

TRAFFIC AND TRANSPORTATION PLAN
FOR THE SHIFTING OF THE
VEGETABLE WHOLESale TRADING ACTIVITIES FROM
MANNING MARKET TO ORUGODAWATTE, COLOMBO

FINAL REPORT



Amal S. Kumarage
Transportation Engineering Division,
Department of Civil Engineering,
University of Moratuwa.

Urban Development Authority

November 2000

Table of Contents

CHAPTER 1	: INTRODUCTION	1-1
1.1	Terms of Reference	1-2
1.2	Study Team	1-2
1.3	Acknowledgements	1-3
CHAPTER 2	: DATA COLLECTION & LITERATURE SURVEY	2-1
2.1	Literature Survey	2-1
2.1.1	Markets in Colombo and Kandy	2-1
2.1.2	Polas	2-3
2.1.3	Newer Markets	2-3
2.1.4	Trends and Transition of Agricultural Markets	2-3
2.1.5	Transport Services	2-8
2.1.6	Pettah Bazaar	2-9
2.1.7	Location of Markets	2-9
2.2	Surveys at Pettah	2-9
2.2.1	Transport Operations at Manning Market	2-9
2.2.2	Manual Classified Count for Vehicles	2-13
2.2.3	Interviews of People in Manning Market	2-15
2.2.4	Transport Activities of Pettah Bazaar	2-2
2.2.5	Parking Surveys at Pettah Bazaar	2-18
2.3	Surveys at Other Regional Markets	2-19
2.3.1	Dambulla Dedicated Economic Centre	2-19
2.3.2	Embilipitiya	2-26
2.3.3	Kegalle/Talduwa/Horana	2-26
CHAPTER 3	: DATA ANALYSIS	3-1
3.1	Manning Market	3-1
3.1.1	Vehicle Distribution	3-1
3.1.2	Arrival Rate of Lorries	3-2
3.1.3	Departure Rate of Lorries	3-3
3.1.4	Storage (Parking Requirements) for Lorries	3-4
3.1.5	Three Wheelers	3-5
3.1.6	Traffic Movement from Manning Market	3-6
3.1.7	Load Distribution of Lorries	3-7
3.1.8	Nature and Location of Return Loads	3-8
3.1.9	Trip Patterns of Lorries Arriving at Manning Market	3-9
3.1.10	Person Arriving at Manning Market	3-10
3.1.11	Mode of Travel of Persons Arriving at Manning Market	3-11

3.2	Pettah Bazaar	3-12
3.2.1	Distribution of Loads of Lorries	3-12
3.2.2	Nature of Travel Routes of Lorries	3-13
3.2.3	Parking in Pettah Area	3-15
CHAPTER 4	: MOVEMENT OF MANNING MARKET TO ORUGODAWATTE	4-1
4.1	Historical Background	4-1
4.2	Possible Future Scenarios	4-1
4.2.1	Scenario I: No Change	4-2
4.2.2	Scenario II: Move Manning Market to Orugodawatte	4-2
4.2.3	Scenario III: Shifting of Both Manning Market and 4 th /5 th Cross Streets to Orugodawatte	4-4
4.2.4	Scenario IV: Development of Satellite Markets	4-6
4.3	Development of Land Vacated by Shifting of Manning Market	4-8
4.4	Advantages of Shifting	4-11
4.5	Transport Requirements in the Move of the Present Manning Market	4-11
4.6	Site Details of Orugodawatte	4-12
4.7	Space Requirements for Orugodawatte	4-14
4.8	Internal Arrangements for Orugodawatte	4-16
4.9	Goods Handling Technology for a Market Complex	4-20
4.10	Rail Linkages	4-21
CHAPTER 5	: CONCLUSIONS AND RECOMMENDATIONS	5-1
5.1	Conclusions	5-1
5.2	Recommendations	5-2

List of Figures

Figure 1.1 : Manning Market and Pettah Area _____	1-2
Figure 2.1: Origin of Loaded Lorries and Fruits to Manning Market _____	2-2
Figure 2.2: Flow of Fresh Vegetables from Manning Market to Main Retail Markets in Western Province _____	2-5
Figure 2.3: Traditional Vegetable Marketing Network, 1970s _____	2-6
Figure 2.4: Emerging Vegetable Marketing Network _____	2-7
Figure 2.5: Layout of Manning Market _____	2-11
Figure 2.6: Survey Area of Manning Market _____	2-2
Figure 2.7: 4 th and 5 th Cross Street in Pettah _____	2-17
Figure 2.8: Pettah Bazaar Area _____	2-19
Figure 2.9: Administrative Hierarchy of the Dambulla Dedicated Economic Center ____	2-21
Figure 2.10 : Distribution of Vegetables from Dambulla _____	2-25
Figure 3.1: Distribution of Vehicles Arriving at Manning Market _____	3-1
Figure 3.2: Distribution of Vehicles Arriving Loaded to Manning Market _____	3-2
Figure 3.3: Distribution of Vehicles Leaving Loaded from Manning Market _____	3-2
Figure 3.4: Arrival Rate of Lorries to Manning Market _____	3-3
Figure 3.5: Departure Rate for Lorries _____	3-4
Figure 3.6: Cumulative Parking Demand for Lorries _____	3-5
Figure 3.7: Arrival and Departure Rates for Three Wheelers _____	3-6
Figure 3.8: Total Traffic Impact due to Lorry & 3 Wheeler Movements: Manning Market _	3-7
Figure 3.9: Load Distribution of Lorries at Manning Market _____	3-8
Figure 3.10: Location of Picking up Return Loads _____	3-9
Figure 3.11: Travel Routes In and Out of Lorries to Manning Market _____	3-10
Figure 3.12: Origins of Persons Coming to Manning Market _____	3-11

Figure 3.13: Mode of Travel of Persons Coming to Manning Market _____ 3-12

Figure 3.14: Nature of Return Trip of Lorries at 4th and 5th Cross Street _____ 3-13

Figure 3.15: Share of Lorry Travel to and from Pettah Bazaar _____ 3-14

Figure 3.16: Distribution of Parking in Pettah Bazaar by Duration and Vehicle Type ____ 3-15

Figure 4.1: Change in Traffic Due to Relocation of Manning Market to Orugodawatte (in PCUs per day- both directions)_____ 4-5

Figure 4.2: Change in Traffic Due to Relocation of Manning Market & 4th/5th Cross Street Trade to Orugodawatte (in PCUs per day –both directions)_____ 4-6

Figure 4.3: Traffic Reductions from Development of Satellite Markets at Kottawa and Kadawatha (In PCUs per day –both directions) _____ 4-10

