PORTION 152

ROAD SURVEY REPORT

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July 2008

CONTENTS

1 INTRODUCTION

This report was commissioned by Coffey Natural Systems (CNS). The work was conducted under the following *Terms of Reference:*

- The Port Moresby to Lea Lea Road is likely to carry increased traffic during both construction and operation of the project. In addition, sections of the road between State Portion 152 and Port Moresby are likely to require minor upgrading/maintenance activities and the existing section of road running through the proposed LNG facility will be realigned.
- At both locations, baseline information is required on existing commercial and local community road use. This information will then be combined with information from the ExxonMobil roads/traffic studies to determine the impact of the project on road users and to recommend appropriate mitigation for road users.

Objectives

- To provide baseline data from observational surveys of the area on levels and types of activities associated with the road from Port Moresby to Lea Lea including transport, commercial and social uses.
- To characterise road use on the Port Moresby to Lea Lea road to provide an indication of the importance of the road to the local community.

Tasks

- Identify key vantage points along the road to undertake observational surveys of road use. The survey should be over a period of no less than one week and include all daylight hours.
- Undertake observational surveys at key points along both survey areas and record numbers of road users (including age and gender), modes of transport, (e.g. car, Public Motor Vehicle (PMV), walking etc.) busiest times and where possible an estimate of average speeds.
- Record the level of roadside trading, social gathering and any other activities taking place along the road not related to travel. This should be concentrated at areas where settlements are in close proximity to the road.
- Determine the importance of the road in terms of the public transport network (including PMVs).
- Record the location of all informal traffic regulation including local community construction of speed humps, erection of warning signs etc.
- Conduct targeted interviews of road users to determine any other times/festivals/seasons when road use for transport, commercial and social events may occur and provide an indication of the magnitude and type of road use these times/events would entail.

2 RESEARCH METHODOLOGY

To fulfil the above defined objectives a research team was assembled in Port Moresby of five University of Papua New Guinea undergraduates, lead by two team supervisors. The research work was conducted in the environs of the four Motu/Koitabu villages of Porebada, Boera, Papa and Lea Lea close to Portion 152.

Four separate surveys were engendered and administered to gather the requisite qualitative and quantitative baseline data. The fieldwork took place between 29 May 2008 and 4 June 2008. At the

conclusion of this survey the two supervisors were further commissioned to write two brief reports outlining their observations, conclusions and recommendations.

The four survey instruments are attached in Annexure 1 and can be described as follows:

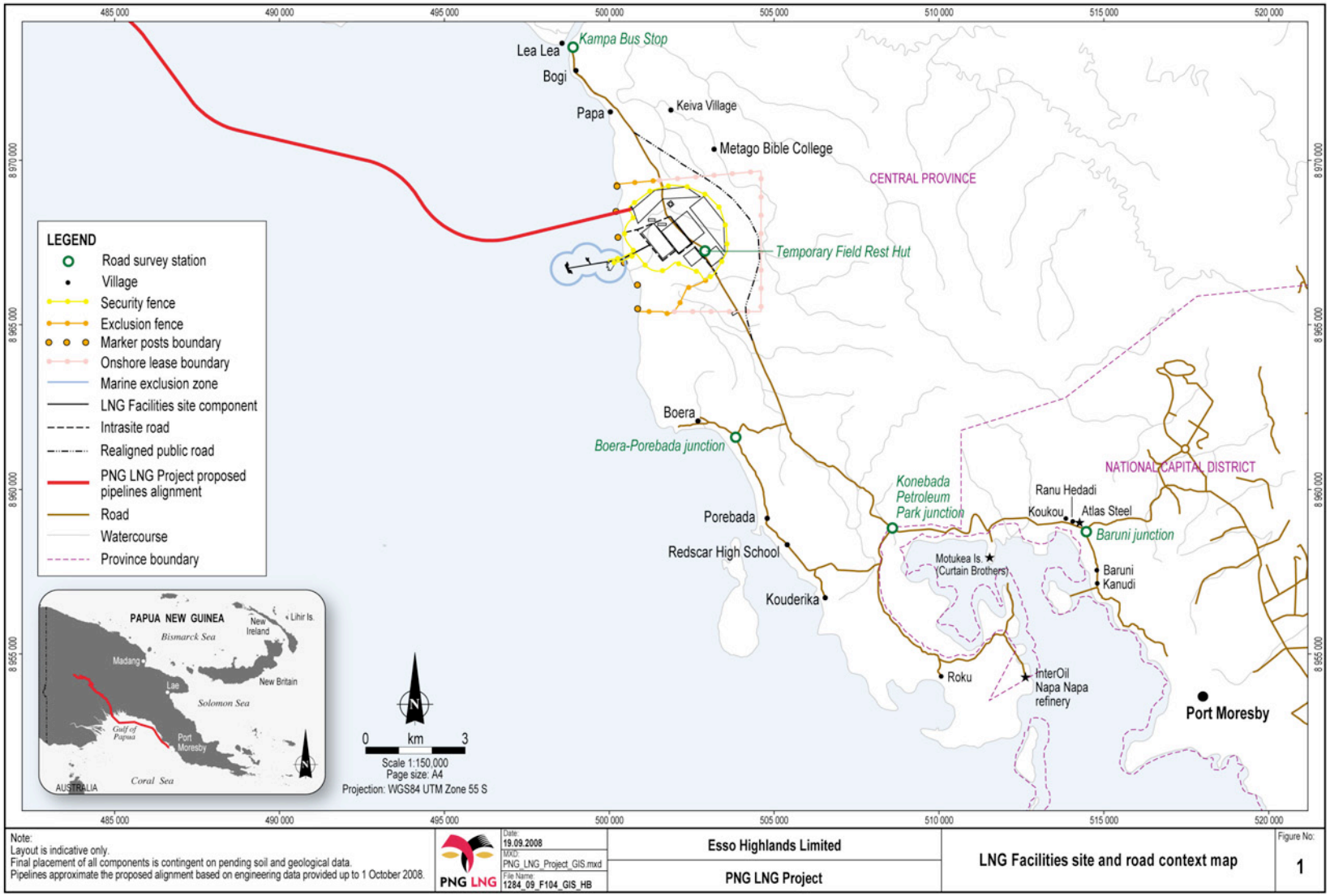
1. **Question Survey (QS)** – to record public comments on recent road accidents, seasonal traffic trends, rationales for road use, and understandings of the adequacy or otherwise of the existing Public Motor Vehicle (PMV) service;

2. **Traffic Survey (TrS)** – to record all types of traffic signs and control forms in the designated area.

3. **Trading survey (TS)** – to record all trade stall activity in respect to goods sold, gender of vendor, and location and type of vending medium; and

4. **Road Survey (RS)** – to record all vehicular and other (human and animal) traffic with regard to gender, destinations, vehicle registration number, and speed;

For the RS, five researchers were position at pre-agreed strategic points along the highway from Port Moresby to Lea Lea. Map 1 indicates the approximate position of the researchers for the duration of the fieldwork component.



Map 1: Field Location of Survey Fieldworkers

The QS, TS & TrS surveys were conducted by the team supervisors at various locations between Baruni junction – the site of Baruni hamlet – and the four villages of Porebada, Boera, Papa and Lea Lea. Towards the latter part of the seven day survey, the two supervisors also conducted interviews around Koukou-Ranu Hedadi hamlets (see Map 1 above for locations). All surveys were conducted between 8.30am and 5.00pm from Thursday 29th May to Wednesday 4th June 2008. The five road traffic surveyors returned each day to the same location with the exception of the surveyor stationed at Lea Lea who, after the first five days, was moved to provide assistance to the surveyor at the Baruni location where traffic activity was heaviest.

Table 1 provides the output for each of the identified surveys described above.

Table 1: Survey information

Survey Form	Entries Recorded
Question Survey	140 interviews undertaken
Road Survey	5481 Traffic movements recorded
Trading Survey	140 records
Traffic Survey	45[1] entries

3 RESEARCH CONSIDERATIONS

It was not possible for the surveyors to always safely stop traffic at any of the recording stations. Frequently the vehicles were travelling too fast, or were too numerous, for the surveyor to perform an accurate count of passengers and related information. For these reasons estimations of passenger loads were made and no claims are made in respect to the reliability of this specific information. There were a number of other PNG LNG Project surveys underway in the area and the fieldworkers made every effort to discount any traffic known to be associated with these enterprises.

