a need for social housing, however it should be recognised as temporary and should be located throughout communities where occupants feel they have cultural similarities with their neighbours. This is not the same as the New Zealand Government Ministry of Housing’s 1950’s practice of “pepper potting” which involved Maori families being housed in mainly white suburban streets in an attempt to help them assimilate to the urban European lifestyle. In this situation the inductees were culturally dissimilar to their neighbours and of a lower economic status. This placed Maori families at a disadvantage as they were not only isolated from their own cultural practices it also assumed that

34 Ibid.p70
35 Ibid.p70
36 Ibid.p69
37 Kaitiakitanga: a Maori word defined in the Resources Management Act as a guardianship and/or stewardship. Marsden considers the term stewardship inappropriate, as the original English meaning of the word is to guard someone else’s property. Property ownership was unheard of pre contact times.
Maori culture was unable to operate in an urban situation without adjustment. It can be suggested that the Housing Corporation of New Zealand could enter into a more even relationship with Pacific Islanders where they feel they are treated as equals and have a role to play in society.

One way would be for HCNZ to gift the land to tenants over a number of years and the house would be built using a mortgage from guaranteed by HCNZ. Initially devices may be necessary such as an agreement to refuse consumer debt to ensure mortgage repayments are kept up. Ownership would be under unit title situation where unit boundaries set out common area to be addressed through body corporate, which would consist of owners, HCNZ and HCNZ tenants. This would enable Pacific Islanders to own their own home — live in a house to their liking in exchange for their responsibility of being kaitiaki of the community.

A version of this already exists in the Gateway Housing Assistance scheme where potential home owners are offered land with a 10 year deferred payment plan on the land which means the initial bank loan would be only for the construction costs of the development. The cost of the land is carried by housing New Zealand and interest is added to the balance over ten years. After 6 years interest repayments start at 1% while non-compounding interest is still added to the balance of the land debt. By year ten interest repayments are 5% with extra interest still added to the balance. At the end of the ten year period, homeowners are required to approach their bank and apply for a remortgage to include the initial cost of the land and the interest added during the ten year period.

This rather protracted scheme relies on the potential of the homeowners to not only increase their income over the ten year period but also for the property to gain significantly in value. However only certain sections and developments are available for purchase, which means people may not get the opportunity to live near their community.

For Maori, Housing New Zealand has the Kainga Whenua scheme available, which gives Maori the opportunity to build on ancestral land. HCNZ requires the land be free from debt and unable to be mortgaged, the homeowner must then gain a licence to occupy from the Maori Court. When this criterion is met the dwelling must be at least 70sqm and built on piles.

How can the Structure of the Samoan Fale be used in modern dwellings in Auckland?

It is useful to dissect the structure of the fale. It appears to be round from the outside and it is also curved vertically. The formation of this double curvature is the most unique and endearing feature of the fale. It is speculated that the structure was an architectural interpretation of the formation of the heavens in the universe. Other opinions are that it was anthropomorphic deriving from a rib structure. The technique for forming the roof is not too dissimilar from a coil woven basket and indeed there are obvious technical crossovers with the art of weaving.

The difference between weaving to create mats and soft baskets is that only the soft flexible laufala (pandanus leaves) are used lacks self supporting strength. Coil basketry involves the use of the coconut frond midrib lashed together with the laufala to create a rigid self supporting form which also has flexibility. It is this practice of tying the rigid rib like members with flexible sennit (coconut fibre) which gives the fale roof form its light basket like qualities.

The main structure that supports the roof is a simple trabeated post and beam construction. The centre post supports the roof ridge allowing cross beams (soa) to support the small flexible rafters as it curves down towards the lower ring beam ref Fig 17. With the fale afolau (long house), trabeated struts form an inner ring of posts and the roof edge is supported by an outer ring of posts.