Figure 4.4: Location of Orugodawatte _____ 4-13

Figure 4.5: Schematic Internal Arrangement for Market at Orugodawatte _____ 4-17

Figure 4.6: Typical Dock for Mechanical Loading/Unloading_____ 4-21

List of Tables

Table 2.1: Distribution of Traders in 4 th and 5 th Cross Street _____	2-2
Table 2.2: Commissions for Trading at Dambulla DEC _____	2-22
Table 3.1: Vehicles Arriving at Manning Market on 29/01/2000 _____	3-1
Table 3.2: Mean Waiting Times at Manning Market _____	3-5
Table 3.3: Time Spent by Vehicles in Different Activities inside Manning Market _____	3-5
Table 3.4: Matrix of In and Out Routes of Lorries: Manning Market _____	3-9
Table 3.5: Origins of Persons Coming to Manning Market _____	3-10
Table 3.6: Mode of Travel of Persons Coming to Manning Market _____	3-11
Table 3.7: Matrix of Goods Carried In and Carried Out by Lorry: Pettah Bazaar _____	3-13
Table 3.8: Matrix of In and Out Routes of Lorries: Pettah Bazaar _____	3-14
Table 4.1: Lorry Traffic to Manning Market and its Traffic Implications (per day) _____	4-3
Table 4.2: Lorry Traffic to 4 th /5 th Cross Street and its Traffic Implications (per day) _____	4-4
Table 4.3: Space Requirement for 450 Trade Stalls at Orugodawatte _____	4-15

EXECUTIVE SUMMARY

Colombo and Kandy have been the traditional terminal markets where due to the large urban and suburban base they are terminal markets for agricultural products. Surveys conducted show that although the Manning market still has a national scope, it appears to be slowly losing its traditional role as the most important transshipment market in the country.

This is partly due to the changes in the marketing network of fresh vegetables and fruits throughout the country. The traditional commission based system in operation at the Manning Market is gradually being replaced by a decentralized system of assembly markets in the production areas as well as transshipment markets in consumption areas and the growth of polas in suburban Colombo. The relocation of the Pettah market requires a clear understanding of the big picture of the current situation and the ongoing trends and transitions.

The other reason is that even though Manning Market was temporarily housed at its present location, it is ill-suited in many respects, particularly parking, traffic circulation, pedestrian circulation, drainage and a host of other facilities that should be features of a major market.

A third reason is that as the population base of Colombo and its suburbs has expanded Pettah's location in the CBD has become less accessible due to growing traffic congestion and other security related measures.

However, even in spite of these shortcomings and trends, the number of traders is reportedly increased from 301 in 1983 to over 1,000 today. Although the number of traders has increased over the last two decades, the volume of throughput of Manning Market is reportedly slowly shrinking.

The Study of Agricultural Markets notes that

'The central city location for a terminal for food markets can no longer be endorsed. Disagreements between the revenue interests of the Colombo Municipal Council, strategic interests of national agencies and very real 'pre-conditions for trade' by traders have led to a stalemate situation for almost 15 years.'

Present Problems

The present transport related problems with respect to the Manning Market are:

- Poorly located so that access is difficult and slow for produce as well as buyers and sellers.
- Poorly designed internal roads totally inappropriate for loading and unloading of goods.
- Inadequate space for the parking of lorries, often overflowing to the Bastian Mawatha and beyond.
- A large number of three wheelers used in distribution have increased congestion within the market.

- A large fleet of push-carts and natamis milling around the lorries with little space makes mobility slows and difficult.
- Hundreds of individual consumers and commuters also use the retail facility of Manning Market thus adding to problems of congestion.
- Loading, unloading and carriage of goods between lorry and shop is done entirely manually. No new technology has been introduced.

Some of these may be illustrated as follows:

Parking: Parking is one of the biggest problems. The maximum parking (storage) occurs around 6.00 in the morning when there are about 250 lorries parked both inside and outside



the Manning Market. Even at 11 AM, there are still around 150 lorries inside the market premises.

Trips: It can be seen that the average trip generation and attraction to the Manning Market is around 358 Passenger Car Units (PCUs) per hour during the period 7AM to 11AM. The peak is at 8AM where it is 497 PCUs per hour. Given that many of these vehicles have to do a series of U-turns and left turns to enter and leave the

market area, their contribution to traffic flow is significant.

Loads: Around 32 percent of the lorries to Manning Market arrive empty, while another 46 percent leave empty. Only 22 percent carry loads in both directions of haul.

Traffic Routes: Lorries arriving at Manning Market arrive by many different routes. The Kandy route dominates with 32 percent, while High Level Road carries 17 percent and Galle Road carries a further 18 percent. However, 23 percent of lorries are from within the CMC.

Passenger Access: Around 25% of people arriving at the Manning Market had originated their travel from within the Colombo DS Division (CMC area). In the case of natamis, it is seen that nearly 60% of them live within the CMC area, probably very close to the Manning area. The largest proportion of persons, around 30 percent appear to arrive via the Kandy Road. This is followed by the Negombo Road- at 8 percent; Hanwella (Low Level) Road - at 6 percent; High Level and Nugegoda total 13 percent and the Galle Road and Dehiwela areas- total 14 percent.

Multi-Stops: It is also noted that according to the interviews, 87 percent of lorries arriving at the 4th and 5th Cross Street returned direct to their origin. Only 10 percent intended to make a further stop in Pettah area, while less than 3 percent were to make a stop outside Pettah. Around 10 percent of lorries coming to Manning Market seem to look for return hauls in the

4th and 5th Cross Streets. Altogether only 23 percent of lorries look for return trips in all of Pettah.

Present Effects

Over the last 15 years there have been several unsuccessful government efforts to "relocate" this market to another designated site at Orugodawatte. The trader's had been unwilling and their objections were based on their judgment that the site was inappropriate for this type of business.

Future Options

There are several possible alternative trading systems concerning the future of the Manning Market. These are:

- a) Continue as it exist (no change scenario)
- b) Move Manning Market to Orugodawatte
- c) Move both Manning and 4th/5th Cross Street trading activities to Orugodawatte
- d) Develop two Satellite markets in suburban areas

Scenario I: No Change to Manning Market

Left as it is, the most probable scenario would be:

- The gradual escalation of cost of operations in the Manning Market.
- The trading activities at the Manning Market would reduce in turnover, the number of traders and number of buyers, thus reducing some of the existing problems also.
- This reduction would mean more demand for trading activities in satellite markets around the suburban areas as well as regional markets in producer areas.
- The traffic problems in Pettah would continue. These would result in sub optimal operations for the market, the bus terminal and the road network in Pettah resulting in major economic losses to the country.

Scenario II: Move Manning Market to Orugodawatte

If only the Manning Market were to be shifted to Orugodawatte this will result in the following transport implications:

- Accordingly, there will be a reduction of around 3,240 PCU kilometers of traffic (that is *number of lorries x EPCU x kms travel reduced*) spread throughout the day. This mean that there would be a net reduction of lorry travel within the CMC area throughout the day which will lead to improving traffic speeds for other users.
- The reduction of lorry traffic would improve traffic space availability by an average of around 2 percent on a daily basis, while it is possible to improve space availability by around 4 percent during the morning peak period. In the Pettah area this improvement may be estimated to be around 12 percent during the peak.
- In addition to the lorry traffic there are an estimated 600 other vehicle trips made up mostly of three wheelers and vans contributing to 2,000 PCU kms that would be reduced

from the system. Thus the improvement to overall space availability resulting from the diversion of both lorries and other vehicles would be even higher at around 3 percent in all of the CMC area. During the morning peak period, a 5 percent improvement is estimated, while a 19 percent improvement is anticipated in Pettah area during the morning peak period.