4 QUESTION SURVEY

This survey was administered across three constituencies:

(a) road users who were drivers of vehicles;

(b) roadside trading stalls; and

(c) road walkers.

On average the interview took between 5–10 minutes. Annexure 2 contains the summary results of this survey.

Road Accident Information (Questions 1–5)*:* Most interviewees concurred that few accidents had occurred along the road in the last six months with less than 25% of the respondents answering in the affirmative. Chart 1 shows the perceived cause of the accidents reported, which in total was 34 incidents. The highest percentage of cases involved stray animals (27%), with criminal behaviour involving hold-ups and police chases presenting as the next highest incidence (21%). It is important to bear in mind that these causes are perceived attributions and thus do not necessarily reflect the true cause of the incidents recalled. Cultural distortion in 'fact' reporting, i.e. that cultures often value

[1] These are collated and summarised in Table 2 in this report. Repetition of recordings and/or remarks has not been included.

emphasis on certain nuanced understandings or memories of events, is a well-known phenomenon in social science analysis. In this regard it was interesting that respondents felt that Port Moresby PMV drivers were more reckless than those that originated from the four Portion 152 villagers. The narrow road around Baruni was also highlighted by informants as a cause of some accidents. 100% of the respondents who reported on the involvement or otherwise of vehicles in accidents said these accidents involved vehicles, and of these incidents 47% of cases involved injuries to persons. Informants reported that in 21% of the accidents only one person was injured, though in 11% of the cases as many as four people had sustained some injury. Equally, in a further 26% of cases, animals had been involved and sustained impact.

Of those reported human accidents, 61% were male and 38% female. Most injured persons of either gender fell in the 30–50 years bracket with an even distribution of others between 1–30 and 50+.

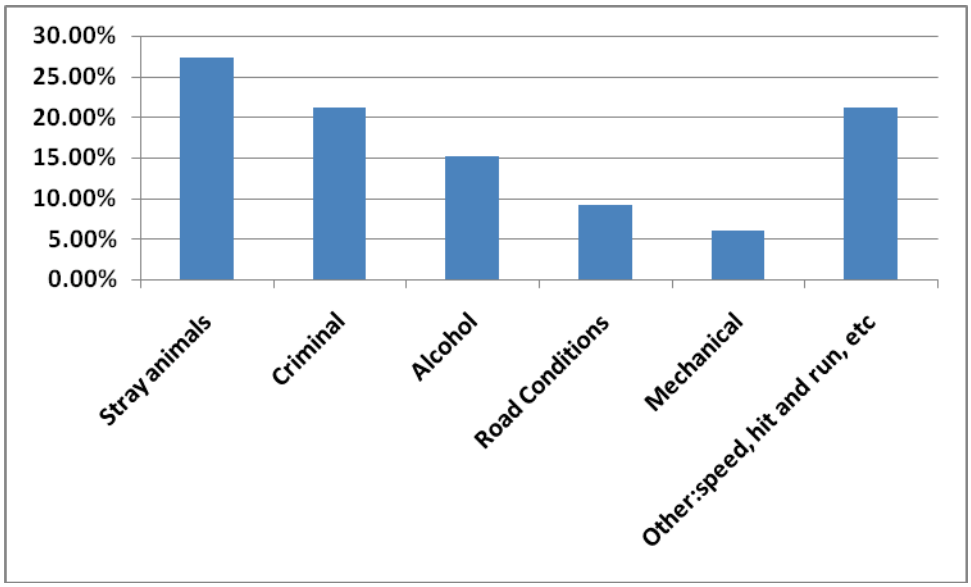


Chart 1: Cause of Accidents Report[2]

Traffic Volume (Questions 6 & 7)*:* Almost 85% of respondents reported that there was more traffic on the road at certain times of the year, with the majority noting that holidays, festive seasons - particularly Easter and Christmas holidays - as well as pay week/Friday/weekends resulted in more vehicles on the road than at other times. Other instances cited as times of increased traffic were cultural occasions like bride-price payments, funeral feasts, independence anniversaries and church related celebrations or functions.

Purpose of Road Use (Questions 8 & 9)*:* Chart 2 indicates the respondent answers to inquiries about the reasons for road use. Clearly the bulk of road users fall within the categories of consumer shopping, market trading and work related activities. At the same time, subsistence activities such as collecting firewood and water (24%) and social visits (15%) were other rationales for travel. 61% of respondents reported they used the road less than five times a week.

[2] The 'Other' category includes swerves, hit and run, and speeding behaviour.

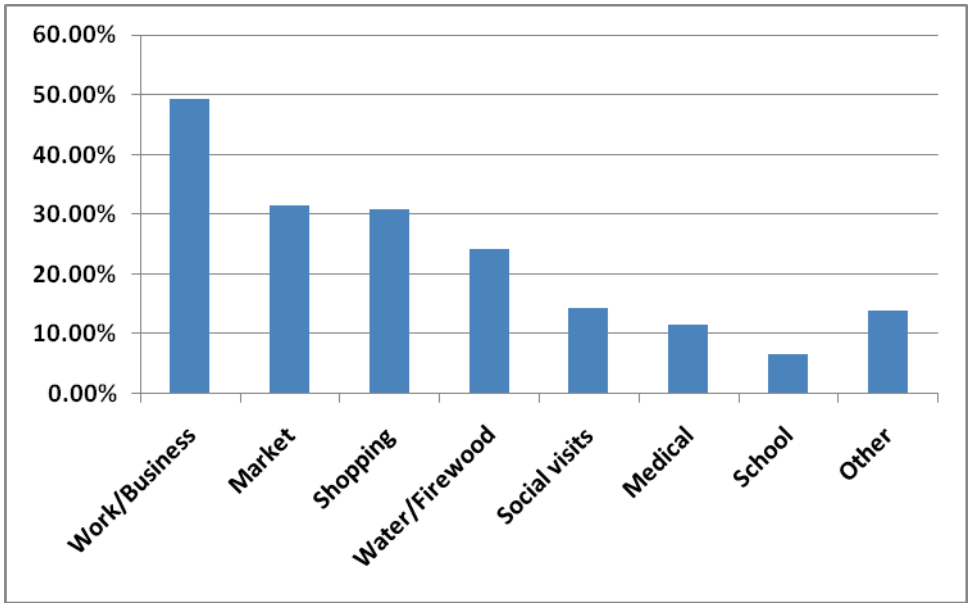


Chart 2: Road Use Reasons[3]

Safety Concerns (Question 10)*:* The analysis allows for multiple answers. The key issues on road safety relate to condition of the road (49%), narrowness of the road (34%), and speeding/reckless (26%) urban PMV drivers under the influence of alcohol/drugs or involved in criminal carjacking. A smaller proportion of responses related to pedestrian footpaths, security police for women and children, and greater signage.

Chart 3 provides some insight into project road user perceptions about what safety recommendations might improve circumstances along the roads surveyed.

