

## **A Residential Satisfaction Assessment of Public Rental Board Housing in the Greater Suva Urban Area, Fiji Islands**

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### **Abstract**

Residential satisfaction is an important measure of overall quality of life and determines how individuals respond to their housing environment. The study examines the level of tenants' satisfaction with Public Rental Board (PRB) flats in the Greater Suva Urban Area (GSUA), Fiji. The objective of the study is to investigate the factors affecting the residential satisfaction of tenants of PRB rental flats using a survey instrument measuring tenants' perceptive responses to the various facets of their housing environment. The study finds that PRB tenants have relatively higher satisfaction level for the building quality features and neighbourhood factors, whilst lower satisfaction level is recorded for the building physical design and housing management services. Physical building design features such as the size of bedrooms, dining areas, together with housing management features such as handling of tenant's complaints, and treatment of tenants, have been rated by tenants to be below satisfactory levels. The factorial ANOVA on the survey data indicates that there are no statistically significant differences in residential satisfaction levels attributed to independent variables such as age, education level, and family type. However, residential satisfaction levels were statistically different among the six PRB estates examined in the study.

**Keywords:** Greater Suva Urban Area; Housing; Public Rental Board; Residential Satisfaction

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## **Introduction**

The provision of affordable and good quality housing is an ongoing development concern for Fiji. The Public Rental Board (PRB) is a statutory body formed in 1989 with the mandate of developing and managing Fiji's public rental housing estates. Its establishment was in response to the recommendation of the World Bank to have a separate body corporate to manage the Housing Authority's (HA) rental flats (Public Rental Board, 2018). Amendments to the Housing Act of Fiji (Cap 267) provided the legislative basis for the establishment of the PRB. At the time of its establishment, the Board owned a total of 24 rental estates nationwide with an offering of 1,753 rental flats. The central role of the PRB is the provision of quality and affordable rental flats to low-income earners on a transitional basis. It is envisaged that PRB tenants will eventually take the pathway into home ownership. Since independence, public rental housing has continued to be an important tenure option in Fiji's national housing framework.

The steady rate of urbanization and concentration of job opportunities in towns and cities impinges on the ability of urban households to access good quality and affordable housing in the open market (Gabriel, 2008; Hassan, 2005). In 2016 alone, the PRB records a total of 1,020 applications registered in their waiting list from a total of 1,561 flats on offer (Public Rental Board, 2016). Notwithstanding the importance of public rental housing, there has been no empirical study to examine the residential satisfaction levels of PRB tenants. Residential satisfaction assessments are important for a number of reasons. Firstly, such assessments provide a basis to evaluate the success or otherwise of public housing provisions from the occupier's point of view (Bruin & Cook, 1997; Huang & Du, 2015; Liu, 1999; Mohammad-Abdul & Mohamed, 2012). Secondly, residential satisfaction studies provide useful information for planners, developers, and policy makers to improve the physical design and planning of housing, engendering better housing delivery outcomes (Mohammad-Abdul & Mahfoud, 2015; Mohammad-Abdul & Mohamed, 2012; Ukoha & Beamish, 1997). Thirdly, knowledge about the factors that shape residential satisfaction is critical in understanding the mobility decision process of households (Liu, 1999; Salleh, 2008). Finally, housing satisfaction studies are recognized as an important component of overall quality of life. An improvement in housing conditions translates to an overall betterment of an individual's quality of life (Amérigo & Aragonés, 1997; Galster & Hesser, 1981; Mohammad-Abdul & Mohamed, 2012).

Residential satisfaction is a complex construct. The complexity is attributed to the

multidimensional and fluid nature of the interaction between individuals and their housing environment. As a utilitarian concept, residential satisfaction measures the difference between actual and desired housing and neighbourhood situations (Galster & Hesser, 1981). Francescato & Weidemann (1979) define residential satisfaction as the emotional response to a person's dwelling, or the positive and negative feelings that occupants have for where they reside. Generally, the satisfaction level of a household with their present housing conditions is evidenced by either the absence or almost nonexistence of any complaints, or, conversely, by the high degree of congruence between the household's actual and desired housing situations (Mohit et al., 2010). A household assesses their satisfaction levels in terms of how well their current housing is compatible with the observed cultural and family norms that exist (Morris et al., 1976; Morris & Winter, 1975).

This study investigates the residential satisfaction levels of PRB housing tenants using a survey questionnaire targeted at six of the PRB rental estates situated within the GSUA. The GSUA is selected mainly due to the high concentration of PRB flats in the area as well as the diversity of the public rental unit types on offer. The outcome of the study will be instructive in providing feedback that will engender better planning, development, and delivery of public rental housing services in Fiji. Furthermore, the research outcome will assist in the formulation of policy prescriptions that will be more responsive in meeting the needs of the growing number of low-medium income households that are (or will be) served by the PRB.

### ***Housing in Fiji and the GSUA***

The National Housing Policy of 2011 (NHP) is the Fijian government's official response towards affordable housing for all Fijians. The NHP outlines the government's broad strategic outlook in addressing the housing challenge in Fiji, with explicit policy prescriptions toward the attainment of better housing outcomes. Rental housing in Fiji is often a neglected sector because of the general bias towards home ownership, as evident in the government's initiatives such as the First Home Owners (FHO) grant and value-added-tax refunds for home building materials. The NHP highlights that demand for public housing in Fiji will continue to grow in parallel with urbanization and the concomitant increase in urban population. Furthermore, it also highlights potential that exists for better coordination between the private sector and housing agencies such as HA and PRB in the area of land development for housing. Access to decent and affordable housing for low income groups will continue to be a challenge in Fiji in view of the growing number of low-income households and their limited affordability (Fiji Government, 2011).

The various housing tenure options in the GSUA consists of private owner-occupied homes/residences, multi-unit apartments, private and public rental, as well housing provided in the informal sector under squatter and *vakavanua*-type land-housing arrangements. According to a UN-Habitat report (2012), an estimated 17 per cent of the GSUA's population – some 44,000 people – live in 86 informal settlements located across the geographical area. Barr (2007) asserts that squatter housing prevails due to an inadequate supply of affordable, low-cost housing in urban areas. Land availability is an important precondition to large-scale land development for housing. The important stakeholders involved in housing provision in Fiji include the Ministry of Local Government, Housing and Environment; I-Taukei Land Trust Board (TLTB); Ministry of Lands & Mineral Resources; Housing Authority; Public Rental Board; Director of Town & Country Planning (DTCP); City/Town councils; commercial banks, as well as private real estate developers and investors.