- The conflicts between motorised through traffic on Olcott Mawatha and load carrying pedestrians and carts would be minimized since with the relocation of Manning Market, trade activities would only be concentrated on one side of Olcott Mawatha. Furthermore the elimination of the loading and unloading of lorries and three wheelers would also benefit the traffic movements on Olcott Mawatha and Bastian Mawatha. The large number of bus movements made on these roads will be especially benefited.
- According to the TransPlan traffic demand estimation model outputs, there would be both increases as well as decreases in traffic to individual road links due to a possible relocation of the Manning Market to Orugodawatte. It has been shown that traffic on Baseline Road will increase while those to the West of Baseline Road, namely Srimavo Bandaranayake Mawatha, Armour Street as well as High Level Road and Galle Road north of Dehiwela will decrease.
- The land presently occupied by the Manning Market could be used as part of the bus/rail terminal that has been planned by the Colombo Urban Transport Study and the Urban Development Authority.

Scenario III: Shifting of Both Manning Market and 4th/5th Cross Streets to Orugodawatte

The Study on Agricultural Markets notes that *'this connection means that both markets should be moved simultaneously in order to effectively improve the food marketing system'*. Thus moving both markets simultaneously will have several advantages. The transport advantages are:

- The vast majority of these vehicles would not be traveling to Pettah in the event that the trading activities of the 4th and 5th Cross Streets are relocated also to Orugodawatte, leaving the other trading activities in Pettah as they are.
- The eventuality that the trading activities on 4th and 5th Cross Streets would be moved to Orugodawatte an estimated 15,000 pcu-kms would be reduced from the existing traffic load on the road network. This reduction would then lead to an improvement of road space availability of around 4 percent within CMC. Its contribution to road space availability during the morning peak period may be as high as 6 percent, while in the Pettah area the morning peak period improvement may be even up to 25 percent.
- Thus the relocation of both Manning Market and the dry goods in 4th and 5th Cross Streets will improve overall road space availability within Colombo City by 7 percent. The improvement to the morning peak is 11 percent while the improvement in Pettah during the morning peak period is 44 percent.

Scenario IV: Development of Satellite Markets

The report argues that in keeping with the trends of developing satellite markets and regional markets there is scope for two such markets to be located in the suburbs of Colombo. The report identifies Kottawa and Kadawatha as two potentially suitable sites especially with respect to the new highways that are being planned for construction within the next ten years. If both these satellite markets were to be developed, it is unlikely that there would be much scope for another large wholesale market within the CMC. In such a scenario, even developing Orugodawatte as a major market may not be necessary.

Objectives of a Move from the Present Location

The following objectives are most important in such a move:

- Reduce lorry and three wheeler traffic in and around Pettah,
- Reduce lorry and three wheeler traffic on the road approaches to Pettah,
- Reduces pedestrian traffic, carts and particularly the manual carriage of goods across Olcott Mawatha,
- Improve lorry turn around time by better circulation within the market,
- Reduce loading and unloading time and associated costs by design of bays and lifts,
- Reduce damage and waste of vegetables by providing proper storage and handling facilities
- Minimize the impacts on the existing traders and changes to trading patterns,
- Minimize the impact on the natamis who are from the general locality,
- Minimize the impact on trading activities on 4th and 5th Cross Street,
- Minimize the impact on trading activities in other parts of the Pettah Bazaar,
- Improve the efficiency of lorry transport and in particular that of backhauls for lorries bringing vegetables.

These impacts are both economic and social. It also has the potential to greatly alleviate some of the traffic-related problems both within Colombo and the major road approaches to the city. Thus the decision to move the market should be taken only after due consideration of all these facts and how any particular option and the possible location for a new facility will achieve each of these objectives.

Suitability of Orugodawatte

The site is located strategically at the northern point of entry to the city by road and rail. It also has an eastern access through the Avissawella (Low Level) Road. It is also located alongside the Baseline Road that is now been widened to six-lane standard from Kelanitissa Roundabout to the High Level Road at Kirulapone. There are proposals for its southward extension to Ratmalana where it is intended to meet the Galle Road. This road will effectively perform as an inner by-pass road to the Colombo City.

This area has 10 acres, and is much larger when compared to the present Manning Market which seems to occupy around 3-5 acres when the entire operational area including the surrounding roads are included. The present system has extremely low space for circulation parking and for services. Most of the space at Manning Market is utilised by the 1,000+ traders. By comparison, Dambulla DEC, is 8 acres in extent part of which is yet to be developed, has only 144 trading stalls. The vast proportion of its space is utilised for parking and circulation purposes and for supporting services. It is qualitatively a bigger complex. It is estimated to have turnover of 500,000 kgs of vegetables and food with a throughput of 500 lorries.

By comparison, Manning Market has a throughput of 450 lorries and about 300 three wheelers. However, in the case of Manning Market only around 200 of these lorries are large lorries with 10-ton load capacities. The others are smaller distribution lorries of much lesser capacity. Most three-wheelers may take up to 300 kgs. Thus the total volume throughput is estimated to be around 300,000 kgs, much less than those reported for Dambulla DEC.

A fundamental decision is required regarding the number of traders to be accommodated. An effort to house all 1000+ traders would possibly mean higher marginal and high costs for consumers.

General Guideline for a Conceptual Design

The following general guidelines for transport requirements may be used for design of the proposed wholesale market:

Number of Shops: The minimum number of shops that would support a wholesale trading complex may be placed at around 100. Space available and the demand for shop space will determine the maximum number of shops that would be sustainable within a single complex.

Shop floor area: This needs discussion with the relevant persons concerned. For the purpose of the transport study we have assumed 150 square feet of shop floor space.

Lorry loading/unloading area: The lorry-parking requirement is a function of the throughput of the market. If the market is assumed to have a throughput of say 600,000 kgs (an increase of 100%) of the present times, then the total number of lorries (or lorry equivalents) would be around 600. Based on present arrival/departure patterns, the peak would need to accommodate around 50% of the total lorry arrivals. Thus around 300 lorry loading/unloading bays would be required. However, as discussed in Chapter 3, the lorry parked time (dwell time) can be reduced with better layout of the market and the use of mechanical implements to load/unload and to move the packages between lorry and shop. In such a well-designed and operationally advanced market the peak storage requirement may be around one third of the total arrivals. This would mean parking for 200 lorries. In other words, one lorry-parking stall would be required for every 3,000 kgs of trade.

Parking space for lorries – (overflow parking): It is recommended that an additional 25% parking spaces should be provided as overflow parking for fluctuations in lorry arrivals caused by seasonal peaks, holidays and other variations. Each lorry parking space inclusive

of circulation requirements would need around 300 to 500 square feet within the parking area, depending on the type of parking and circulation arrangement.