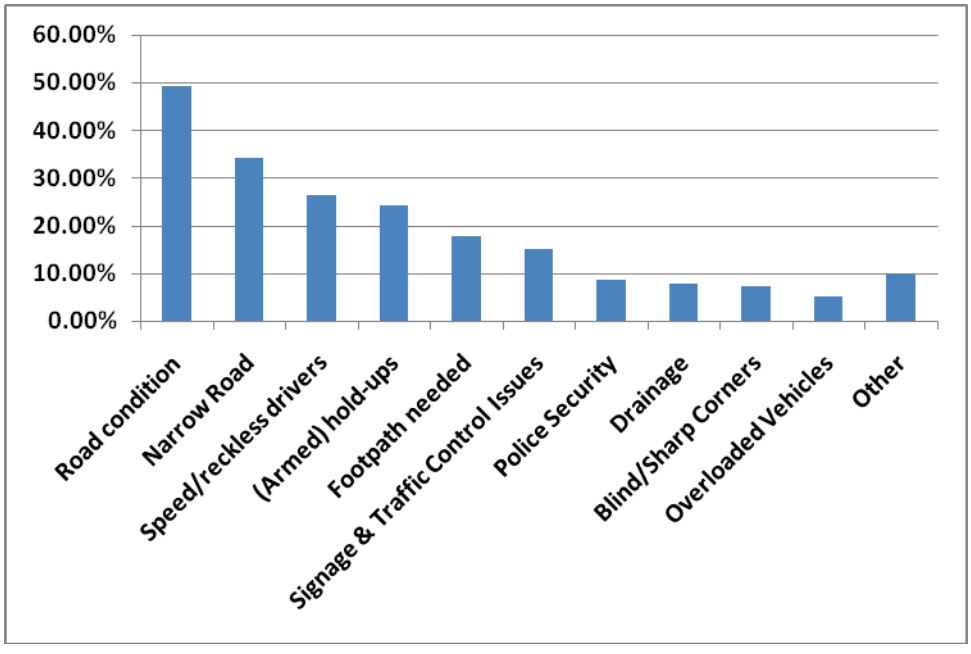


Chart 3: Road Safety Issues[4]

[3] The 'other' category includes Hunting, Recreation/Sports, and Church Related rationales.

[4] The 'other' category includes Low power lines, animals, fires, stones which are thrown, glass, unsafe vehicles.

***Public Motor Vehicle Transport Service (Questions 11 & 12)**:* A high 65% of people felt the current PMV service was inadequate and this accords well with the findings of the 2008 Social Impact Assessment (SIA).

- Travel to Redscar High School for students in Porebada and Boera is not a significant hardship, but it is for students living in Papa and Lea Lea. The students of Lea Lea in particular face significant travel time and are dependent upon PMVs to attend school and return home. The services are not considered to be very good as the children are transported to the junction of the Port Moresby–Lea Lea Road, then they have to walk. The transport is provided free by a woman who runs her own PMV from Papa, but from Lea Lea it is 2 Kina one way, so sometimes the children walk back and the girls walk with the boys for safety. The Boera village people expressed a desire to operate the transport companies (the bus to Redscar High School at Porebada is 50 toya each way or a 1 ½ hour walk each way) (SIA 2008).

- The high demand for PMV services is particularly critical for village-based city employees and the fish vendors during the mornings and afternoons. Villagers left stranded in the city late in the afternoons have become a common occurrence. They are forced to hire urban PMV buses for rescue runs back to the village. Not only does this raise the ire of local PMV operators but the urban PMV bus drivers find themselves having to bribe policemen at the roadblocks in order to escape penalties over violating their allocated PMV routes.[5]

Question 12 provides an open question answer for those respondents who gave a negative response to Question 11. Clearly, as depicted in Chart 4, insufficient PMVs, affordability and an irregular and overloaded service were the main reasons why respondents thought the existing PMV service was inadequate.

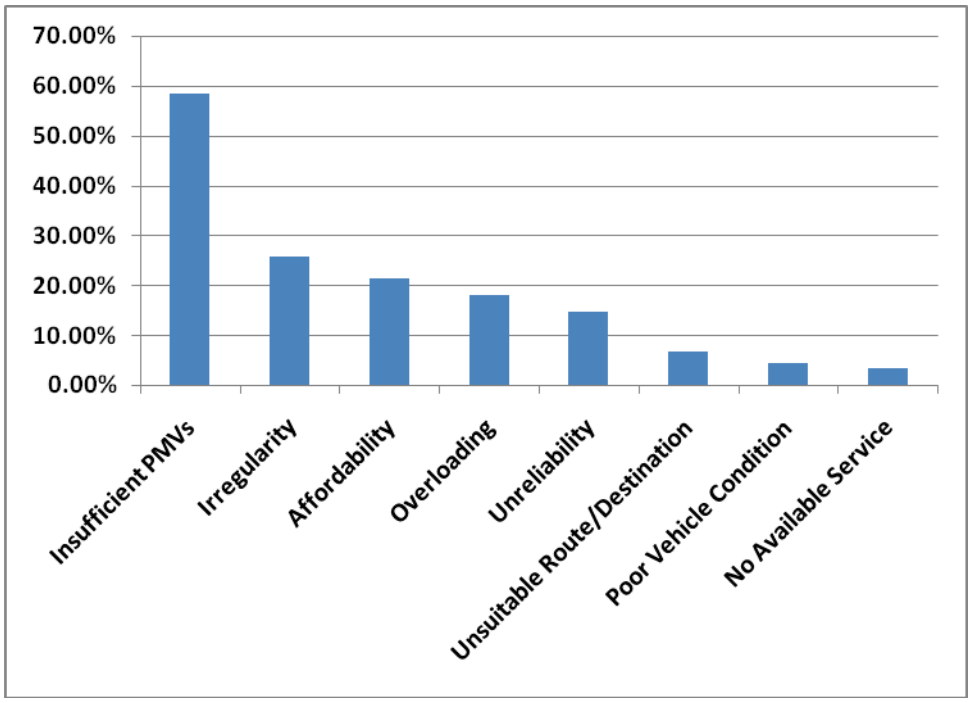


Chart 4: Note Inadequacies of Existing 152 PMV Service

[5] The researcher stationed at the Baruni-Atlas Steel junction did pick up several anecdotal incidents of attempted bribery by drivers that mistook him for a policeman setting up a road block - he had a bright yellow vest on with a police-like navy blue hat.

4.1 Recommendations

- The entire road from the Baruni junction to Lea Lea could benefit from widening, sealing and better signage. These improvements would assist resolve and perhaps alleviate some safety concerns.

- Additionally, better control of speeding / reckless driving is likely to decrease the number of accidents in the area. The 2008 SIA[6] sector analysis on Transport & Communication (chapter 3.6) contains a broader discussion of the likely impacts which will flow from the proposed project intervention in Portion 152. These include in-migration, start-up trading stalls along the road from Port Moresby to Lea Lea, and possible increased anti-social behaviour. The erection of check point boom-gates would ensure PMV routes and loads are monitored stringently for safety purposes.

5 TRAFFIC SURVEY

The signage survey noted that the Lea Lea causeway—bridge across the stream—had no signs informing pedestrians the bridge was currently unstable. Table 2 below lists all the noted signs and other traffic safety infrastructure.

What is noticeable is the lack of speed humps in the road (except at Baruni where the road is very narrow and potholes abound), and the lack of signage for pedestrians at schools, etc. Clearly it would be useful to have pedestrian crossings at these junctures. Equally, signs indicating wallabies and snakes might be useful given that some accidents have involved these animals.

[6] Draft PNG LNG Gas Project SIA (Goldman 2008).

Table 2: Portion 152 Signage

LOCATION	TRAFFIC CONTROL TYPE	PRECISE LOCATION	COMMENTS
Lea Lea –to-Papa section	Circuit sign indicating directions back to Port Moresby	100m from bus stop facing east	Bus sign for trucks
	Road Sign -direction	150m from Bogi facing Church on south side of road	From Bogi to Papa
	Road T-junction sign	Papa[7] village junction – where the small track leaves the main road to enter Papa village	80m from turn off to Papa going east
	White lines on road edges	Lea Lea to Papa	Lines on both sides of roads
Papa	T-junction signs – 1 tall 1short to Keiva, and Port-Moresby-Lea Lea road	Keiva turn off	Keiva is just past Papa and a turn off to Bible college on right
	Keiva-POM turn off	T-junction site	
	Road T-junction	Approaching Papa T-junction	100m turn-off from village going west
	Road 'winding' sign	Approaching Papa T-junction	
	White lines	Both sides at village road	
SP152 Tent site-Boera	White lines on road	To Boera turn off and KPP	
	Sign board 'Boera and Moresby'	Boera junction	Sealed road, potholes
Boera Turn off-Boera Village	None		Dirt uneven road, Porebada to Roku turnoff in poor condition
	Black lines on road	KPP to Baruni junction	Sealed road in good condition
	Sign board – Port-Moresby-Lea Lea	KPP junction	

[7] There is a small dirt road that leaves the main road going north-west to Lea Lea and which allows vehicles to enter Papa village. This is not shown on Map 1.

	road		
Baruni Road Junction	Roundabout	Baruni roundabout junction	13 sign posts without signs, just poles
	Sign board	KPP junction	KPP town plan, Papa-Lea Lea Road
	2xSign board – directions to Lea Lea, Roku and Porebada	KPP junction	

The Baruni roundabout to KPP junction is a good road but the painted lines on both sides of the road are in black and not visible at night. There are no signs indicating the turn-off to Atlas Steel production site, or the hamlets of KouKou and Ranu-Hedadi. The Baruni roundabout can be challenging for a new driver as it has two directional possibilities: Port Moresby via Baruni village, and Lea Lea. Thirteen 2m high metal posts were in evidence at the Baruni road junction itself (see Map 1) but none had a sign board on them.