The Fiji NHP addresses some important areas in relation to PRB operation. The first is the high management and maintenance costs of the PRB rental housing stock and the need to balance PRB's social and commercial responsibilities to safeguard the viability of its operations. In addition, tighter screening of PRB tenants will assist in identifying those who can afford to graduate to market-rented houses or into home ownership, thus allowing more deserving tenants to access PRB housing (Fiji Government, 2011). The strategies proposed under the NHP to address these concerns include transferring the maintenance cost of public housing to tenants, and ensuring that rentals of public housing are appropriately indexed to market to avoid distortions in the rental market, in turn improving cost recovery of public housing for reinvestment. These strategies, once in force, will undoubtedly influence the future operations of PRB and in turn affect the residential satisfaction levels of PRB tenants with their occupied housing units.

## **Literature Review**

Residential satisfaction studies have been classified into two broad strands (Weidemann & Anderson, 1985). The first strand conceptualizes residential satisfaction as a criterion of evaluating residential quality. Under this strand, residential satisfaction is a dependent variable that is influenced by the user's ranking of a range of housing attributes. These attributes encompass all facets of an individual's housing environment (Amérigo & Aragonés, 1990). In the second category, residential satisfaction is treated as a variable that influences residential mobility decisions. Under this strand, residential satisfaction is construed as a predictor of behaviour and, therefore, an independent variable (Amérigo &

Aragonés, 1997; Américo & Aragonés, 1990). This conceptual framing postulates that housing satisfaction level will influence the behaviour of the occupier to either make changes to their housing unit, or move to another housing unit in order to bring their current housing needs and housing services offered into alignment. Stated differently, residential satisfaction acts as a predictor of the likelihood of household behaviour in making housing adjustment decision (Morris, et al., 1976; Weidemann & Anderson, 1985).

Residential satisfaction theory, in essence, examines the complex interaction between households and their residential environment. Earlier writing by Rossi (1955) introduced the notion of “housing need” to elucidate the notion of residential satisfaction, stating in effect that housing needs and aspirations change as the household unit progresses through different life cycle stages. Rossi observes that housing needs arise directly from the composition of the family or household. This idea has been somewhat expanded by Rodgers (1962), as cited in Morris & Winter (1975), in that it seems preferable to base the idea of changing housing needs on the progression of norms that governs a family's behaviour as the household composition changes. As the composition and size of the family changes over the course of time, the norms that apply to them change as well, influencing their satisfaction level. Residential satisfaction arises only to the extent that the household perceives that their current housing meets their housing needs.

Further theoretical contributions to the subject of residential satisfaction by Morris & Winter (1975) introduced the concept of “housing deficit”. They asserted that households judge their housing condition according to two types of norms, personal and cultural, which may not coincide. Any incongruity between the actual housing needs and housing norms results in a housing deficit, which engenders a state of residential dissatisfaction, leading further to some form of housing adjustment. This housing adjustment may be either in-situ, such as revisiting their housing needs and aspirations in order to reconcile the incongruity, or it may take the form of improvement to their existing housing conditions through remodelling or eventually, if incongruity persists, the household may move to another place and bring their housing into conformity with their aspirations and needs (Morris & Winter, 1978, as cited in Mohit, et al., 2010). As alluded to by Speare (1974), dissatisfaction attributed to housing deficiency can result from a change in the needs of the household, change in the social and physical amenities offered by a particular location, or a change in the normative standards used to evaluate these factors.

The work of George (1985) is also instructive in adding to the theory of residential

satisfaction, highlighting the notion of psychological construction of residential satisfaction. He theorized that individuals may be seen as cognitively constructing a reference condition for each particular facet of their residential situation. The quantity or quality of the given facet implied by the reference point will depend on the individual self-assessed needs and aspirations. If the current housing situation is perceived to be in proximate congruence with (or superior to) the reference situation, a psychological state of satisfaction should be manifested. If, on the contrary, the current housing situation falls short of the reference condition, then the households may either choose to reconcile the incongruence by adaptation, or they may reduce their dissatisfaction by altering the conditions of the present dwelling unit or moving to another more congruent residential situation (Foote et al., 1960, as cited in Galster, 1987).

There is little consensus in the literature on the general pattern of residential satisfaction and the specific factors that influence it across different socio-economic groupings, countries, and cultures (Ibem et al., 2013; Mohammad-Abdul & Mohamed, 2012; Mohit et al., 2010). Variation in residential satisfaction scores can be attributed to factors such as socio-economic and demo-graphic characteristics of residents, the housing tenure options, housing quality & standards, and the housing acquisition process, as well as differences in values and meaning that people attach to their residential environment (Ibem et al., 2013). These differences justify the need for country-specific assessment of residential satisfaction. Furthermore, residential satisfaction is an inherently dynamic process, capturing the contextual changes in the interactions between individuals and households with their housing environment over time and space.

The extant literature on residential satisfaction identifies a broad range of housing factors that directly or indirectly influence residential satisfaction levels. These individual factors contribute to a composite measure of residential satisfaction score (Galster, 1987). The various factors drawn from the literature include building physical features and design, the housing services and condition, public facilities provided, social environment within the housing area, housing management practices, and etc. (Amérigo & Aragonés, 1997; Huang & Du, 2015; Liu, 1999; Mohammad-Abdul & Mahfoud, 2015; Mohammad-Abdul & Mohamed, 2012; Ukoha & Beamish, 1997; Weidemann & Anderson, 1985). Building physical features include the number and size of bedrooms, privacy, and location of kitchen, etc., whilst building quality features relate to the level of amenities and services offered. The neighbourhood amenity factors include distance to school, employment, medical, public transport, community centres, and shopping facilities. Management

services, particularly in the context of public housing, relates to the enforcement of rules, handling of complaints, etc. In addition, residential satisfaction is also hypothesized to change in relation to the socio-economic characteristics of the residents, covering aspects such as household/tenants age, income, duration of residence, and housing tenure status.