Parking Space for Other Vehicles: Vehicles used by traders, buyers and sellers that are not used for the carriage of goods may be located at a corner or periphery of the complex. It could even be located at an upper floor if space is limited. It may be reasonable to provide one parking space for a car or van for every two shops. Each such space may require around 300 square feet inclusive of circulation.

Area for Services: It is assumed in this study that administrative offices, Police Post, canteens, banks, toilets, garbage disposal sites should occupy not less than 10% of the floor area for shops. Some of these could however be located on an upper floor.

Circulating areas for buyers/sellers and for natamis with loads: This area should be equal to the area provided for loading and unloading of lorries. This will of course change with the type of circulation system that is used in the design. An efficient arrangement between loading/unloading and the shops will reduce the requirement for circulation space. It is proposed to use manually operated trolley carts to be replaced by mechanized trolleys at a future date.

Circulation space for lorries: This is basically taken as a minimum of a road width of 25 feet for purposes of reversing and pulling out of the loading bay. Thus with an angle parked lorry of 20 feet length, the minimum circulation width should be 45 feet. Thus the circulation area that is in addition to the parking area requirement should be calculated as 450 square feet for a 10-foot wide loading bay. A 25 feet length is preferable to plan for larger vehicles in the future.

Thus an example for an estimated 450 trade stalls at Orugodawatte, the space requirement would be around 10 acres which corresponds to the extent of Stage V of the Orugodawatte Warehouse Complex that is earmarked for shifting of the Manning Market.

Layout of Market

The type of operations in Manning Market means that the lorries have to be unloaded to many shops and in the reverse actually, each lorry is loaded from many different shops. Thus access between lorries and shops should be all to all. This is different to the arrangement at Dambulla where it is often a case of one lorry to one shop and thus it is a one to one system.

The lorry operations at Manning Market are made by transport unions, where a particular 'line' will share a certain loading and unloading staff. They may wish to use their parking bays for a particular group of lorries. Parking bays can then be even auctioned off so that each union has operating rights for certain parking bays. Use of mechanical means for this process will mean that they can reduce the delay of occupying a particular bay. This is very similar to airport operations and the manner in which gates are managed between different airlines.

As shown in Figure I, for an arrangement with a central concourse with four piers on each side there could be around 420 shops in the wholesale area in seven rows set back to back separated by aisles. A further 30 retail shops towards the Baseline Road could be planned as set out to operate separately from the wholesale operations.

A new market complex should also anticipate the introduction of new technology even at a later stage if the high unemployment and traditional practices do not permit a sudden change

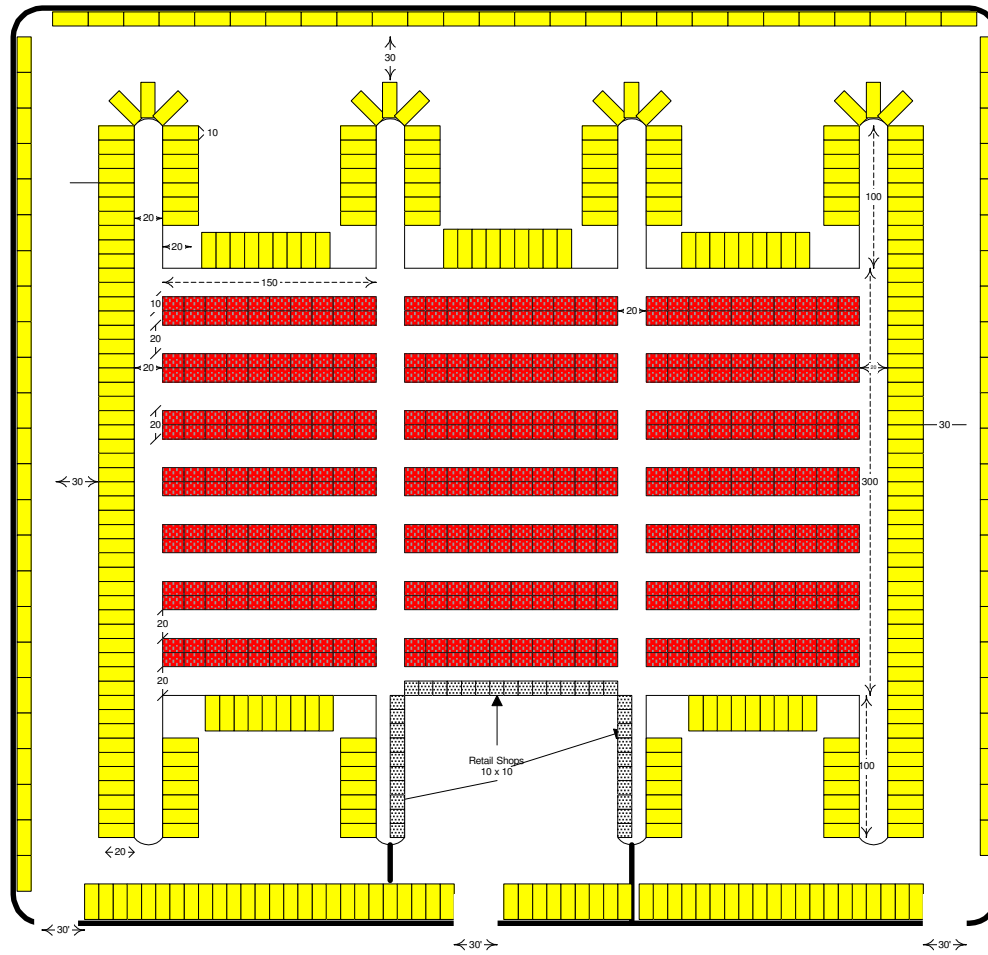
Railway: The Orugodawatta site has railway access at the other end of the complex. The Stage V does not have direct access. Although the railway is not used at the present, the proximity would be useful for the future. It may be recommended that a railway station be established here to serve the needs of the entire complex both passengers' needs as well as the goods transport.

Future of the Present Site of the Manning Market

From a transport perspective, the following suggestions are made for optimum utilization of this valuable land without causing unsustainable traffic conditions.

- Since this has evolved to a strong bus and rail passenger hub, priority should be given for the setting up of the Pettah Transport Terminal as proposed in the UDA's CMR Structural Plan (1999). This will actually ease congestion further as on-street bus terminals and stands are shifted to well-designed off-street facilities. The large flow of passengers crossing Olcott Mawatha getting from one bus terminal to another will also reduce and thus the circulation of traffic on Olcott Mawatha will improve.
- The nature of development to replace the trading activities in the 4th and 5th Cross Streets should also be considered carefully. It should exploit two central transport nodes located on either - i.e., the port and the bus/rail terminals. Thus preference should be given to activities that will depend on the import or export activities of the port, perhaps those that require large numbers of passenger travel either with respect to employees of such institutions or consumers. The latter can be provided convenient public transport due to the proximity of the bus and rail terminals within walking distance.

Figure I shows a typical arrangement for a many-to-many type of goods flow arrangement similar to the present functions of the Manning Market. However, if dry goods activities of 4th/5th Cross Street are also to be shifted their patterns, storage requirements are different. They would then require a different arrangement. The inter-relationship between the two sectors would also need to be incorporated in the design.