5.1 Recommendations

The EIS SIA (Goldman 2008) has noted that the road at Baruni – the hamlet situated just south of and on the Baruni junction - is far too narrow to carry two-lane traffic and if used or upgraded by the project is likely to require considerable resettlement of people. In addition, there are some additional road safety and road improvement recommendations that can be listed as follows:

- Black road lines could be painted white for better visibility, and a line running through the middle of the road painted to indicate legitimate sides for vehicles.
- Road signs could be erected indicating culverts, roundabout directions, and also turn offs to villages and hamlets.
- The stretch of the road from Lea Lea to KPP junction could be widened to acceptable standards, and pot holes resealed.
- The two stretches of the road from Boera turn off to Boera, and Boera to Roku/Porebada junction via Porebada village along the seaside could be sealed and sign posts erected and maintained to acceptable standards.
- Road signs indicating possible crossings of wildlife such as wallabies (i.e. *magani*) and domestic animals like dogs, pigs and chickens could be strategically erected to warn drivers of possible occurrences.

The SIA (Goldman 2008) makes it clear that the majority of these recommendations are the primary responsibility of the Provincial and State PNG Government agencies such as National Planning and Department of Works. In a with-LNG project scenario, and given the predicted social impacts for this environs, discussions between the Developer and these Government agencies should take place with regard to general road safety and traffic regulation.

6 TRADING SURVEY

The principal objective of this survey was to understand the extent of trading stall activity along the main road and close to villages, the variety of items traded, and the gender nuance in trade store owners. These activities are likely to increase with the project intervention due to anticipated higher traffic numbers resulting from the project.

The results of the trading survey are given in Table 3. There were 109 recordings of trade stalls. Chart 5 illustrates the disaggregation of this total into the type of stalls observed and it is evident that the bulk of trading is done either under houses or by the roadside.

Plate 1: Market Trade Stall Boera

Table 3 Results of Trading Survey

Village	Stall Type	Trading Stall*	Goods Being Sold 1 Buai 2 Meat 3 Soap/household items 4 Fish 5 Vegetables/garden produce 6 Smokes/matches 7 Firewood 8 Other (eg fishing line, clothes etc)	Time Survey conducted over each day from 29th May-June 4th 2008		Total Number of Traders Observed			
BOERA				**am**	**pm**	**Male**	**Age**	**Female**	**Age**
	Under House	8	1,6,8					8	
	Vehicle								
	Sep Stall								
	Road	9	1,6 [8,3]					9	
	*Other**	2	8			2	40-50		
	Total	**19**		10.30	14.30	**2**		**17**	
	Average age						**45**		**34**
LEA LEA									
	Under House	2	1,6,8			1		1	30
	Vehicle								
	Sep Stall	1							
	Road	1	1.6.8					1	35
	Other	6	3,6 [4]			7			
	Total	10		10.30	14.30	8		2	
	Average age						**48.5**		**33**
PAPA									
				9.00	14.00				
	Under	7	1,6,8			1	63	6	

	House								
	Vehicle								
	Sep Stall								
	Road	9	4 [1,6]			1	36	8	
	Other								
	Total	**16**				**2**		**14**	
	Average age						**50**		**30**
BARUNI									
	Under House								
	Vehicle								
	Sep Stall	1	1,6,8					1	
	Road	10	1,6,8			2		8	
	Other								
	Total	**11**		9.00	15.30	**2**		**9**	
	Average age						**50**		**35**
POREBADA									
	Under House	15	1,6 [2,8]			3		12	
	Vehicle	1	1,6					1	
	Sep Stall	3						3	
	Road	33	1,6,8 [3]			20		13	
	Other	1	5,8			1			
	Total	**53**		9.00	16.00	**24**		**28**	
	Average age						**48**		**41**

[ ]Brackets indicates less common goods found
*Other – eg walkabout pedestrian trader

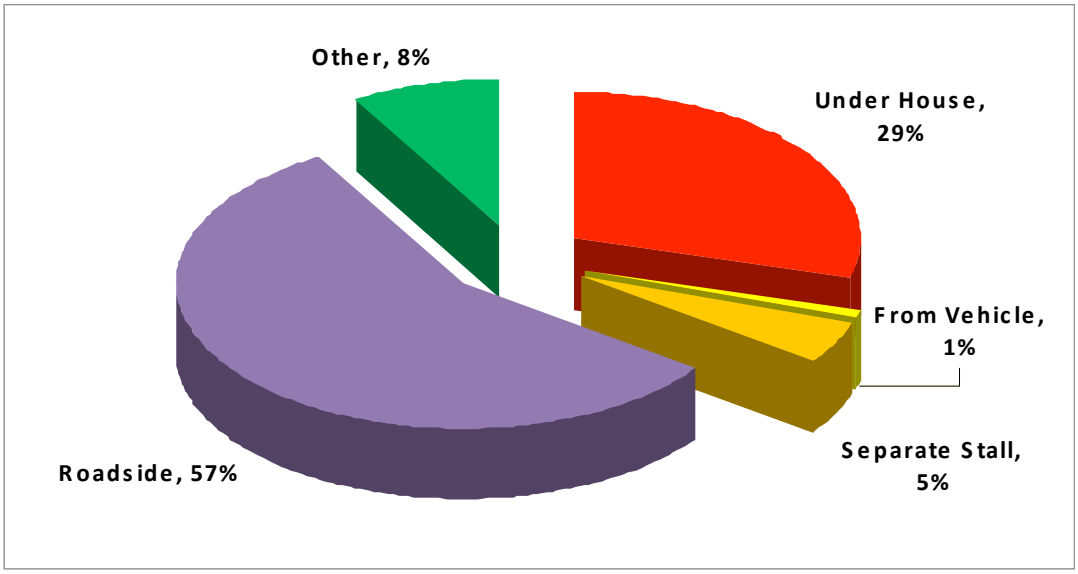


Chart 5: Distribution of Recorded Trading Stall Type

Most of the goods being sold were Buai[8] (1), tobacco and cigarettes (6), and goods such as clothes, ice etc., (8). Vegetables were rare, and not much fish displayed in any of the stall types. Firewood was completely absent as an item being traded in this manner. Kerosene is sold in all villages in 500 ml ex-coke containers. Unlike firewood, kerosene is needed to fuel a range of lamps, and cooking stoves. Firewood is abundant and the lack of local demand means that most, if not all of it is transported and sold in Port Moresby markets where there is a definite demand, a higher price is fetched, and sales are rapid. The most common fruit on sale was mangoes (which were in season at the time of the survey), with a much cheaper price than Port Moresby's markets. Vendors pointed out that soil quality prevents the cultivation of other exotic tropical fruits. Most of the stalls were open in the morning and afternoon, though the survey data indicate afternoon trading is slightly more common because people return with goods bought in Port Moresby to then sell forward.