The effects of the age of the resident(s) on residential satisfaction level has been mixed. For in-stance, Chapman & Lombard (2006), and Lu (1999) find that older people are more satisfied with their housing services, while in a more recent study, Mohit, et al. (2010) argued that the age of the household is negatively related to housing satisfaction. Another important variable considered is the income level of the household and its effect on residential satisfaction. There is consensus in the literature that income exerts a positive effect on residential satisfaction. For in-stance, Yearns (1972) as cited in Mohit & Raja (2014), observed that a significant relationship exists between income and housing satisfaction, a sentiment supported by the work of Adriaanse (2007), and Lu (1999), who also affirmed that higher-income households are generally satisfied with their housing. The reason for this, as Frank (2009) contends, is that higher-income families have more housing options and are also able to move to a suitable house in an attractive neighbourhood, which may result in a relatively higher level of satisfaction.

In addition to socio-demographic variables, studies on residential satisfaction have also investigated the effects of the housing physical characteristics. Housing physical attributes have been found to have a significant effect on housing satisfaction, either positively or negatively (Jiboye, 2009; Parkes et al., 2002). The housing unit's physical characteristics include the size and position of kitchen space, laundry and washing areas, size of living area and dining area, number of bedrooms and bathrooms, etc. Housing quality variables include issues such as privacy, housing services, safety, lighting, and ventilation of the house (Mohit & Raja, 2014). In assessing satisfaction in public housing in Nigeria, Ibem, et al. (2013) observed that residents of public housing in Ogun State were generally dissatisfied with their housing conditions, but enjoy higher satisfaction levels with dwelling unit features than neighbourhood facilities and services. Furthermore, building features such as number of bedrooms, size and location of kitchen, and quality of housing units have shown to be strongly related to residential satisfaction (Noriza & Nadarajah, 2010). Morris, et al. (1976) found a positive relationship between number of rooms and housing satisfaction. Whilst Speare (1970), and Stewart & Mccown (1977) found a negative relationship between person-per-room ratio and housing satisfaction.

The neighbourhood profile of the area also affects residential satisfaction levels. Lu (1999) argues that neighbourhood satisfaction has been shown to be an important predictor of dwelling satisfaction. In their study, neighbourhood amenities of the area include elements such as distances travelled to school, access to employment and medical centres, recreational and civic opportunities, as well as the geographical location of housing estates. Accessibility to the public transportation, community and shopping facilities, and physical environment variables have been noted as predictors of neighbourhood satisfaction (Ozo, 1990). The study by Mohammad-Abdul & Mohamed (2012) in Maldives showed that the majority of the residents in public housing were not highly satisfied with their present housing situation, but for services and public facilities the satisfaction levels were higher. In another study, using the Hangzhou public housing household survey data in China, Huang & Du (2015) observed that neighbourhood environment, public facilities, and housing characteristics are the main factors that influence residential satisfaction. Lastly, in a Korean study, Jun & Jeong (2018) observed that social mix influences residential satisfaction, with higher satisfaction levels recorded for housing that randomly mixes public housing with private housing in the same building (in comparison to buildings devoted entirely to only public housing).

The foregoing review indicates that residential satisfaction comprises satisfaction with various aspects of the housing unit, which taken together provides a composite measure of the satisfaction level. Furthermore, overall satisfaction level is specific to a particular housing context. The contexts that give rise to differences in empirical findings relates to the type of housing studied and the housing delivery methods adopted, the culture of housing of the area or country, and the housing policy adopted, in addition to the idiosyncrasies of the neighbourhood and development progress of the country itself, etc. For this reason, residential satisfaction assessments must be tailored to capture the specific context of the study, and conclusions drawn must be interpreted with these caveats in mind.

### **Objective of the Study**

The aim of the paper is to identify the factors influencing PRB tenant's satisfaction level with their occupied rental units and to further assess the effects of these factors on overall residential satisfaction. The objectives guiding this research are as follows:

- a) To examine the factors affecting the overall residential satisfaction/dissatisfaction with PRB occupied rental flats
- b) To explore the levels of residential satisfaction/dissatisfaction perceived by the tenants of PRB housing



## **Research Methodology**

The data for this study is collected through a survey questionnaire based on four housing factors, namely physical features & designs, housing quality and amenities, neighbourhood services & amenities, and housing management services. The field survey was administered by University of the South Pacific (USP) Land Management major students that have undergone the requisite training on administering the survey competently and effectively. The survey was carried out over a period two months, allowing ample time for follow-ups on the questionnaires. The research adopts a stratified, random sampling method in the selection of the PRB estates for the study, guided by the motive of ensuring balance between old and newer estates, location of the estates, as well as obtaining a good mix of the different types of rental units.

There are 14 PRB housing estates in the study area, with a combined total rental offering of 956 flats (see Appendix A). The study focused on six out of the 14 PRB estates, namely Nadera, Raiwai (Kia Street), Raiwai (MacFarlane), Toorak (Charles Street), Nabua (Mead Road), and the new Kalabu estate. Respondents (tenants) that were surveyed were selected randomly from the six estates. The survey questionnaire was piloted first to student researchers to ensure that the questions asked are clearly formulated and easy to understand. A total of 270 questionnaires were administered across the six study sites and all questionnaires were returned. A total of 18 questionnaires were deemed incomplete (missing values), and thus not unusable for analysis. This resulted in a total valid count of 252 questionnaires, a sample representing 26.4% of the total number of households in the chosen area of study.

The survey questionnaire is designed to measure residential satisfaction levels following a Likert Scale format, where the respondents were asked to evaluate their responses to a series of variables under each of the four broad housing factors (components). The overall satisfaction for each variable was analysed based on a mean score of 3.00 as a positive indication of satisfaction, and values below 3.00 indicating dissatisfaction. The questionnaire structure consists of five sections, with section 1 pertaining to the respondent's/household's basic information. Section 2 comprises variables measuring satisfaction with physical building design features, section 3 addresses building quality and services. Housing neighbourhood features is in section 4, and the final section captures questions measuring satisfaction with PRB housing management services. Overall satisfaction for each housing factor comprises an aggregation of the elemental scores across each of the variables used to measure that factor/component (see Table 1 below).