During construction the roof is constructed independently from the floor. The roof is supported by the trabeated superstructure that is lodged directly to the ground. Finally once the roof structure is complete the villagers take over, prepare and fix thatch to the roof, weave pola (blinds) and the paepae (stone platform). Rocks are then piled into the centre finished with finer coral at the top. In more functional rudimentary building the floor can be an elevated timber platform.

Fig.41  Fale Tele roof structure - tala (round ends)

Fig.42  Fale Afolau roof structure itu (middle section)
Fig. 43  The drawing above was created by a man named Paiore in 1869, he was from Paumotu in the Society Islands (French Polynesia). This shows man’s effort in creating the heavens by pushing it up in layers at the time of creation.

Fig. 44  Ribs (fau) being laid out on ground prior to installation.

Fig. 45  Upper ribs (fau) of fale structure.

Fig. 46  Lower ribs of tala ends of fale structure.

Fig. 47  Examples of coil weaving show Samoans already possessed the technology to allow the creation of curved roof forms.
The Samoan fale is far simpler than a European building with regards to structure cladding and materials. However fixing methods are more complex. There are no walls, no windows, no trim. However the high ceiling in the fale which makes it so cool in tropical heat would make a space extremely difficult to heat as would the porous nature of the roof. While lashed architecture is aesthetically pleasing and flexible to allow for movement, the afa or sennit cord is difficult to obtain.

Open walls in suburban Auckland make for obvious security and thermal comfort issues. Auckland is in the path of a prevailing southwest wind. Therefore materiality should be adapted to New Zealand conditions. Double-glazing would allow for thermal comfort and visual connection however there are costs involved. A double layer wall could allow for an air space, a transition space and still allow visual transparency.

What is commonly known as a double skin façade, with the glazing being the inner face and a clear plastic operable blind on the outer would allow for many different configurations depending on weather. It would also add the insulating properties of any glazing by increasing the surface resistance of the glass – by providing still air at its face.
Short Investigation: Asian Archetypes.

It is argued here that the housing typologies that New Zealand has inherited from Europe are unsuitable for modification to Polynesian living patterns. Therefore it would be useful to look to an archetype, which has some ancestral commonality with Polynesia. It is now generally accepted that Polynesians originated from Asia, with the Austronesian language group (which all Polynesian languages belong to) being traced as far north as Taiwan and west as Madagascar. Japan being at a similar latitude to New Zealand would be a useful archetype to investigate for construction methods, spatial planning and devices for climatic control.

“A house should be built with the summer in view. In winter one can live anywhere, but a poor dwelling in summer is unbearable.”\textsuperscript{42}

Traditional Japanese architecture is based on the old religion of Shinto where one is considered to be part of nature. This means that it is expected that the inhabitant feels the heat of summer or the chill of winter even within the home. While Japan experiences similar weather to New Zealand, anecdotally many Japanese houses lack any form of space heating and instead choose to heat the occupants locally using small heaters foot warmers and Kotatsu (low tables with small heating devices below). There are many similarities with Polynesian living such as the lack of furniture and open plan rooms with multi functions such as sleeping and receiving visitors. Materially the Japanese use timber and stone in a similar trabeated fashion to the fale tele. There are also many examples of timber structures being lashed together.

Despite the many similarities Japan has with Polynesian architecture the screening

\textsuperscript{42} Yoshida Kenko, \textit{Essays in Idleness}, Cosimo Classics: Philosophy (New York: Cosimo, 2005), p.25
devices are at odds with the notion of transparency and the heating devices would be difficult to implement into a Polynesian routine. Korea however developed a way of warming the house through underfloor heating called ondol - this involved heat being drawn across the underside of a floor before being expelled through a chimney on the opposite side. This ensures there is always an constant ambient temperature. The modern interpretation of this type of floor heating is hydronic using warm water or heated electric cables. Korean houses are traditionally planned around a courtyard an important outdoor living space that also gives protection from inclement weather and invasion.
Samoan Fale and Privacy

The notion of privacy in the European sense of the word was unheard of in Polynesia. The physical separation of space was something introduced on arrival in New Zealand and achieved by the architectural device of the wall. Previously privacy was accomplished through spatial hierarchy, rituals and traditions, the landscape and most importantly the dark.