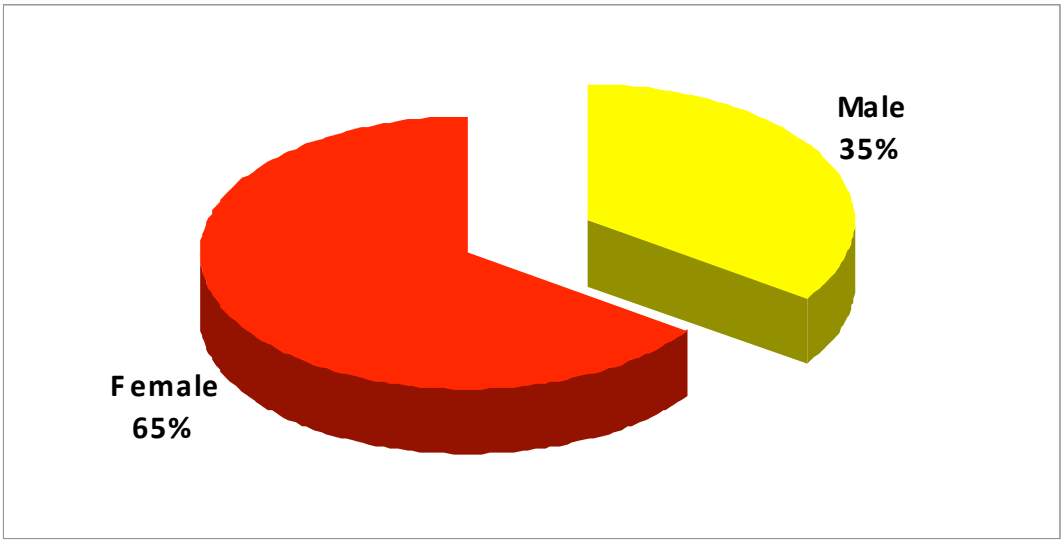


Chart 6: Percentage of Stall Owners by Gender

Chart 6 depicts the finding that the majority of stall owners are female. Most men are setting up their stalls by the roadside and appear to be on average 48 years of age. By contrast, most women operate from beneath their house, due no doubt to the primary caregiver status and security concerns; the average age of a female stall owner is only 35. This division of trading labour is marked in this environment and goes to the argument that for women this is a prime source of income.

The field research team noted the following: "All vendors indicated that trading was a means for making ends meet. It is a source of income, and for many, the only serious source of cash income. It supplements families whose livelihood is based solely on subsistence (gardening, fishing and hunting) - feeds families, pays for the needs of children, and allows families to purchase manufactured goods and merchandise, such as medicine, cigarettes, rice, sugar, soap, clothes, stationery, canned food and in Porebada, market produce. Most vendors interviewed agreed that they earn between K15 and K40 per day on average. On the weekends, earnings go up to K50 on average because of sporting activities that take place in the villages, especially in Boera, Papa and Lea Lea. The money is retained for purposes of purchasing new stock, and profit spent on daily household and family necessities.

Items (fish & meat) in categories 2 and 4 are usually sold in the afternoons and early evenings, after the day's catch has been brought in by fishermen and hunters. In some cases, these are added to existing stalls, and in other cases, a new stall with a new vendor sets up the trading activity. In Papa,

[8] Buai (betel nut) is a small nut which has a bright red centre. It is usually imbibed with lime and *daka* which is the leaf from the same vine. The affect is similar to coffee with a small adrenaline rush for the user.

increased trading activity in the afternoons and early evenings has been reported largely due to this practice. Also, this is the time Port Moresby commuters return to the villages and families preparing their evening meal may buy these food items. Most commuters rely on this source as convenient and cheaper in comparison with the same goods sold in Port Moresby. These serve as sources of protein for villagers, and makeshift stalls along the road through Papa may attract motorists traveling to Lea Lea and Bogi. Unlike other goods which are only sold locally, a significant portion of fish and meat is sold in Port Moresby markets by villagers from all sites, and supplements the family's income. In Papa, a PMV organizes a 3pm run that transports fishing and hunting produce to Port Moresby markets on a daily basis. Prices charged in Port Moresby markets are considerably higher than those in the villages, thus creating better opportunities for generating more cash. All villages sell surplus tapioca in Port Moresby's markets.

In Porebada, Lea Lea and Boera, visiting vendors travel from other parts of Central Province (mainly from Rigo and Mekeo) to sell items of high demand - mainly garden vegetables, buai and daka . This was observed mainly in Porebada, where there is a conspicuous shortage of other garden produce, except tapioca. This staple grows well in the area and surplus is often sold in Port Moresby markets. Buai and daka do not fare well in the soil around this area, hence its supply is dependent on external sources. Some interviewees said that some villagers also conduct barter trading with these visitors (who are allowed to stay in the village until all their goods are sold), with villagers trading clothes, kitchenware, rice, sugar, fish, and store goods for vegetables and buai/daka.

In all locations, vendors from Port Moresby (mainly Highlanders) were observed conducting "walking" sales of an assortment of merchandise and goods including, batteries, razor blades, ear buds, hair bands, combs. The prices of these items were noted to be comparatively cheaper than those of the canteens and trade stores in the villages. Villagers informed us that these vendors travel into the villages daily and return to Port Moresby in the afternoons. In addition, in Porebada, one canteen was on rent to a Tari man, who now lives in the rented property and operates the canteen. The biggest shop in Porebada is also owned and operated by a man from Tari married to a Porebada woman.

A number of observations were made by the research team about roadside trading stalls along the road:

a) Roadside trading on the main highway has been largely restricted to sections of the highway where a village, hamlet or township is in close proximity – for example, KPP, Koukou, Papa, and Bogi. It is not common for residents of Porebada or Boera to conduct roadside trading along the main highway. In addition, no trading has been observed at turnoffs to major locations such as Napa Napa, or the Curtain Brothers wharf both of which are outside the areas depicted on Map 1.

b) The bulk of roadside trading in Porebada and Boera takes place on the roads leading into the villages. This is also the case for Lea Lea, Papa, and Bogi villages, however, the location of the latter two villages along the main highway means that the trading is directly on the highway itself. Based on interviews with vendors, apart from the odd motorist that stops for a purchase, particularly on the weekends, the majority of their customers are local residents, including villagers from Kido, Gorohu (both outside Map 1 environs) and Keiva.

c) Roadside trading is a livelihood for the majority of vendors and supplements subsistence existence and other incomes from trading in Port Moresby. It is a vital part of community life and makes ends meet for many families on a daily basis.

d) All these villages also trade a large number of goods in Port Moresby's markets. These include firewood, tapioca, fish and meat products. These are usually items in

widespread supply in the area, thus at reduced local demand, and fetch higher prices due to demand from a larger market.

e) Port Moresby is the major and only source of manufactured goods and merchandise. Roadside traders make regular trips into Port Moresby to make purchases.

6.1 Recommendations

- It may be appropriate to provide road signs to warn traffic of areas were roadside trading venues occur (such as at Baruni and Lea Lea). It is understood that the KPP junction site will be fenced and operated as a fixed market place in the future and this may alleviate the need for many traders to set up stalls by the roadside.
- Education and/or regulation of traders in terms of how close they can locate their stalls to the edge of the road would reduce the likelihood of accidents due to increased volumes of traffic in the future.
- Further regulation may be needed in the future to ensure sale of alcohol, home brew, and drugs like marijuana do not appear on road side trading. At the moment, this is almost non-existent but increased traffic and an influx of people could change this scenario.

7 ROAD SURVEY

Annexure 3 contains a results summary for the Road Survey which recorded 5481 traffic movements over seven days at those survey stations marked on Map 1. Chart 7 provides a graphic indication of where the heaviest movements occurred.