Table 1. Residential Factors and Variables Selected for Measuring Residential Satisfaction

<b>Factors</b>	<b>Variables</b>
Housing Physical Features	Position of stairs & access to house, position of living rooms, position of kitchen, position of toilet & shower, size of living room, kitchen, bedroom, dining rooms, no. of bedrooms, privacy level, study space, cyclone integrity of the building
Housing Quality Features	Water pressure level in flat, quality of exterior and interior construction, quality of flooring, quality of windows, quality of lightings, quality of interior & exterior painting, quality of doors, plumbing quality
Housing Neighbourhood Features	Accessibility to schools, shopping centres, medical facilities, public transport, recreational facilities, churches and places of worship, accessibility to police stations/postal services, security level of neighbourhood, neighbourhood relations and connectedness
Management Services	Garbage collection, rental level & review, PRB rules & regulations, enforcement, tenant relations, handling of tenants' complaints, response to repair requests

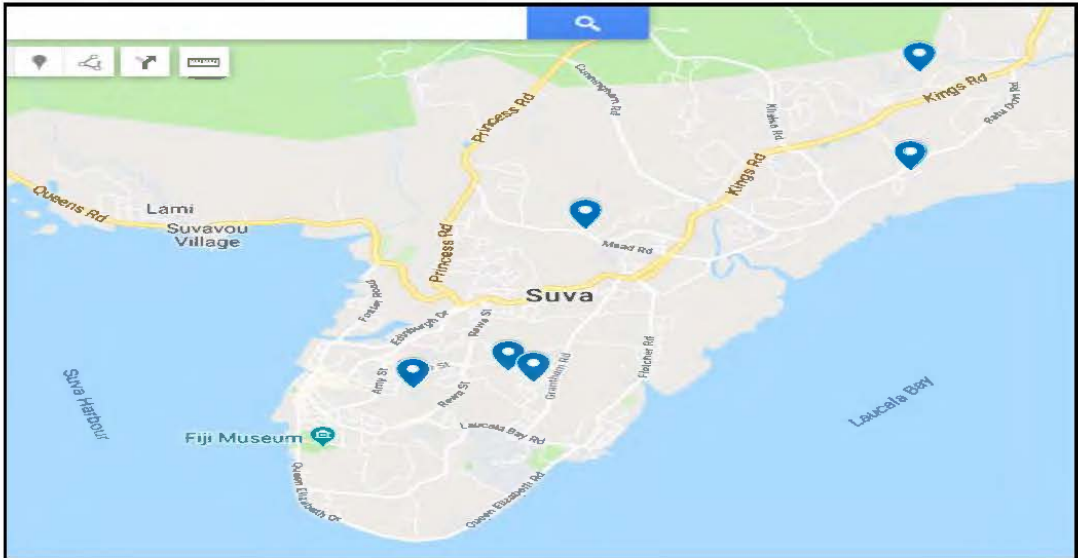
Data collected was analysed through SPSS for frequency distribution of the variables under study, including mean, standard deviation, and percentage scores of satisfactions. Further analysis was carried out using cross tabulation, correlation analysis (Pearson  $r$ ), and a regression analysis of variables. Multiple linear regression analysis was applied by regressing the variables capturing the various housing components against the overall residential satisfaction scores to ascertain which of the predictor variables exerts the largest influence on the overall satisfaction levels with PRB housing estates. Factorial ANOVA tests were also conducted to test residential satisfaction levels across different locations (estates) and socio-economic variables such as household type, education level, age group, as well as housing unit type occupied.

### ***The Study Area***

The study examines tenants' residential satisfaction with PRB flats located within the GSUA. The GSUA covers the municipal areas of Suva, Nasinu, Lami, and Nausori. According to a UN Habitat report (2012) on Fiji's urban profile, the GSUA

has a population of 244,000, and hosts 55% of Fiji's urban population. Furthermore, the GSUA is Fiji's economic centre, generating an estimated 30% of the national gross domestic product. Suva is the capital of Fiji, where the seat of parliament is located, and also boasts the core of Fiji's businesses, retail and trade, education, recreation, culture, and civic functions.

Figure 1. Map of the GSUA with PRB Study Sites



Source: Google Maps

The townships of Lami and Nasinu are satellite towns that formed as a result of the gradual expansion of the economic base of Suva. This urban expansion, coupled with intensifying urbanization and denser urban land-use activities, fostered a steady growth of these municipalities. The six PRB estates selected for this study include Nadera, Mead Road, Raiwai (McFarlane), Raiwai (Kia Street), Charles Street (Toorak), and the new Kalabu PRB estate, which opened in 2016. The PRB rental unit type on offer to prospective tenant's ranges from open rooms units, one-bedroom units as well as two-bedroom units. The PRB estates vary in term of age, size and physical design with a mix of two and three storey's buildings and single storey duplexes.

## Empirical Results & Discussion

The socioeconomic profile of the sample ( $N = 252$ ) is summarized in Table 2. In terms of the gender profile of respondents, approximately 60% of those interviewed are females and the remaining 40% are males. In regards to the age group of the respondents, those that fall in the 18-30-year-old category represent 28.6% of the

sample, whilst 44% of the sample fall in the 31-50-year-old category, and the remaining 27.4% are 51 years old and above. In terms of marital status, approximately 58.7% of the respondents are legally married couples, with the balance categorized as single adults (24.2%), widows/widowers (8.7%), and those in the divorced and de-facto category (8.3%).

Table 2. Socio-economic Characteristics of the Survey Respondents

Characteristics		Frequency	Percent	Cum. Percent
Gender	Female	152	60.3	60.3
	Male	100	39.7	100.0
Age	≥ 51 years	69	27.4	27.4
	31-50 years	111	44.0	71.4
	18-30 years	72	28.6	100.0
Marital Status	Widow/Widower	22	8.7	8.7
	Divorced & Defacto	21	8.3	17.1
	Single	61	24.2	41.3
	Married	148	58.7	100.0
Ethnicity	Others	11	4.4	4.4
	Rotuman	13	5.2	9.5
	Indo-Fijian	26	10.3	19.8
	iTaukei	202	80.2	100.0
Education	Tertiary	108	42.9	42.9
	Secondary level	129	51.1	94.0
	Primary level & no education	15	6.0	100.0
	No formal education	6	2.4	100.0
Living Arrangement	Extended family	68	27.0	27.0
	Non relation & Alone	21	8.3	35.3
	Single parent family	36	14.3	49.6
	Nuclear (two parent)	127	50.4	100.0
Building Unit Type	flat in multi-unit	194	77.0	77.0
	semi-detached	58	23.0	100.0
No. of Bedrooms	Open room	117	46.4	46.4
	two bedrooms	49	19.4	65.9
	one bedroom	86	34.1	100.0
Employment	No	16	6.3	7.9
	Yes	236	93.7	100.0
Employment Type	Others	27	11.4	11.4
	NGO's	3	1.3	12.7
	Self Employed	15	6.4	19.1
	Private Firm	142	60.2	79.3
	Civil Servant	49	20.8	100.0
Characteristics	Mean	Standard Deviation		
Family Size	4.67	1.92		
Household Income	714.74	467.57		

The ethnic composition of the sample households comprises of 80.2% iTaukei, 10.3% Indo-Fijian, 10.3% Rotuman, and 4.4% other. In terms of education level, most of the respondents (51.2%) reached as far as secondary school level education, whilst 42.9% attended tertiary level education (certificate level and higher), with the remaining 6% capturing those educated up to primary school level. The family living arrangements of most of the households surveyed is classified as a nuclear family type arrangement (50.4%), with the remaining categories comprising extended-family type arrangements (27%), single-parent families (14.3%), and those living with a non-relation or living alone (4.4%).