At night the interior of the fale is lit up like a stage, hovering in space. Nearby other fales are also lit up giving a strong visual connection between the clusters of housing. Therefore the notion of privacy is reversed; the privacy is afforded to the people outside the fale, in the dark, amongst the trees. This is where as Shore notes that clandestine encounters take place. In the dark people have the freedom to do as the please away from the village regulations.

During the day the concealment of darkness and is located away into the bush and far out to sea.

“Where day is an almost stately progression of still points leading to the final still point of the sa and the evening meal, night is often an inversion of the stillness of daily life. Night is the time of invisibility and as such, is the time of the greatest privacy, and the greatest unobserved movement.”

The edge of the fale is porous. Traditional seating arrangements in a large fale would have the inner ring of posts occupied by the matais and upstanding citizens of the village with authority diminishing as it radiates outward. At the very edges of the paepae the children sit – on the outside but still included and close enough to hear. There is a certain zone surrounding the fale in which interactions can

take place with people inside the fale without the participant actually having to enter inside. It is this potential for interaction a fuzzy boundary that encourages neighbourly relations and also appropriate behaviour. The alternative solution, which is often to be found in Auckland, is the garage or the carport where it can open up to the street and enable the occupants to part of the community and allowing others to interact with them.

Obviously the needs to shelter from the significantly colder climate in New Zealand led Maori to wall in their homes and often notch the house into the ground, mounding earth up around the walls providing further insulation against the cold. However there was always a single space with no dividing walls.

It could be argued that Maori arrived from the Pacific had limited tools and technology with which to quickly adapt to a new climate – unlike other Polynesian migrations where technology and produce and livestock were easily assimilated. However currently Polynesians are at a time in history when they are able to borrow technologies to enable them to live a similar pattern that they would in the Islands thus maintaining the family and societal structure that gives their culture strength and opportunities to thrive.
Fig. 52  Fono (meeting) in a Fale Afolau (Long House) shows the higher ranking matai seated at the inner ring posts while lower ranking members sit behind at outer ring of posts

Proposal

On the proposed site at Ventura Way the present scheme allows a density of 130 persons. This can be achieved in the proposed design through using familial ties as a means of intensifying groups together in certain areas around the site.

The site requires visual transparency but also requires a protection from the rear. The proposal to partially fences the site and plants along the boundary activate the duality concept of public/private space, with the fenced planted boundary replicating the bush and mountains. In the centre of the complex would be a malae – or open space, which could be used communally. The site would be divided into separate areas depending on size and requirements of extended families. Vehicular access is gained to the site through driveways, which pass talong the edges of the malae; these are intended for residents only. The driveways are accessed via cul de sacs nibbled into the boundary of the site. These “beaches” emulate the encounter zone between local and visitor who must access the site on foot. The buildings radiate from the centre of the malae with the most formal buildings skirting the edge of the malae the more rudimentary up against the boundary.

Materially the most effort would be put into the formal permanent buildings at the edges of the malae. Dwelling buildings and outhouses can be constructed of more basic or even second hand materials. The dwelling houses could be self built and would give participants an opportunity to experiment with form and construction techniques.

Most importantly the buildings, particularly around the malae would have maximum transparency allowing visual connection between people inside and outside the building.
Increase Density

“...village expansion has tended to use every available metre of living space in the core of the village before expanding living into the areas deeper into the plantation or bush areas.” “...It is not unusual to see houses being built such that they almost touch each other, while land outside the dignified centre of the village lies empty and unused.....”

Despite the fact that Samoans usually live a rural or suburban existence in Samoa, it is very common for them to in fact live at high densities, close together clustered around the centre of the malae – this ensures inclusion support and status. There is the concept that if an individual chooses solitude there are dark forces at work – this may also be seen as an insult to the rest of the village.