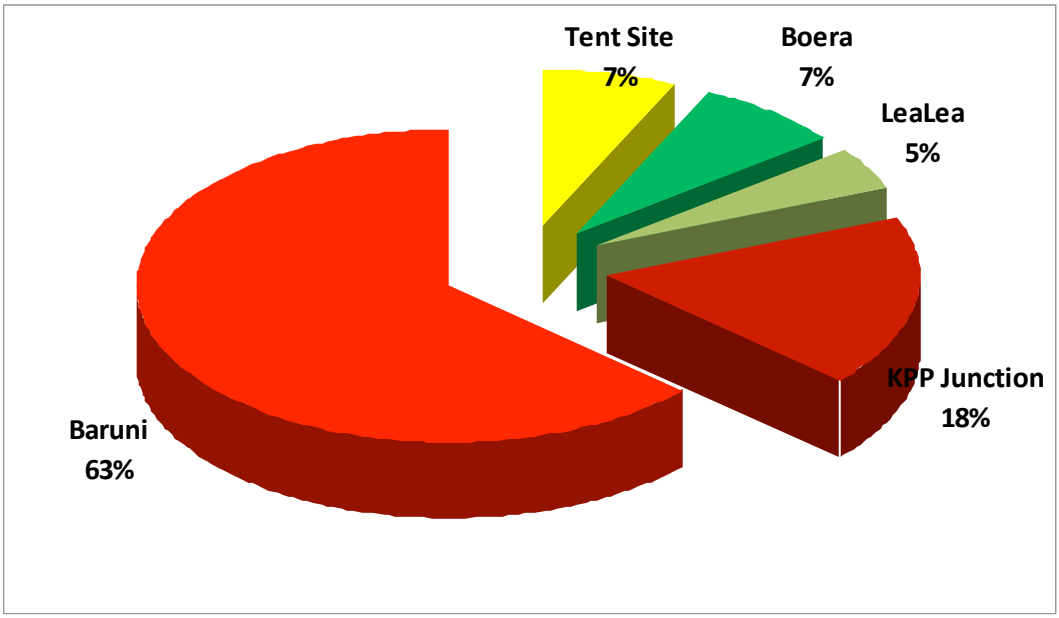


Chart 7: Percentage Distribution of Traffic Movement Records

Clearly the Baruni junction, close to Atlas Steel, witnessed the heaviest daily traffic with an average of approximately 500 vehicle runs per day. This can be attributed to the fact that this section of road provides a vital economic link for the Curtain Brothers construction company at Motukea, stevedoring construction, and the Interoil refinery plant at Napa Napa. This stretch of road is known to be a notorious 'hold-up' spot for carjacking criminals. The Baruni survey also recorded one animal (a dog) death by a Curtain Brothers Company vehicle.

Chart 8 illustrates the finding that the majority of the traffic movements are undertaken by ute/trucks followed by buses, and then fairly evenly distributed between PMVs, walkers and cars. The pattern of road usage is similar for am and pm.

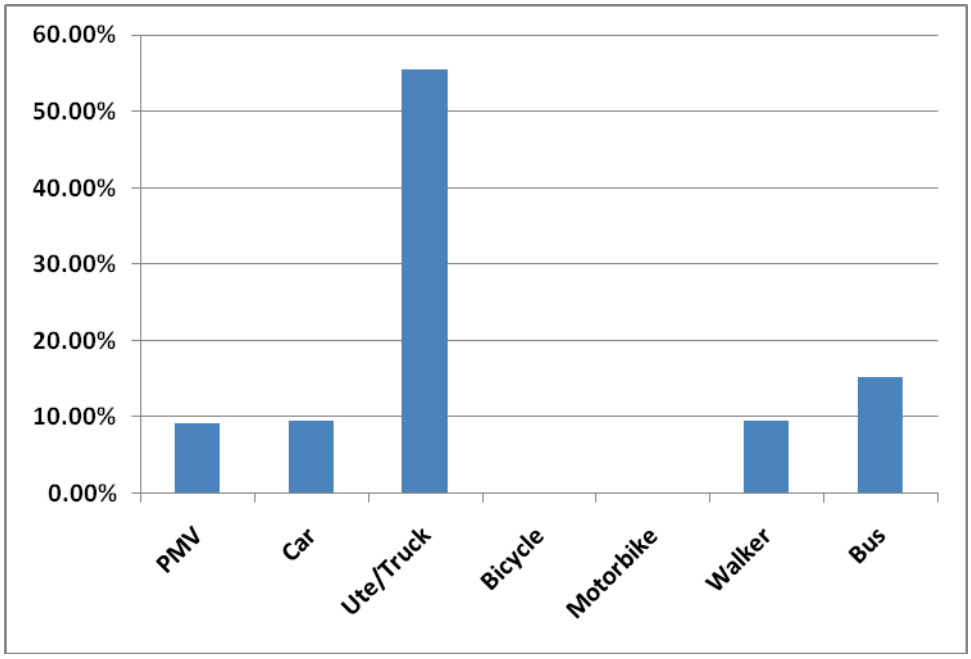


Chart 8: Percentage Distribution of Traffic Users

The findings reported in Annexure 3 indicate that of almost 30,000 road users 65% were male and some 34% were female. Again, this finding is similar for am and pm traffic. With respect to destination most of the traffic movements appear to have been destined for Port Moresby (42%) or other areas including Napa Napa, and Curtain Brothers etc. The overall totals are consistent with the figures for both am and pm totals—in essence, no distinct patterns of travel emerge for different times of day. Consistent with comments made in section 3, it was not feasible for the surveyors to stop and interview drivers so ascertaining accurate understandings of destinations was not always possible.

Average speed recordings are estimated between 50–65 kms an hour.

The KPP junction was the second busiest thoroughfare for traffic which reflects its gateway status to the Napa Napa oil refinery plant and the large population of Porebada village which is more than twice (see Table 4) that of any of the other three villages of Boera, Papa and Lea Lea.

Table 4: Central Province Demographics[9]

CENTRAL PROVINCE 2000							
Total	**Male**	**Female**	**HHs**	**LLGs**	**CU**	**Wards**	**Districts**
183,983	96,062	87,921	29,823	13	961	209	4
KAIRUKU-HIRI DISTRICT							
78,784	41,552	37,232	12,464	4	373	76	
Hiri Rural LLG							
28,352	15,112	13,240	3589		77	18	
Ward Units							
1310	683	627	155	Boera			
885	479	406	96	Papa			
929	528	401	81	Roku			
1685	888	797	190	Lea Lea			
4055	2173	1882	428	Porebada			

The newly constructed houses are looked after by local villagers and a few police. This junction has become a pick-up and drop-off zone for high school students that attend the Redscar High School at Porebada and those that attend schools in Port Moresby. Additionally, subsistence gardeners have used it as a trading station when they take their firewood there.

Lea Lea appears to have relatively little ute/truck traffic indicating its peripheral status to the industrial hubs of Moresby, Axis Steel, Curtain brothers and Napa Napa. Conversely, this village had the highest number of walking traffic recorded. The tent site station along the road from Lea Lea indicates increased ute and car movements and we surmise that in all probability much of this is accounted for by ongoing project related trips of surveyors for site investigations.

The road between Boera and Porebada along the coast clearly experiences more traffic than is the case from Boera to Port Moresby.

7.1 Recommendations

The implementation of traffic control measures—signage, speed bumps, traffic lights, road widening, speed warning signs etc., would be helpful in assisting to mitigate accidents consequent on increased and heavier vehicle use especially at the busy junctions of Baruni and KPP.

A more detailed discussion of recommendations pertaining to road use and associated issues is given in the 2008 SIA. The main recommendation results from the traffic increase due to the project in areas that already have reasonably high road usage. In the immediate short term it appears that security attended boom-gates would be beneficial to road users just prior to the road junction to Porebada. The rationales for this recommendation are as follows:

[9] These figures are taken from the official 2000 PNG National Census.

(a) In the initial phases of construction there will be a high level of ‘curiosity’ which attracts increased onlookers and others seeking employment. The manned boom-gates send a message that there will be continued high security in the area which may perhaps act as a deterrent to anti-social behaviour

(b) It would give a measure of security to the four villages knowing that all traffic is monitored, and assist who are most vulnerable.

(c) There are presently some Police accommodation and clearly plans to build a community health centre with shops as well on the KPP junction. The controlled boom-gates would thus further assist and ensure residents can access these services without the site developing into a squatter settlement.

ANNEXURE 1: SURVEY INSTRUMENTS

1. Question Survey
2. Trading Survey
3. Traffic Survey
4. Road Survey

QUESTIONS INTERVIEW

Please circle one number only		YES	NO
1.	**Have there been any traffic accidents in the last 6 months?**	1	2

2.	**What was the cause of the accident (***specify in few words)*	

Please circle one number only		YES	NO
3.	**Were there any vehicles involved?**	1	2

Please add number only		NO.
4.	**If yes, how many got hurt?**	

5.	**Who were they?**	
Name *(please print their names)*	**Male or Female** *(please write M or F)*	**Age** *(please use numbers)*

Please circle one number only		YES	NO
6.	**Are there certain times of the year when there is more traffic on the road?**	1	2

7.	**If yes, when?** *(please specify the month or day of the week)*	

8.	**What is your main business when you use the road?** *(Please specify)*

Please circle one number only		**Less than 5 times a week**	**More than 5 times a week**
9.	**How many times a week do you use the road for this business?**	1	2

10.	**What safety issues, if any, are associated with this road?** *(Please give suggestions or alternatives)*

Please circle one number only		**YES**	**NO**
11.	**Is the Public Motor Vehicle service sufficient for your purpose?**	1	2

12.	**If your answer is 'No' - what do you see are the problems with it ?**

Thank you for your time and co-operation.