PRB offers a number of different building types. In the sample, 73.8% of the buildings occupied were multi-unit residential buildings of two floor levels or higher, while 23.0% were single-storey, semi-detached buildings, such as duplexes and row housing. In terms of specific rental-unit type, from the total PRB units surveyed, 46.4% of the units were open-plan rooms, with 34.1% classified as one-bedroom units, and 19.4% classified as two-bedroom units. In regards to the employment profile of the households surveyed, 92.1% of the households have at least one family member actively employed, with the balance of those households being on pension or social welfare, or supported by family relations (7.9%). For households surveyed that are in formal employment, 56.3% are employed in the private sector, with 18.7% employed in the government/public sector, whilst the balance (25%) comprises those classified as either self-employed or employed with non-government organizations (NGO's). The average monthly household income for the surveyed households is approximately FJD 714.00, and the average household size is approximately five persons.

### ***Tenant's Satisfaction with Housing/Residential Environment***

The study examines the residential satisfaction of tenants of PRB based on four factors/components of the tenants' housing environment, namely physical design features of the housing unit, quality and amenities of the housing unit, neighbourhood services, and amenities and housing management services. A total of 37 variables have been used to capture the four housing factors/components (Table 1). Table 3 provides an overall summary of residential satisfaction scores across each of the four housing components. The overall count under each housing component varies depending on the total number of variables used to explain that housing factors/component.

The survey results indicate that, overall, 38% of the respondents were either “very dissatisfied” or “dissatisfied” with the physical features of the housing unit, while 40.5% were either “very satisfied” or “satisfied”, and the balance (21%) remain “neutral”. In regards to the building amenities and quality, more than half (52%) were either “satisfied” or “very satisfied” with the building amenities and quality level, whilst 27% were either “dissatisfied” or “very dissatisfied”. For neighbourhood services and amenities, the majority of the respondents (76.9%) were either “satisfied” or “very satisfied” with the residential neighbourhood they are located in, with only 14% expressing that they were “dissatisfied” or “very dissatisfied” with the neighbourhood aspect of their housing environment. In regards to the perception of tenants on PRB housing management service and functions, 46% of the respondents indicated that they were either “satisfied” or “very satisfied”, 18% were “neutral”, whilst 35% expressed that they were “dissatisfied” or “very dissatisfied” about the management services.

### ***Satisfaction with physical characteristics of the rental unit***

In this study, 12 variables relating to the physical design characteristics of the housing units were examined. The results of the survey indicate that the households surveyed expressed the highest level of satisfaction with the position of the stairs and/or access point to the housing unit ( $MS = 3.47$ ), as well as the position of the toilet unit ( $MS = 3.22$ ), and the position of the rooms ( $MS = 3.10$ ). The respondents expressed the most dissatisfaction with the availability of space for study ( $MS = 2.52$ ), the size of the area designated for dining ( $MS = 2.59$ ), the privacy-level of the housing units ( $MS = 2.66$ ), the size of the area kitchen or cooking area ( $MS = 2.77$ ), as well as the cyclone worthiness of the building ( $MS = 2.72$ ).

### ***Satisfaction with the Housing Unit Quality & Amenity***

A total of nine variables were utilized in this study to measure the general satisfaction level with the building quality & amenity level. In general, the respondents were most satisfied with the water pressure level in the building ( $MS = 3.92$ ), as well as the quality of the lighting used in the housing unit ( $MS = 3.41$ ), and the quality of the flooring system ( $MS = 3.34$ ). By contrast, the variables that the respondents were most dissatisfied about include the functionality of the plumbing system of the units ( $MS = 2.88$ ) as well as the quality of the doors ( $MS = 2.99$ ). Overall, it is observed that the respondents were generally satisfied with the quality and amenity features of the building/housing units.

Table 3. Satisfaction with the Four Housing Factors ( $N = 252$ )

Housing Factors		Count	Percent
Physical Structure (12 Variables)	Very Dissatisfied	543	18.0%
	Dissatisfied	614	20.4%
	Neutral	634	21.0%
	Satisfied	1001	33.2%
	Very Satisfied	220	7.3%
	Total	3012	100.0%
Building Quality (9 variables)	Very Dissatisfied	213	9%
	Dissatisfied	406	18%
	Neutral	467	21%
	Satisfied	921	41%
	Very Satisfied	252	11%
	Total	2259	100%
Neighbourhood Quality (9 variables)	Very Dissatisfied	128	5.7%
	Dissatisfied	188	8.3%
	Neutral	206	9.1%
	Satisfied	1016	45.0%
	Very Satisfied	721	31.9%
	Total	2259	100.0%
Management Function (7 variables)	Very Dissatisfied	240	14%
	Dissatisfied	375	21%
	Neutral	323	18%
	Satisfied	517	29%
	Very Satisfied	302	17%
	Total	1757	100%

### *Satisfaction with the Neighbourhood Amenity of the Estate*

To capture the effect of neighbourhood amenity and services on tenants' residential satisfaction, a total of nine variables were utilized. The survey results indicate that the respondents are more than satisfied with their housing neighbourhood in relation to variables such as access to shopping & retail centres ( $MS = 4.25$ ), access to schools ( $MS = 4.17$ ), access to a medical centre ( $MS = 4.09$ ), access to public transport services ( $MS = 4.01$ ), and access to a place of worship ( $MS = 4.09$ ). This indicates that most of the PRB estates are located in neighbourhoods with good connectivity

to positive externality factors, which is apparent in locations such as Raiwai, Toorak, and Nadera. Satisfaction levels were slightly lower (albeit still more than  $MSL = 3$ , denoting indifference) for neighbourhood factors such as access to recreational opportunities ( $MS = 3.24$ ), neighbourhood security level ( $MS = 3.24$ ), and degree of neighbourhood relation and connectedness ( $MS = 3.94$ ). The overall sentiment shared by the respondents is that they are generally very satisfied with the neighbourhood amenity level and services of PRB estates.