The proposal is to allow for a mixture of permanent and impermanent dwelling on the same site. The aim would be to provide infrastructure or an armature that would satisfy regulatory authorities.

The notion is to separate the building into elements, the pae pae, the frame, the roof, the pola would become the walls some thin and translucent with insulation from cold with layering panels. The roof would be a structure supported by a frame as opposed to load bearing wall traditionally used in light timber construction.

An obvious question is whether this design based on the open fale and traditional spatial theory should be as open as a traditional Samoan fale. Obviously there are the climatic differences between the tropical south pacific and New Zealand.

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The house is conceptually in a state of constant visual interaction. Maybe the house needs to be brought in to the light, as a village needs the light and dark (a sa and taga.) Maybe the world outside the dwelling is enough to be considered taga – dark and dangerous. But people also need a place to be alone and private with ones thoughts this could be the garden or vegetation on the perimeter of the site.

PaePae

The Pae Pae is the connection to the earth. In my proposal the Pae Pae would be the central most important dense core of the cluster the formal space the warm space. With under floor hydronic heating the space is guaranteed to be warm and there is little furniture or objects to clutter the openness allowing the warmth to draw people together. Safer than a fire the space would be large enough to be temporarily divided off into smaller spaces if required.
Fig.59  Folded roof, layered facade shown in “sketchup”
Fig. 60 Proposal inserted into existing urban fabric
Fig. 61  Proposal

- Planting around boundary
- Rear buildings - may be more temporary
- Front buildings - permanent
- Unsealed Driveway
- Boundary fence
- Visual transparency through site
Fig. 62 Spatial Hierarchy

- Young men at the edges of site
- Bathroom
- Family Dwelling
- Kitchen Dining
- Formal house
- Covered decks connect buildings
Fig. 63  Transparency between buildings and through the site
Fig. 64 Axonometric: creating secondary by twisting walls
Conclusions/ Recommendations

What role does the architect play in this new proposal? How is she or he able to contribute? There is considerable controversy over whether architects designs determine behaviour but what is certain is that there are harmful effects from the imposition of a harmful regime. The familial structure needs to be accommodated. This proposal offers a new approach based on existing patterns that have not been devised to alter behaviour but embrace tradition and allow it thrive in a new context. For the architect this may go against examples presented during their study and careers as currently the education and practice of architecture in New Zealand is highly influenced by European and North American models.

The proposal has the following advantages.

The creation of many and smaller buildings would give architects and builders greater freedom to experiment as the financial risk is lowered and the expectation of profit or capital does not stifle creativity.

The need for social housing would diminish as single parents the elderly and disabled would all become part of an extended family network.

This style of living, will not only appeal to Polynesians but also many who have come to the realisation that current housing trends are unsustainable both financially and environmentally.
Postscript

This postscript is added following the examination on November 8 2011. It was suggested that the possibility of pilot scheme should be investigated. I see this study as the beginning of a series of research involved in the development of social housing and public architecture aimed at aligning more with the Polynesian world view.

In retrospect other areas which still require addressing is the issue of death - traditionally family members are interred on the family land. In Auckland however there may need to be other options. The structure of land ownership for Pacific Island communities is a large area in need of further research.

There is also a lot of scope to develop more detailed construction techniques and to include environmental initiatives in design.