-  Parking Spaces
-  Wholesale Shops
-  Retail Shops

Figure I:

Arrangement Proposed for Orugodawatte Site

CHAPTER 1 : INTRODUCTION

Manning Market has traditionally been the largest and premier national marketplace for fresh vegetables for many years. Since 1983 it has been temporarily housed by the Colombo Municipal Council (CMC) in a former dilapidated sugar warehouse belonging to the Sri Lanka Railways. This is located between Olcott Mawatha and Bastian Mawatha in Pettah (Figure 1.1), which is within the Central Business District of Colombo. The present site is quite inappropriate for a major agricultural market as the internal road network, facilities for load, unloading and storage, as well as other services such as drainage and sewage and public amenities are almost non-existent.

However, even in spite of these shortcomings, the number of traders is reportedly increased from 301 in 1983 to over 1,000 today. Since the CMC, has comparatively few management staff, it follows a comparatively open access rule. As a result many unauthorized trade stalls have sprung up in addition to a retail trade, which is conducted, adjacent to the wholesale side.

Although the number of traders has increased over the last two decades, the volume of throughput of Manning Market is reportedly slowly shrinking. Meanwhile, the union of traders struggles to put some order into the traffic flows to accommodate unloading and loading of lorries and to settle disputes. Basic amenities such as toilets are inadequate, while health and sanitation conditions defy descriptions.

Manning Market in Colombo appears to be slowly losing its traditional role as the most important transshipment market in the country. Even its current ability to service all the market needs of Colombo's consumers, institutional buyers and agribusiness including exporters has been recently called into question. Although its prices remain competitively low, the quality and shelf life of its goods have become a major concern, especially at the retail level (Mengey et al, 1996).

The University of Moratuwa carried out a lorry parking study of both the Manning Market and the 4th and 5th Cross Street areas in 1992. This study has also recommended the relocation of both markets to more suitable sites as a long-term measure. Although a number of interim measures have been proposed in this report to ease traffic operations within these sites such as changes in circulation, re-demarcation of parking areas etc, it is noted that no improvements whatsoever have been made over the last 8 years and the problems appear to have compounded over time, even though the volume of throughput is reported to have decreased.

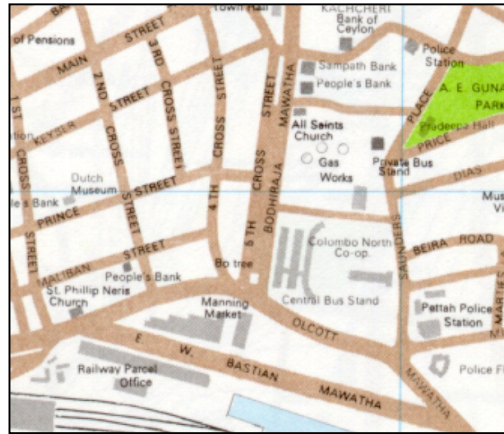


Figure 1.1 : Manning Area

Market and Pettah

1.1 Terms of Reference

The terms of reference for the study have been set out in the Memorandum of Understanding signed between the Urban Development Authority and the University of Moratuwa in September 1999. These are given as follows:

1. A comprehensive survey and analysis of lorry traffic presently arriving at Pettah and its circulation patterns including return trips and its contribution to the traffic congestion within the City.
2. An analysis of the demand for lorry transport in Manning market and its relationship to other wholesale markets elsewhere in Pettah such as the dry goods and hardware markets.
3. A study and analysis of patterns in the arrival of vegetables at the Manning market and the mode and manner in which they are distributed.
4. An assessment through the Trans Plan traffic model of the impact from the proposed project on the future traffic flow within the city.
5. An assessment of any new road linkages and/or improvement to existing roads resulting from this project.
6. Exploring of possibilities of rail linkages to the Wholesale Market.
7. A study of the functional requirements for unloading and loading of different types of commodities from different types of lorries and other vehicles.
8. Specification of the transport and vehicle related functional requirements for incorporation in to the design of the wholesale complex.

1.2 Study Team

This study was led by Dr. Amal S. Kumarage, Head/Transportation Division of the University of Moratuwa and was assisted by Dr. JMSJ Bandara, Senior Lecturer and Ms. Pradeepa Jayaratne, Technical Officer. The field surveys and analytical work were carried out by Ms. Namali Sirisoma and Mr. Ravindra Wijesundera.

1.3 Acknowledgements

The study team acknowledges the advice it received from Mr. L. P. Rupasena of the HARTI and Mr. Win Lee Chang of Tropical Harvest. The study team is also grateful to the cooperation and assistance it received from the Dr. Elleperuma, Veterinary Surgeon, Colombo Municipal Council who is in charge of the operations of the Manning Market; the Divisional Secretary's Office in Dambulla. The study also acknowledges the assistance it received from the many users of Manning market and the Dambulla market who readily complied with the requests for cooperation in the field survey. Gratitude is also due to Mr. Gunatileke Banda, Transport Planner of the UDA who assisted in liaison activities with the UDA.

CHAPTER 2 : DATA COLLECTION & LITERATURE SURVEY

2.1 Literature Survey

Since the 1980s there has been some changes in the marketing network of fresh vegetables and fruits. The traditional commission based system in operation at the Manning Market with the setting up of assembly markets in the production areas as well as transshipment markets in consumption areas.

The World Bank has conducted a major study and its final report has been titled the Study of Agricultural Markets in Sri Lanka dated April 1998. This report provides an extensive and analytical study of agricultural markets in Sri Lanka and should be recommended as a companion guide to this report from which it has borrowed substantially.

Colombo and Kandy have been the traditional terminal markets where due to the large urban and suburban base, they are terminal markets for agricultural products. They are also transshipment markets for the distribution of vegetables to neighboring urban centers.

2.1.1 Markets in Colombo and Kandy

The large commission based markets in Colombo and Kandy use lorries belonging to Transport Unions to ship agricultural produce directly from the farmers fields to the these two markets. However, it is noted in (Menegey et al, 1998) that the performance of the Colombo and Kandy terminal markets, i.e. marketplaces primarily servicing the demand of large numbers of local consumers, continues to steadily weaken and their market share of total production is declining.

One indicator of the scope of the Manning Market in Colombo is to examine the range of supply areas sending commodities to it. The surveys conducted by the HARTI study shows that still the Manning market truly has a national scope of supply as illustrated by Figure 2.1, which is based on the main origins of vegetables and fruits which arrived there on October 11 1996. About 30-35 of those lorries had come from low country origins and 45-50 lorries from the upcountry areas. Fruits were the main commodities sent from the southern origins.