### ***Satisfaction with PRB Housing Management Services***

Residential satisfaction is also contingent on how well the management services are carried out routinely by the PRB. This is particularly important for public rental housing where the landlord is a public agency acting as a quasi-property management firm overseeing tenant relation issues. A total of seven variables were used to measure the efficiency and effectiveness level of various aspects of the PRB estate management functions. The results indicate that respondents are satisfied with garbage collection ( $MS = 3.8$ ), management rules & regulations ( $MS = 3.48$ ), and rental review process ( $MS = 3.37$ ). The variables that tenants are least satisfied about in relation to PRB management functions relates to the handling of complaints lodged by the tenants ( $MS = 2.67$ ) as well as the duration of time that PRB management takes to respond to repairs requested by tenants ( $MS = 2.43$ ). Furthermore, tenants are also generally neutral (i.e., neither satisfied nor dissatisfied) about how PRB management enforces the rules and regulations of the estate ( $MS = 3.04$ ).

### ***Housing Factors Influencing Residential Satisfaction with PRB Rental Flats***

Pearson correlation ( $r$ ) analysis was carried out between the residential satisfaction scores against the scores of the four housing components used in this study (Table 5). The analysis indicates that all of the housing factors are strongly correlated with overall residential satisfaction, with the highest correlation score recorded for the building quality and amenities (.826\*\*), followed by building physical features (.776\*\*), management services (.701\*\*), and neighbourhood services & amenities (.604\*\*). This indicates that tenants consider the building physical characteristics as well as the building quality and amenities offering important variables that affect their overall satisfaction with their housing environment.

The result of person correlation analysis (Table 4) between residential satisfaction and socio-economic factors indicates that there exists statistically significant negative correlation ( $\alpha = .05$ ) between residential satisfaction and the number of occupants, as well as the existence of family relations in the same neighbourhood.



The negative correlation between residential satisfaction and number of occupants is consistent with the findings of Speare (1974), and Mccown & Stewart (1977). Socio-economic variables such as age, marital status, income, unit type, and living arrangement positively affect residential satisfaction. On the other hand, variables such as living arrangement, employment, and length of time renting all negatively affect residential satisfaction.

Table 4. Pearson Correlation Between Housing Factors Overall Residential Satisfaction

<b>Correlations</b>					
	Building Quality index	Physical Feature Index	Neighbourhood Feature Index	Management Index	Overall RS Index
Building Quality Index	1	.510**	.315**	.479**	.776**
		.000	.000	.000	.000
	251	251	251	251	251
Physical Feature Index	.510**	1	.283**	.397**	.826**
	.000		.000	.000	.000
	251	251	251	251	251
Neighbourhood Feature Index	.315**	.283**	1	.316**	.604**
	.000	.000		.000	.000
	251	251	251	251	251
Management Index	.479**	.397**	.316**	1	.701**
	.000	.000	.000		.000
	251	251	251	251	251
Overall RS Index	.776**	.826**	.604**	.701**	1
	.000	.000	.000	.000	
	251	251	251	251	251

A stepwise multiple linear regression model was applied to examine the effect of all 37 variables used in the study against the overall residential satisfaction score. Following standard stepwise regression procedure (results in Table 5), the model identifies 12 variables as predictors for residential satisfaction - position of kitchen, management enforcement of tenancy rules, quality of housing exterior, size of dining place, quality of interior painting, neighbourhood relations and connectedness, bedroom sizes, management treatment of residents/tenants, as well as access to places of worship, quality of doors, and rental review. The 12 variables in the regression model explained 95% of the variation in the dependent variable – i.e., the overall satisfaction of residents (adjusted  $R^2 = 0.954$ ,  $df = 12$ ,  $F = 410.97$ ,  $p < 0.001$ ). According to the  $p$ -value, this model can be considered an appropriate scale to

measure overall satisfaction. The individual beta coefficient indicates that variables such as position of kitchen, quality of house exterior, size of bedroom & dining, accessibility to medical services, and management treatment of residents are important consideration for tenants occupying PRB rental estates. Management factors such as treatment of tenants, the enforcement of rules and regulations for all residents of the estate, as well as management handling of issues pertaining to the rental levels and review are particularly important areas for improvement highlighted by the tenants.

Table 5. Stepwise Regression Results (Variables Against Overall Residential Satisfaction Score)

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	9.582	1.946		4.923	.000
Structure: position of kitchen	3.842	.363	.214	10.591	.000
Management: enforcement rules	1.995	.361	.108	5.520	.000
Quality: House exterior	3.781	.351	.179	10.762	.000
Neighbourhood: Medical Centre	3.345	.409	.143	8.174	.000
Structure: size of dining area	2.855	.387	.155	7.369	.000
Quality: Interior & ext. painting	2.068	.340	.106	6.076	.000
Neighbourhood: relation & connect	2.977	.386	.126	7.715	.000
Structure: Size of bedroom	3.465	.388	.179	8.925	.000
Management: Treatment of resident	2.360	.357	.128	6.606	.000
Neighbourhood: Access worship place	2.862	.431	.118	6.646	.000
Quality: Main External Doors	2.182	.328	.116	6.654	.000
Management: Rent review	1.810	.297	.102	6.088	.000

Dependent Variable: Residential Satisfaction overall score

Note: Adjusted  $R^2 = 0.95$

### ***Analysis of Variance (ANOVA)***

The survey data was further analysed using factorial ANOVA, a univariate data analysis tool, to study the effect of two or more independent, categorical variables on the dependent variable. In this study, factorial ANOVA is applied to test if there are statistically significant differences in residential satisfaction scores attributed to the different level of the independent variables tested. In other words, the study tests whether the selected independent variables are statistically significant in explaining differences in residential satisfaction levels. The independent variables tested include PRB housing estates, household types, age groups, and education levels. The PRB estates variable consists of six levels (which represent the six study sites), age consists of three levels, and education attainment has three levels, whilst household types have four levels. The dependent variable is the overall residential satisfaction score for each respondent in the survey.