TRADING SURVEY

Road Section Name:	
Interviewer Name:	
Date of Survey:	
Survey Start Time:	
Survey End Time:	

Record No.	**Trading Stall** *(please use code below)*	**Goods being sold** *(please use code below)*	**Time**		**Total No. of Traders Observed**			
			am	***pm***	***Male***	***Age***	***Female***	***Age***
1								
2								
3								
4								
5								
6								

Trading Stall.....

From vehicle 1

From under house 2

Separate stall..... 3

Open road display..... 4

Other ..... 5 *(please specify in space above)*

Goods being sold

Buai 1

Meat (kangaroo/pig, etc.) 2

Soap or household items..... 3

Fish 4

Vegetables/garden produce 5

Smokes/matches 6

Firewood.....7

Other.....8

TRAFFIC SURVEY

Road Section Name:	
Interviewer Name:	
Date of Survey:	
Survey Start Time:	
Survey End Time:	

Record No.	Traffic Control Type	Location + GPS	Comments

ROAD SURVEY

Road Section Name:	
Interviewer Name:	
Date of Survey:	
Survey Start Time:	
Survey End Time:	

Record No.	**Mode of Transport** *(please use code below)*	**Average Speed** *(please use code below)*	**Livestock**		**Time**		**Total Walkers/Passengers**				**Destination (if possible)** *(please use code below)*
			No.	***Type***	***am***	***pm***	***Male***	***Age***	***Female***	***Age***	
1											
2											
3											
4											
5											
6											

Mode of Transport

PMV..... 1
Car 2
UTE/Truck 3
Bicycle 4
Motorbike..... 5
Walker..... 6
Bus.....7

Average Speed .

Walker.....4 k/ph
.....
.....
.....
.....
.....

Destination

Lea Lea..... 1
Papa 2
Boera 3
Porebada 4
Moresby 5
Other 6
Baruni.....7

ANNEXURE 2: ROAD SURVEY

ROAD SURVEY			
NO. SURVEYS:	140		
QUESTION	NO. RESPONDENTS	%	COMMENTS
Q1	Total:140	100.00	
YES	34	24.29	
NO	106	75.71	
Q2	Total:33	97.06	33/34 with YES response to Q1 supplied cause of accident
STRAY ANIMALS/DOGS	9	27.27	
CRIMINAL	7	21.21	HIJACK, POLICE CHASE, ARMED HOLDUP
ALCOHOL-RELATED	5	15.15	
ROAD CONDITIONS	3	9.09	NARROW ROAD AT BARUNI, TRUCKS
MECHANICAL FAULT	2	6.06	STEERING, BRAKES
SWERVE	2	6.06	
COMBINED OTHER	5	15.15	SPEED, HIT & RUN, CHILD ACCIDENT, FAMILY PICNIC, UNKNOWN
Q3	Total:28	84.85	28/34 with YES response to Q1 responded to this question
YES	28	100.00	all 28 stated that a vehicle was involved
NO	0	0.00	
Q4	Total:34		Animal and human injuries are included here; human injury responses were 25 in total
0 PERSONS	9	26.47	9/34 accidents had 0 injuries
1 PERSON	7	20.59	7 " 1
2 PERSONS	1	2.94	1 " 2
3 PERSONS	1	2.94	1 " 3
4 PERSONS	4	11.76	4 " 4
5 PERSONS	1	2.94	1 " 5
UNKNOWN	2	5.88	2 " unknown #

ANIMAL INJURIES	9	26.47	9 " animal
Q5			
MALE	Total:21	61.76	21/34 … 21 male injuries from total 34 injuries reported
<10 yrs	2	9.52	% of male injuries aged <10yrs
10-30yrs	2	9.52	" 10-30 yrs
30-50yrs	14	66.6	" 30-50 yrs
adult	2	9.52	" adult
no age given	1	4.76	" no age given
FEMALE	Total:13	38.24	13/34 … 13 female injuries from total 34 injuries reported
10-30yrs	2	15.38	% of female injuries aged 10-30 yrs
30-50yrs	10	76.92	" 30-50 yrs
adult	1	7.69	" adult
Q6	Total:132	94.29	132/140 responses
YES	112	84.85	112/132 responses stated YES
NO	20	15.15	20/132 responses stated NO
Q7			
HOLIDAYS	44	39.29	*NOTE: MULTIPLE RESPONSES ALLOWED IN Q7 (% sum > 100)*
FESTIVE SEASON/CHRISTMAS/EASTER	40	35.71	%s of 112 cases with YES response to Q6
PAY WEEK/FRIDAY/WEEKEND	37	33.04	
WEEKENDS	23	20.54	
CHURCH-RELATED ACTIVITIES	11	9.82	
SPECIAL EVENTS	8	7.14	
BRIDE PRICE	7	6.25	
COMBINED OTHER	21	18.75	inc. PEAK HOURS,WHOLE WEEK, EVERY AFTERNOON, MON-SAT
Q8	Total:136	97.14	NOTE: MULTIPLE RESPONSES ALLOWED IN Q8 (%sum > 100)
WORK/BUSINESS/TRADING	67	49.26	%s of 136 cases with at least 1 response
SELL GOODS AT MARKET	43	31.62	
SHOPPING (BUYING)	42	30.88	
WATER/FIREWOOD COLLECTION	33	24.26	

VISITING FRIENDS/RELATIVES	21	15.44	
MEDICAL/HOSPITAL TREATMENT/VISIT	16	11.76	
SCHOOL	9	6.62	
REACH HUNTING GROUNDS	6	4.41	
RECREATION/SPORTS	3	2.21	
CHURCH-RELATED	3	2.21	
OTHER	2	1.47	
Q9	Total:129	92.14	129/140 responses
<5/WEEK	79	61.24	%s of 129 cases with valid response
>5/WEEK	50	38.76	
Q10	Total:140	100.00	all cases provided at least one response to Q10
ROAD CONDITION	69	49.29	NOTE: MULTIPLE RESPONSES ALLOWED IN Q10 (%sum > 100)
NARROW ROAD	48	34.29	
SPEED/RECKLESS DRIVING	37	26.43	
(ARMED) HOLD-UPS	34	24.29	
PEDESTRIAN FOOTPATH NEEDED	25	17.86	
SIGNS/CROSSINGS/LIGHTING/SPEED BUMPS	21	15.00	
WOMEN&CHILD SAFETY/POLICE	12	8.57	
DRAINAGE	11	7.86	
BLIND/SHARP CORNERS	10	7.14	
OVERLOADED VEHICLES	7	5.00	
COMBINED OTHER	14	10.00	inc. LOW POWER LINES, ANIMALS, FIRES, STONES THROWN, GLASS, UNSAFE VEHICLES
Q11	Total:136	97.14	136/140 response
YES	47	34.56	%s of 136 responses
NO	89	65.44	
Q12	Total:89	100.00	all responding NO to Q11 provided at least one response to Q12
INSUFFICIENT PMVs	52	58.43	NOTE: MULTIPLE RESPONSES ALLOWED IN Q12 (%sum > 100)
IRREGULAR TIMES	23	25.84	

AFFORDABILITY	19	21.35	
OVERLOADING	16	17.98	
UNRELIABILITY	13	14.61	
UNSUITABLE ROUTE/DESTINATION	6	6.74	
POOR VEHICLE CONDITION	4	4.49	
NO SERVICE AVAILABLE	3	3.37	