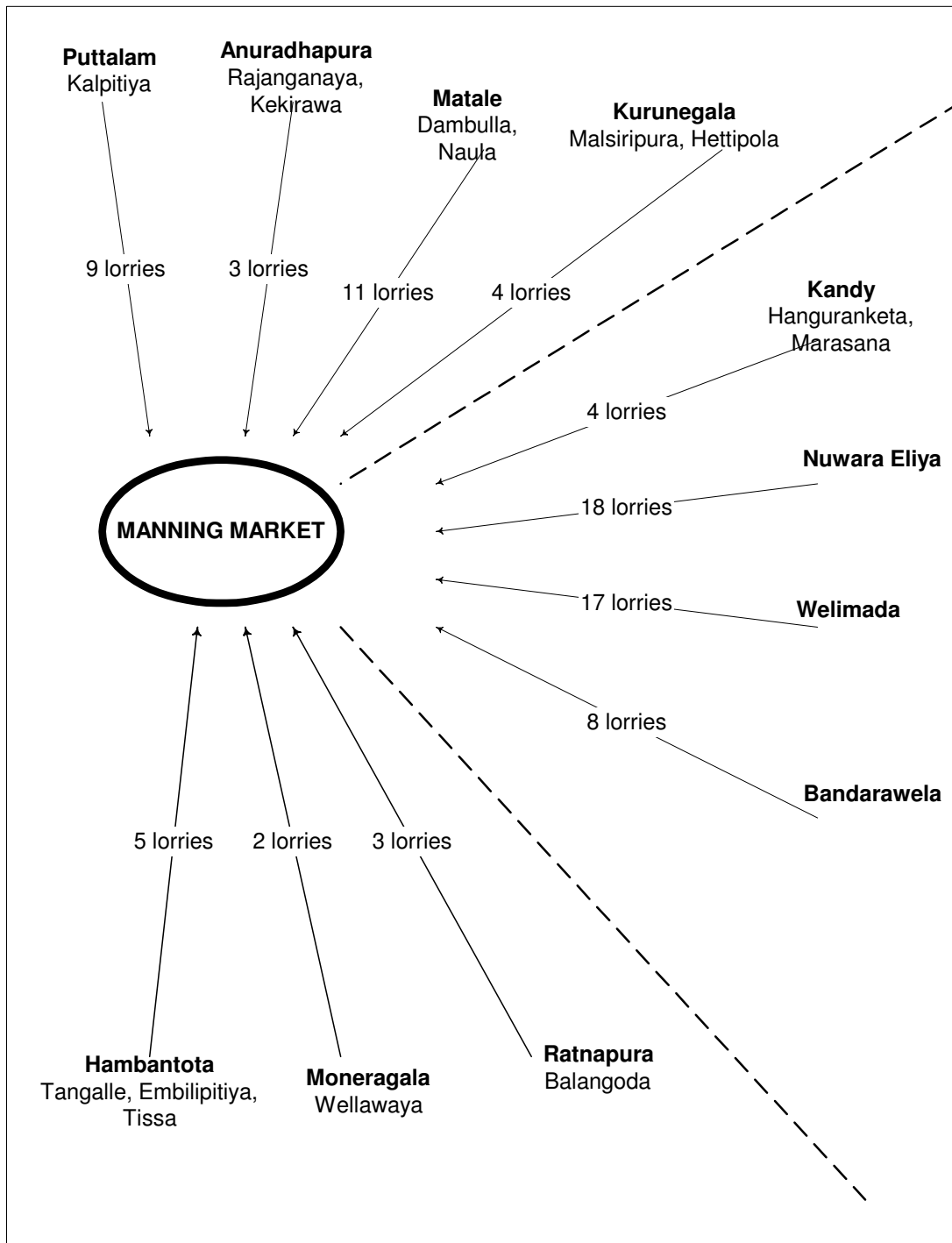


Figure 2.1: Origin of Loaded Lorries and Fruits to Manning Market¹

¹ Source: The Study of Agricultural Markets in Sri Lanka pp., 6-31.

The vegetable and fruit marketing networks have other complex implications mostly to do with transport features and the nature of the national markets. This includes the Pettah wholesale market and the arrangements of forward haul and back haul arrangements.

2.1.2 Polas

In Sri Lanka the periodic markets 'Polas' have become popular both in production areas as well as consumer areas. The producer Polas are where produce is brought particularly by small to medium scale farmers who often hire transport directly or collectively from field to market. These markets are held once or twice a week. The producer Polas are common practice in the southern part of the country. This is mostly due to the fact that most households in Sri Lanka do not have refrigerators and thus weekly purchases become essential. Most polas have also become multi-faceted with other household items too being sold so that it takes on a 'supermarket' atmosphere.

Most Polas however are consumer based where retail activity dominates. These are to be found throughout the country. It is noted that these have become increasingly popular and that daily transactions at public markets have declined while polas have become the major outlet for the majority of Sri Lankan consumers (Menegey et al).

It is also noted that in 'Sri Lanka's system that a large number of wholesalers and retailers from deficit areas/polos travel to surplus areas; negotiate small, medium and large scale purchases of different commodities; and often as a group, hire transport for mixed lots of several types of vegetables to their markets for distribution to other local retailers'. (Menegey et al)

2.1.3 Newer Markets

Newer markets have developed in both producer areas as well as consumer areas. The Dambulla market is the largest of these, which has become a strong transshipment market, particularly for agricultural produce from the Mahaweli areas. Many smaller markets have also developed in Suriyawewa in the south and elsewhere in the country. Most of these markets are functioning throughout the week. At the consumer end, several sub urban markets have developed most notable are those at Maharagama, Horana, Talduwa etc, which are also known as the traditional 'pola' or fair. These are held once or twice a week.

2.1.4 Trends and Transition of Agricultural Markets

The transition from the traditional pattern of marketing based on Manning Market in Colombo and the Kandy market seems to be rapidly changing. It is observed in the Study of Agricultural Markets that '*the national market network for vegetables is in a state of transition and not very well understood by leaders either in the public or private sector*' (Menegey, et al).

Thus the relocation of the Pettah market requires a clear understanding of the big picture of the current situation and the ongoing trends and transitions.

Figure 2.2 shows the area of distribution of the produce from Manning Market. This is because some of the peripheral markets such as Horana, Talduwa and Kegalle have become transshipment markets where produce is bought and distributed to smaller polas in the neighborhood by passing the Manning market altogether. Thus the area served by the Manning Market is now shrinking when compared to the 1970s (Figure 2.3). This is partly due to the urban expansion and suburban area becoming deficit areas. The conversion of agricultural land to other use is also partly responsible for this situation. Migration of higher income residents to these suburban areas is also responsible for increased demand in these areas. It has been noted that up country vegetables dominate the main commercial marketing channels through Manning Market.

Three distinct trends have been identified in Menegey et al (1998) to emerge in agricultural trading and produce movements in Sri Lanka. These are:

- **System #1:** as the emerging decentralized hierarchy where assembly traders, located in wholesale market centers or transshipment markets, collect and distribute upcountry and low country vegetables.
- **System #2:** as the declining centralized hierarchy based in the Colombo and Kandy terminal markets as supplied by upcountry farmers, collectors, wholesalers and lorry unions who deliver directly to these terminal markets on a commission basis.
- **System #3:** as a large unorganized group of itinerant traders with lorries arriving from low country consumer polas and public markets to procure upcountry vegetables directly from farmers and collectors in more interior areas.