The following pages are drawings presented for the examination.
Fig. 65  Birds Eye View
**Fale Tele**  
*Main Living Area*
- Double skinned cladding
- Composed of double glazed panels
- Dual wall temperature control
- Operable walls to exterior

**Fale Kuka**  
*Meal Preparation, Dining, Informal Living*
- Kitchen with large prep area
- Operable wall
- Outdoor food preparation

**Fale Kuka (small)**
- Outdoor food preparation
- Operable wall

**Fale O’o**
- Family sized dwelling
- Separated by curtains if required
- Exterior joinery selected by occupant
- Council approved supply and waste

**Fale O’o (small)**
- Council approved supply and waste

**Fale Vao**
- Council approved supply and waste

**Fale Vao Laititi**
- Council approved supply and waste

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**Village Components**

**Fig. 66 Building Plans**

- Scale 1:100
<table>
<thead>
<tr>
<th>Building Type</th>
<th>Foundation</th>
<th>Underfloor Heating</th>
<th>Roof Type</th>
<th>Frame Type</th>
<th>Joinery Selection</th>
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</thead>
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<td>Underfloor hydronic heating</td>
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<tr>
<td>Fale O’o</td>
<td>Timber piles on concrete footing</td>
<td>Underfloor and ceiling insulation</td>
<td>Profiled Metal Roof</td>
<td>Joinery selected</td>
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<tr>
<td>Fale O’o (small)</td>
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<td>Reinforced block walls</td>
<td>Profiled Metal Roof</td>
<td>Joinery selected</td>
<td></td>
</tr>
</tbody>
</table>
Funeral
Operable wall in place to screen kitchen from guests. Lounge furniture is placed in dining area where guests are served. Fale tele is cleared for deceased.

Christmas
Operable walls opened in Fale faleku. Table extended. Guests sleep in Fale Tele with possibility of sleeping on the deck.

Special Visitor
In the case of a special visitor or older relation the Fale Tele may be divided off by a curtain. This maintains visual connection with outside but provides privacy from others inside.
Appendices:

Three crowding measures are used in this report namely household size, people per bedroom and the Canadian National Occupancy Standard (CNOS). These measures use two key variables, number of people in the household and the number of bedrooms in the house. The number of bedrooms in the tenant households is recorded in the property database. There are a number of different variables that measure the bedrooms in the applicant household.

HNZC in the past has recorded the number of bedrooms that the applicant household has access to and has used this to measure the crowding levels to assess the need for housing. As a result of the HC&HS, some additional fields have been added to the NA form to record the total number of bedrooms in the house and the number of other rooms (such as the lounge) that are being used as bedrooms. To calculate the number of bedrooms in the applicant house the 29 above variables have been incorporated in the following manner. If the “total bedrooms” is zero, then the “current bedrooms” is used instead, if the current number of bedrooms is also zero then the “other rooms used” is used instead.

Crowding Levels Measured by People Per Bedroom

One measure of crowding is to calculate the number of people per bedroom. A value more than 2 is considered crowded as it is generally accepted that there should not be more than 2 people per bedroom. Some households will be crowded at levels between 1 and 2 people per bedroom depending on the mix of occupants.

Two different methods were used to calculate the crowding levels for the applicants as follows:
1. People per bedroom = Total non-applicants + Total applicants

Total Bedrooms

2. People per available bedroom = Total applicants

Bedrooms applicants have Access to

This second method is the one that HNZC currently uses to measure crowding levels for applicants. As the formula shows, this method attempts to eliminate the effect of nonapplicants (where an applicant household is sharing a house with a non-applicant household) by removing them from both the numerator and denominator.

Canadian National Occupancy Standard

The Canadian National Occupancy Standard (CNOS) [6] measures the bedroom deficit by calculating the number of bedrooms needed for the household and comparing this to the number of bedrooms available. This gives the degree of bedroom deficit for crowded households. This method has been widely used in New Zealand to assess levels of household crowding [7]. The standard sets the bedroom requirements of a household using the following composition criteria:

1. There should be no more than two people per bedroom.

2. Parents or couples share a bedroom.

3. Children under five years, either of the same or opposite sex, may reasonably share a bedroom.

4. Children under 18 years of the same sex may reasonably share a bedroom.
5. A child aged five to 17 years should not share a bedroom with one under five of the opposite sex.

6. Adult 18 years and over and any unpaired children require a separate bedroom.
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