ANNEXURE 3: RESULTS SUMMARY OF ROAD SURVEY

ROAD SURVEY - TRAFFIC BY SECTION BY TIME OF DAY

	Tent Site Portion 152		BOERA		LEA LEA		KPP		BARUNI		TOTALS	
	#	%	#	%	#	%	#	%	#	%	#	%
AM	148		126		112		486		1436		2308	
MODE OF TRANSPORT												
PMV	37	25.00	10	7.94	24	21.43	76	15.64	91	6.40	238	10.37
CAR	29	19.59	5	3.97	6	5.36	45	9.26	119	8.37	204	8.89
UTE/TRUCK	54	36.49	43	34.13	10	8.93	208	42.80	962	67.65	1277	55.67
BICYCLE	0	0.00	1	0.79	4	3.57	0	0.00	1	0.07	6	0.26
MOTORBIKE	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
WALKER	1	0.68	53	42.06	55	49.11	14	2.88	84	5.91	207	9.02
BUS	27	18.24	14	11.11	13	11.61	143	29.42	165	11.60	362	15.78
AVERAGE SPEED (km/hr)												
PMV	77.94		49.00		60.83		71.45		50.77		62.54	
CAR	67.41		36.00		76.67		64.22		48.13		54.96	
UTE/TRUCK	66.89		49.17		52.80		66.11		48.34		52.08	
BICYCLE	n/a		65.00		8.50		n/a		10.00		18.17	
MOTORBIKE	n/a		n/a		n/a		n/a		n/a		n/a	
WALKER	6.00		4.00		4.00		4.00		5.78		4.99	
BUS	68.91		50.64		67.69		66.29		46.37		56.85	
LIVESTOCK	NO DATA RECORDED for NUMBER or TYPE											
PASSENGERS												
MALE	687	63.03	571	71.55	446	49.83	2119	60.93	4381	72.68	8204	66.76
FEMALE	403	36.97	227	28.45	449	50.17	1359	39.07	1647	27.32	4085	33.24
DESTINATION	143	96.62	105	83.33	112	100.00	485	99.79	1415	98.54	2260	97.92
LEA LEA	42	29.37	0	0.00	32	28.57	33	6.80	13	0.92	120	5.32

ROAD SURVEY - TRAFFIC BY SECTION BY TIME OF DAY

	Tent Site Portion 152		BOERA		LEA LEA		KPP		BARUNI		TOTALS	
PAPA	29	20.28	0	0.00	15	13.39	56	11.55	11	0.78	111	4.92
BOERA	1	0.70	42	40.00	0	0.00	9	1.86	7	0.50	59	2.62
POREBADA	0	0.00	18	17.14	0	0.00	119	24.54	45	3.19	182	8.07
MORESBY	61	42.66	19	18.10	46	41.07	199	41.03	659	46.74	984	43.64
OTHER	10	6.99	25	23.81	19	16.96	68	14.02	634	44.96	756	33.53
BARUNI	0	0.00	1	0.95	0	0.00	1	0.21	41	2.91	43	1.91
PM	240		277		142		473		2032		3164	
MODE OF TRANSPORT												
PMV	48	20.00	16	5.78	22	15.49	63	13.32	123	6.07	272	8.62
CAR	47	19.58	13	4.69	14	9.86	60	12.68	186	9.19	320	10.14
UTE/TRUCK	94	39.17	97	35.02	14	9.86	203	42.92	1347	66.52	1755	55.59
BICYCLE	0	0.00	7	2.53	6	4.23	0	0.00	4	0.20	17	0.54
MOTORBIKE	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
WALKER	2	0.83	110	39.71	61	42.96	14	2.96	127	6.27	314	9.95
BUS	49	20.42	34	12.27	25	17.61	133	28.12	238	11.75	479	15.17
AVERAGE SPEED												
PMV	69.79		56.56		61.82		71.45		51.20		60.34	
CAR	68.15		42.69		67.86		64.22		46.74		53.92	
UTE/TRUCK	60.37		43.35		64.29		66.11		50.06		52.21	
BICYCLE	n/a		32.57		8.67		n/a		9.33		18.67	
MOTORBIKE	n/a		n/a		n/a		n/a		n/a		n/a	
WALKER	6.00		4.00		4.00		4.00		8.26		5.90	
BUS	62.40		42.50		72.00		66.29		48.22		55.52	
LIVESTOCK	NO DATA RECORDED for NUMBER or TYPE											
PASSENGERS												
MALE	1059	60.45	1170	67.24	425	52.47	2506	61.18	6255	68.23	11415	64.98

ROAD SURVEY - TRAFFIC BY SECTION BY TIME OF DAY

		Tent Site Portion 152		BOERA		LEA LEA		KPP		BARUNI		TOTALS	
	FEMALE	693	39.55	570	32.76	385	47.53	1590	38.82	2913	31.77	6151	35.02
DESTINATION		236	98.33	236	85.20	140	98.59	466	98.52	1996	98.23	3074	97.16
	LEA LEA	80	33.90	3	1.27	44	31.43	38	8.15	28	1.40	193	6.30
	PAPA	34	14.41	6	2.54	17	12.14	42	9.01	6	0.30	105	3.43
	BOERA	0	0.00	149	63.14	0	0.00	8	1.72	14	0.70	171	5.58
	POREBADA	1	0.42	41	17.37	0	0.00	136	29.18	60	3.01	238	7.77
	MORESBY	98	41.53	30	12.71	60	42.86	169	36.27	926	46.39	1283	41.86
	OTHER	22	9.32	6	2.54	19	13.57	72	15.45	877	43.94	996	32.50
	BARUNI	0	0.00	1	0.42	0	0.00	1	0.21	77	3.86	79	2.58
COMBINED AM+PM		388		403		254		959		3468		5481	
MODE OF TRANSPORT													
	PMV	85	21.96	26	6.37	46	18.11	139	14.49	214	6.20	510	9.3
	CAR	75	19.38	18	4.41	20	7.87	105	10.95	304	8.81	522	9.5
	UTE/TRUCK	148	38.24	143	35.05	24	9.45	411	42.86	2314	67.03	3040	55.5
	BICYCLE	0	0.00	8	1.96	10	3.94	0	0.00	5	0.14	23	0.4
	MOTORBIKE	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
	WALKER	3	0.78	164	40.20	116	45.67	28	2.92	211	6.11	522	9.5
	BUS	76	19.64	49	12.01	38	14.96	276	28.78	404	11.70	843	15.3
AVERAGE SPEED													
	PMV	73.17		53.65		61.30		72.52		51.03		61.64	
	CAR	68.13		40.83		70.50		65.33		47.29		54.58	
	UTE/TRUCK	62.72		45.42		59.50		66.40		49.40		52.24	
	BICYCLE	n/a		36.63		8.60		n/a		9.50		18.54	
	MOTORBIKE	n/a		n/a		n/a		n/a		n/a		n/a	
	WALKER	6.00		4.00		4.00		4.00		7.26		5.53	
	BUS	64.51		45.18		70.53		69.46		47.54		57.14	

ROAD SURVEY - TRAFFIC BY SECTION BY TIME OF DAY

Tent Site

		Portion 152		BOERA		LEA LEA		KPP		BARUNI		TOTALS	
LIVESTOCK		NO DATA RECORDED for NUMBER or TYPE											
PASSENGERS													
	MALE	1746	61.44	1772	68.79	871	51.09	4625	61.06	10634	70.00	19648	65.74
	FEMALE	1096	38.56	804	31.21	834	48.91	2949	38.94	4558	30.00	10241	34.26
DESTINATION		377	97.42	346	84.80	252	99.21	951	99.17	3292	94.79	5218	95.20
	LEA LEA	122	32.36	3	0.87	3	37.50	71	7.47	41	1.20	240	4.72
	PAPA	63	16.71	6	1.73	0	0.00	98	10.30	17	0.50	184	3.62
	BOERA	1	0.27	194	56.07	3	37.50	17	1.79	21	0.62	236	4.64
	POREBADA	1	0.27	59	17.05	1	12.50	255	26.81	105	3.09	421	8.28
	MORESBY	158	41.91	49	14.16	0	0.00	368	38.70	1590	46.72	2165	42.58
	OTHER	32	8.49	32	9.25	1	12.50	140	14.72	1511	44.40	1716	33.75
	BARUNI	0	0.00	3	0.87	0	0.00	2	0.21	118	3.47	123	2.42