Figure 2.2: Flow of Fresh Vegetables from Manning Market to Main Retail Markets in Western Province²

² Source: Study of Agricultural Markets in Sri Lanka, pp 3-4.

Figure 2.3: Traditional Vegetable Marketing Network, 1970³s

³ Ibid, pp. 3-7.

Figure 2.4: Emerging Vegetable Marketing Network

The new wholesale-based system seems to emerge from a combination of events and situations, both in the major upcountry production areas and in the terminal markets. Beginning in the early 1980's period, some collectors and buying agents in the upcountry production areas began doing business with itinerant traders who came to buy vegetables. Over time they setup wholesale shops in close proximity to each other and became recognized as wholesale market centers, especially in Nuwera Eliya and Bandarawela.

These resident wholesale traders bought vegetables on their own account and received orders placed by buyers from distant deficit areas. These outside buyers brought their own lorries or hired local lorries to transport their purchases back to their markets, such as in Galle and Matara. The payment of cash at the farm gate by these resident wholesalers, rather than waiting until the vegetables were sold according to the commission-based system, was a strong incentive in favor of this approach.

During this period, a group of traders from the Kandy area reported observing the profits of the larger commission agents within that terminal market. Since they were unable to enter that market, these traders along with others from around the island moved into Dambulla and formed a new market. This market town, located at a strategic cross roads to the north of Kandy, steadily grew into a vibrant wholesale transshipment market center. During the peak season, over 90 active traders bought from areas to its south and sold mostly to buyers from the north and east of Dambulla. Both this low country transshipment market and the upcountry market centers noted above, consisted of several small shops situated adjacent to each other within a well-defined location. Without a fixed number of stalls or shops, as in the terminal markets and public markets, new traders rapidly entered into this business.

2.1.5 Transport Services

In most producer areas there are resident traders as well as itinerant buyers arriving regularly from outside markets as well as the services of the Transport Unions to pick up and deliver vegetables to commission agents in Manning Market.

This traditional marketing system was prominent till the 1980s when large commission agents, primarily in Colombo and secondarily in Kandy formed a well-organized assembly system. The system worked by Transport Unions bring in produce to the commission agents who then used designated lorry owners in suburban towns and cities with large retail markets.

In the original upcountry production areas, the assembly arrangements were well organized. This system gave the Transport Union responsibility to send its lorries on specified, scheduled routes along interior mountain roads to collect whatever vegetables were placed at the roadside by local farmers. On each bag or other container were the farmer's mark and the symbol of a designated commission agent in a terminal market. The lorry operators with their assistants loaded and transported these vegetables to a common assembling place, consolidated the loads into a few lorries and shipped them over night to the specific market for delivery to the consignees. One variation was in the Welimada area where individual

farmers and collectors with their own lorries assembled and shipped vegetables to the Colombo Commission Agents.

2.1.6 Pettah Bazaar

Meanwhile, the trading in the Bazaar has continued as imports and domestic grains and storable vegetables as well as imported fruits converge here to be redistributed throughout the country. The number of traders in the Pettah Bazaar has expanded into nearby streets as hundreds of small wholesalers and commission agents sell their goods to outstation retailers and other buyers. The linkage between these two markets is clear as some of the outstation lorries that deliver fresh vegetables and fruits to Manning Market, thereafter go to the Bazaar in search for backhaul loads to the outstation areas. The Study on Agricultural Markets notes that *'this connection means that both markets should be moved simultaneously in order to effectively improve the food marketing system'*.

2.1.7 Location of Markets

Traders around the country both wholesale and retail contend that roadside markets are a "natural phenomenon" and very conducive to 'efficient' transportation services. For example, the initial Dambulla transshipment market center consists of two rows of roadside shops set back off the main street from which traders conduct their business. Traders in lorries pulled in front of the shop, purchased or sold vegetables, loaded or unloaded them and then continued on their way. Similarly scores of lorries waited along the roadside in Welimada, Hangeranketa, Kande Handiya and Kandapola to load vegetables rather than pull into any dedicated trading facility. This phenomenon has important implications for the location, design and construction of improved market facilities.

2.2 Surveys at Pettah

The surveys in Pettah area undertaken in this study were done on 29/01/2000 a Saturday. Data collection and observation included five separate stages. These are;

- Transport Operations at Manning Market
- Manual Classified Count for Freight Vehicles entering and leaving Manning Market.
- Origin-Destination Survey for Lorries in Manning Market and Pettah Bazaar.
- Interviews of People in the Manning Market.
- Parking Duration Survey in Pettah Bazaar.

2.2.1 Transport Operations at Manning Market

The layout diagram of the Manning Market and its surrounding areas is given as Figure 2.5. Vehicles generally the large lorries queue outside Gate No. 3 on Bastian Mawatha throughout the night. Gate No. 3 opens at 5 AM and these vehicles are allowed to park in Blocks B and C. Unloading starts around 6 AM. Vehicles that are parked in Block B have to

be reversed once they are unloaded in order to leave through Gate 2. After 6.30 AM the Gate No. 2 is open for vehicles to exit. In Blocks B and C lorries are parked one behind another so that the vehicles at one end of the queue have to be unloaded and move out before the next can move in. Vehicles that cannot enter through Gate No. 3 are unloaded on Bastian Mawatha.

The road widths within the market only allow for two rows of lorries to be parallel parked in two rows with no space for a through lane. There is hardly space for movement of natamis and the thousands of buyers and sellers milling through the parked lorries. In Block A, lorries are angle-parked with a lane for through traffic. But invariably, scores of handcarts and three wheelers are parked between the lorries at any given instant making movement of lorries through any of these roads slow and difficult. The physical condition of all these roads is also poor adding to the difficulties in internal circulation, especially on rainy days.



The internal operations within the terminal markets and the distribution system to retail outlets also appears well organized. When the markets open around 6 AM, the lorries are met and unloaded by the “line natami”, meaning the group of labors specifically responsible for lorries arriving from pre-designated supply areas. The driver or clerk tells the natami the name or number of the consignee for each bag, as they are unloaded. Then each bag is taken manually one or two sacks at one time, to the consignee who gives a token to the natami to indicate delivery. The natami returned to the lorry for additional bags and gives the token to the clerk who is at the lorry to be. Those records determine the freight and unloading costs per consignees as well as the payments for each natami. Thus all lorries are unloaded simultaneously. It is not unusual to find the different lorries unloaded by a group of natamis to be parked at different corners of the market. Furthermore the consignees are also distributed throughout. There are no unloading decks so each natami has to manually place on shoulder or head each bag of vegetables and carry to the consignee, where he is helped to put it down on the floor. There is little movement for these natamis leave alone space for carts or trolleys to be used.

Once each consignee has sold the vegetables at the prevailing market prices, he pays the freight fee, natami-handling charges and deducts any other costs he has incurred plus his 10% commission. He then arranges for the farmer or other supplier to be paid the balance as payment for the vegetables. This is either sent with a lorry driver or put into their local bank account, or saved by the commission agent until the farmer or other suppliers comes to claim the entire amount.