Following standard ANOVA procedures for data treatments, such as normality and homogeneity of variance tests, the factorial ANOVA tests hypothesis expressed the following:

- HO: There are no statistical differences in residential satisfaction attributed to the levels of the selected independent variables (i.e., PRB estates, household types, age groups, education attainment levels)
- H1: Residential satisfaction levels statistically differ across the levels of the selected independent variables (i.e., PRB estates, household types, age groups, education attainment levels)

The Factorial ANOVA test is conducted using SPSS with an alpha level of 0.05 (i.e.,  $\alpha = .05$ ). The result of the homogeneity of variance test (Levine's test) with  $p$ -value of 0.553 signifies that the dataset fulfils the homogeneity of variance assumption for factorial ANOVA tests. For the purpose of this study, only the main effects for each independent variable are examined without endeavouring to explore any interaction effects amongst the independent variables. The objective is to isolate the main effects to determine whether there exist statistically significant differences within levels of each of the independent variables.

Table 6: Factorial ANOVA Output for Residential Satisfaction

Dependent Variable: Overall RS Index

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	23213.214 <sup>a</sup>	12	1934.434	4.366	.000
Intercept	1251702.785	1	1251702.785	2825.094	.000
Age	508.458	2	254.229	.574	.564
Education	531.501	2	265.750	.600	.550
PRB Estate	19070.969	5	3814.194	8.609	.000
Household Type	1520.877	3	506.959	1.144	.332
Error	105449.695	238	443.066		
Total	3828765.000	251			
Corrected Total	128662.908	250			

a. *R Squared* = .180 (Adjusted *R Squared* = .139)

The findings of the factorial ANOVA (see Table 6) indicates that variables such as age, education, and household type are not statistically significant in explaining differences in residential satisfaction with *p* values of 0.564, 0.550 and 0.332 respectively, which are all greater than the rejection level of  $\alpha = .05$ . Thus, the null hypothesis cannot be rejected and no statistically significant main effect is observed. However, there are statistically significant differences in residential satisfaction scores among the different PRB estates with *p* value (.001) that is less than  $\alpha = .05$ . For the independent variable PRB estate we reject the null hypothesis and conclude that there are statistically significant differences in residential satisfaction among the six PRB estates. A post-hoc test to further examine the pairwise differences within the group reveals that with the exception of Kia Street estate (which records no statistically significant differences) all other PRB estates means are statistically significantly different from the mean score for the Mead Road PRB estate (see Appendix). Residential satisfaction mean scores were the lowest for the Mead Road estate from among the six PRB estates study sites. This could be explained by the fact that Mead Road estate is characterized as one of the older and more densely populated estates due to the number of storeys of the building, as well as the fact that the unit type offered at Mead Road comprises of only open rooms units, which lack proper kitchen and adequate living spaces, in addition to its location away from main commercial centres and employment opportunities.

## Conclusion

The study examined the PRB tenant's satisfaction with PRB housing estates in the

GSUA utilizing four broad housing factors/components and 37 variables. Residential satisfaction assessment is based on tenants' perception of how satisfied they are with the physical features of the housing unit, the quality and amenities provided within the housing unit, the neighbourhood services & amenities, and the PRB housing management services. The study found that, overall, the PRB tenants are most satisfied with the level of neighbourhood services and amenities, and the building quality and amenity levels, with slightly lower satisfaction levels recorded for the management services variables, and the physical features of the housing unit. Respondents expressed dissatisfaction with physical housing features such as availability of space for study, dining, privacy of the units, space for dining, and cyclone resistance status of the building. Improvement in these dimensions of the housing will lead to improvements in overall residential satisfaction for PRB housing estates.

Pearson correlation matrix of housing factors and residential satisfaction indicates that all four housing factors – physical housing features, building amenity and quality, neighbourhood service and amenities, and housing management are all positively correlated with residential satisfaction. The result of the stepwise regression analysis further indicates those variables considered to be important for tenant's satisfaction relates to building amenity variables (quality of building interior and exterior, painting, and quality of doors) as well as management factors and neighbourhood factors such as distance to medical services, and places of worship, as well as neighbourhood relations.

In general, the study reveals that tenants of PRB housing estates express lower satisfaction with the physical features of their dwelling units but expressed higher satisfaction level with building quality variables as well as variables that measure the neighbourhood amenities and services. This could be attributed to the fact that the majority of the tenants have been residing in PRB for more than 10 years and have become acclimatized to their housing neighbourhood environment. This is further supported by the number of respondents that expressed that they have no immediate desire to move out of their occupied units in the short term. Furthermore, the result of factorial ANOVA tests indicates that there are no statistically significant differences in residential satisfaction levels attributed to independent variables such as age, education level, and family type. Residential satisfaction levels were however observably different among the six PRB estates studied.

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## Appendix A

ESTATE	Type of Room	Year Established	Town/City	Total Flats
Macfarlane (new)	2 Bed Room Flat	2005	Suva	43
Marfarlane (old)	1 Room Flat	1979	Suva	36
Kia Project	1 Bedroom Flat	2006	Suva	27
Kia Estate	1 Room & 1 Bedroom Flat	1979	Suva	54
Charles st	1 Room Flat	1964	Suva	94
Mead Road	1 Room Flat	1965	Nabua	168
Newtown DB STOREY	2 Bedroom Flat	1985	Nasinu	21
Newtown Project 2 & 3	1 Bedroom Flat	1995	Nasinu	51
Nadera	2 Bedroom & 1 Room Flats	1974	Nasinu	142
Kalabu	1 Bedroom	1981	Nasinu	63
Kalabu Project	1 Bedroom	1999	Nasinu	6
Kalabu Project	1 Bedroom	2004	Nasinu	5
Raiwai Pro	1 & 2 Bedroom Flats	2015	Suva	210
Kalabu Project	1 Bedroom Flat	2017	Nasinu	36
Total number of PRB flats, Greater Suva Area				956

## Appendix B

### (A) Residential satisfaction with housing physical features

Variables	N	Minimu m	Maxim um	Mean	Std. Deviation
Structure position stairs	252	1.00	5.00	3.4701	1.10005
Structure position rooms	252	1.00	5.00	3.1076	1.20681
Structure position kitchen	252	1.00	5.00	2.9602	1.26428
Structure position toilet	252	1.00	5.00	3.2231	1.20914
Structure size living room	252	1.00	5.00	2.9841	1.19321
Structure size kitchen	252	1.00	5.00	2.7769	1.23532
Structure size bedroom	252	1.00	5.00	3.0518	1.17359
structure size dining	252	1.00	5.00	2.5976	1.23346
Number bedrooms	252	1.00	5.00	2.8765	1.24124
Privacy level	252	1.00	5.00	2.6653	1.26157
Space study	252	1.00	5.00	2.5299	1.23049
Cyclone resist	252	1.00	5.00	2.7251	1.23293

**(B) Residential satisfaction with housing quality features & amenity**

<b>Variables</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Quality water pressure	252	1.00	5.00	3.9283	.99340
Quality house exterior	252	1.00	5.00	3.3068	1.07215
Quality interior ceiling walls	252	1.00	5.00	3.1673	1.14712
Quality floors	252	1.00	5.00	3.3466	1.07860
Quality windows ventilation	252	1.00	5.00	3.1235	1.19193
Quality lighting	252	1.00	5.00	3.4143	1.11518
Quality interior ext. painting	252	1.00	5.00	3.1952	1.16178
Quality doors	252	1.00	5.00	2.9920	1.20993
Functioning plumbing	252	1.00	5.00	2.8884	1.14346

**(C) Residential satisfaction with neighbourhood services & amenity**

<b>Variables</b>	<b>N</b>	<b>Minimu m</b>	<b>Maxi mum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Neighbourhood school	252	1.00	5.00	4.1753	.90396
Neighbourhood shopping	252	1.00	5.00	4.2590	.78017
Neighbourhood medical health	252	1.00	5.00	4.0996	.96852
Neighbourhood public transport	252	1.00	5.00	4.0120	1.08989
Neighbourhood sports recreation	252	1.00	5.00	3.2470	1.38374
Neighbourhood church temple	252	1.00	5.00	4.0996	.93490
Neighbourhood police station	252	1.00	5.00	3.9363	1.08624
Neighbourhood security level	252	1.00	5.00	3.2470	1.27230
Neighbourhood relation connect	252	1.00	5.00	3.9482	.95985

**(D) Residential satisfaction with management relation & functions**

<b>Variables</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Management garbage collect	252	1.00	5.00	3.8884	1.14696
Management rent review	252	1.00	5.00	3.3705	1.27835
Management rules regulation	252	1.00	5.00	3.4821	1.21765
Management enforcement	252	1.00	5.00	3.0478	1.23195
Management treatment resident	252	1.00	5.00	3.1554	1.23441
Management handle complains	252	1.00	5.00	2.6773	1.28197
Management response repairs	252	1.00	5.00	2.4382	1.22930

**Descriptive Statistics for Four Housing Factors**

	N	Minimum	Maximum	Mean	Std. Deviation
Overall physical features	252	1.00	5.00	2.9140	.90443
Overall quality features	252	1.00	5.00	3.6952	.95909
Overall neighbourhood features	252	1.00	5.00	3.8915	.71767
Overall housing management features	252	1.00	5.00	3.1514	.87943
Valid N (list wise)	252				

**Correlation Matrix Residential Satisfaction & Socioeconomic variables**

	Overall RS Index		
	Pearson Correlation	Sig. (2-tailed)	N
Overall RS Index	1		252
Gend	-.043	.496	252
Age	.094	.137	252
Marital	.043	.494	252
Ethnic	.009	.886	252
Edu	-.090	.153	252
Living	-.085	.180	252
Occupants	-.133	<b>.036</b>	252
Employ	-.017	.788	252
type employ	-.060	.360	234
Income	.004	.948	234
First time	-.102	.106	252
Rent time	-.019	.764	252
Unit type	.014	.828	252
bedrooms	-.080	.207	252
family-rel	-.127	<b>.046</b>	252

**Result: Factorial ANOVA: (Post-Hoc Test)**

Multiple Comparisons

Overall RS Index: Tukey HSD

(I) Location	(J) Location	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Nadera	MacFarlane	4.1491	4.35498	.932	-8.3635	16.6618
	Mead Road	17.3753*	4.03988	.000	5.7680	28.9827
	Bagasau	-8.3074	4.13505	.340	-20.1882	3.5733
	Kalabu	-6.4937	5.75098	.869	-23.0173	10.0299
	Kia Street	4.1138	4.76659	.955	-9.5815	17.8091
MacFarlane	Nadera	-4.1491	4.35498	.932	-16.6618	8.3635
	Mead Road	13.2262*	4.30310	.028	.8626	25.5898
	Bagasau	-12.4566	4.39257	.055	-25.0773	.1641
	Kalabu	-10.6429	5.93884	.473	-27.7062	6.4205
	Kia Street	-.0353	4.99164	1.000	-14.3772	14.3066
Mead Road	Nadera	-17.3753*	4.03988	.000	-28.9827	-5.7680
	MacFarlane	-13.2262*	4.30310	.028	-25.5898	-.8626
	Bagasau	-25.6828*	4.08037	.000	-37.4064	-13.9591
	Kalabu	-23.8690*	5.71179	.001	-40.2801	-7.4580
	Kia Street	-13.2615	4.71924	.059	-26.8208	.2977
Bagasau	Nadera	8.3074	4.13505	.340	-3.5733	20.1882
	MacFarlane	12.4566	4.39257	.055	-.1641	25.0773
	Mead Road	25.6828*	4.08037	.000	13.9591	37.4064
	Kalabu	1.8137	5.77950	1.000	-14.7918	18.4193
	Kia Street	12.4213	4.80096	.104	-1.3728	26.2153
Kalabu	Nadera	6.4937	5.75098	.869	-10.0299	23.0173
	MacFarlane	10.6429	5.93884	.473	-6.4205	27.7062
	Mead Road	23.8690*	5.71179	.001	7.4580	40.2801
	Bagasau	-1.8137	5.77950	1.000	-18.4193	14.7918
	Kia Street	10.6075	6.24695	.534	-7.3411	28.5562
Kia Street	Nadera	-4.1138	4.76659	.955	-17.8091	9.5815
	MacFarlane	.0353	4.99164	1.000	-14.3066	14.3772
	Mead Road	13.2615	4.71924	.059	-.2977	26.8208
	Bagasau	-12.4213	4.80096	.104	-26.2153	1.3728
	Kalabu	-10.6075	6.24695	.534	-28.5562	7.3411