The distribution arrangement involves a specific fleet of contracted lorries, each arriving from one of the retail markets services by these terminals and usually being parking in a pre-

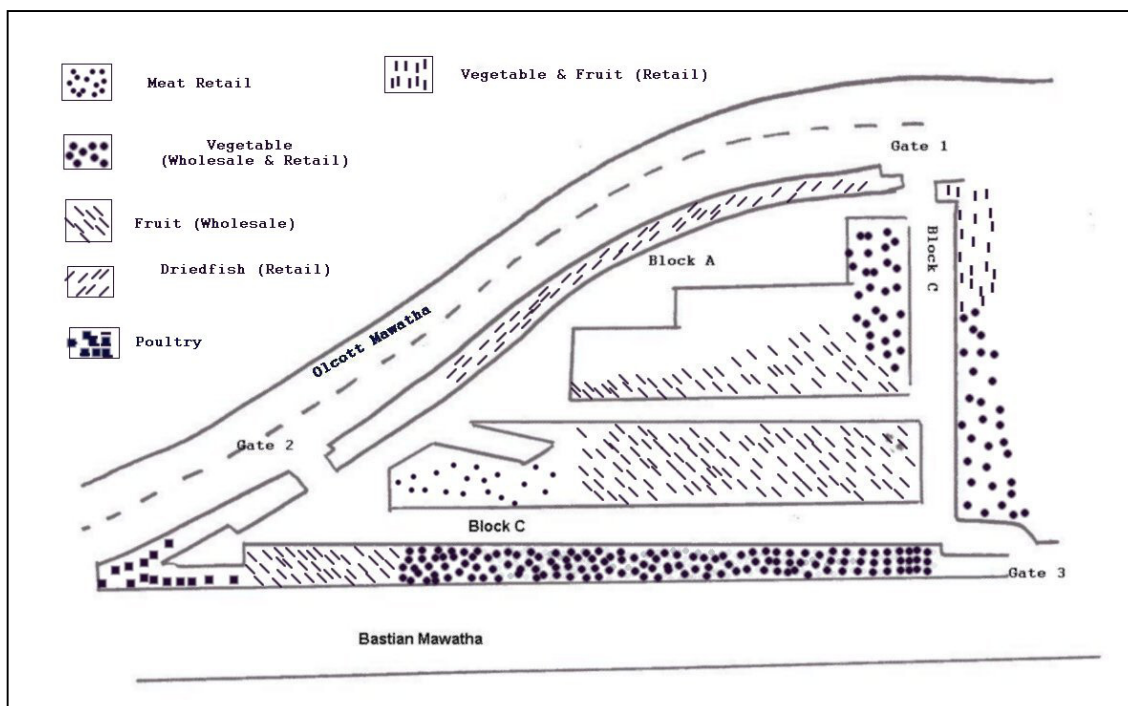
arranged area. The retailers arrive from many locations by bus, or by the lorry or three-wheeler in the early morning hours, then negotiates purchases from the various commission agents, and arranges for natami to load their purchases onto the lorry or three wheeler according to its destination. After informing the lorry driver about the number and types of vegetables to expect, the retailers returned to their markets by bus to await the delivery of their vegetables. In the case of some they return in the three-wheeler or van along with the purchases. The final destinations of these purchases are mostly specific retail market as well as stops at vegetable stands along the route. There are some purchases that are bought by large consumers and kitchens.

The delivery lorries for the larger retail markets departs from about 8 AM at staggered times in order to give their retailers flexibility in purchase time. When the lorry arrived at its designated market, the lorry natami unloads and delivered the vegetables to each retailer who then pays the freight and unloading charges. A local transporter usually owns these lorries from the area of the retail market. That transporter usually has '*exclusive rights*' for that particular route.

The problems faced by the commission agents in Manning Market with respect to transport can be summarized as:

- Increased competition from major transshipment centres such as Dambulla and Kegalle that are also easily accessible.
- Increased competition also from former commission agents who have relocated to wholesale business in nearby suburban polas and have an advantage of lorries not having to deal with congested roads.
- Inadequate space for circulation resulting in ever increasing levels of internal congestion as hundreds of 3 wheel vehicles, vendor's carts and loaded and empty lorries attempt to simultaneously navigate the same aisles/roadways during the peak period from 6 am to 10 am within Manning Market.
- Insufficient lorry parking space for loading, unloading or awaiting hire before & during peak traffic periods. This also leads to frequent conflicts in the use of scares road space.
- Within the Manning Market facility there is inadequate drainage which easily causes flowing, damage to the interior roadways, erosion around structures, heightened deterioration to whatever goods are stored, and poor hygiene conditions which are hazardous to the health of traders and their customers alike.

Figure 2.5: Layout of Manning Market



- Thefts and other undesirable activities have occurred in the early morning hours as lorries loaded with fresh vegetables wait along deserted streets until the gates of Manning Market are opened around 5 am.
- Increased bus traffic due to the development of the Bastian Mawatha bus stand behind the market has forced earlier entry of lorries in to the market and the inability to park on Bastian Mawatha when the parking space within the market is full.
- The location of the bus termini close to Manning has some advantages as well. It provides the means for the arrival and departure of the majority of outside buyers (mainly retailers). Commuters also buy from the Manning Market and use these buses to take their purchases homes in the early evening hours.



Several, generally old empty lorries arrive from each large retail market or pola, as far north as Negombo, east as Hanwella, or south as Aluthgama/Kalutara, to be loaded with the purchases of their regular local retailers and then return to their home town to unload and distribute the vegetables to the stalls of those retailer. These lorries enter traffic from 8 am to the early afternoon, thus avoiding most traffic congestion.

- Three wheelers have competed with the traditional distribution of small lots for distribution. But the large number so three wheelers have increased congestion within

the market. The parking space taken by a large lorry is around five times that of a three wheeler- but a three-wheeler can take only two bags compared with up to 200 bags in a lorry. The congestion within the market causes further delays in the lorry departure and in turn results in late arrivals in many retail markets. This then promotes the use of three wheelers that can manage to leave the market quickly thus compounding the problem further for the lorries.

- Thus a large number of three wheeler vehicles also arrive from many, nearby parts of the Greater Colombo Area to haul goods/buyers from Pettah to roadside stands, polas retail markets, supermarkets, and/or households in those locations, thus creating congestion within the market and contributing to city wide traffic
- An array of vans elf lorries, jeeps and cars are brought inside by large households and institutional buyers, such as caterers, military camps, restaurants, food processors and hospitals to haul larger volume purchases to their establishments but they largely avoid heavy traffic
- Carts are taken inside or rented at outside stands to be loaded by vendors who push them through neighboring residential areas for direct sale to consumers at their homes, thus contributing to temporary congestion as pushed through side streets and
- Hundreds of individual consumers and commuters walk to and from the Manning and Bazaar Markets to buy and carry vegetables to the bus stands on their way home.

2.2.2 Manual Classified Count for Vehicles

The main purpose of this survey was to count the number of vehicles that comes in to and leave the Manning Market. Therefore, four survey locations shown in Figure 2.6 were selected at Gate Nos. 1,2 and 3 of the Manning Market and both ends of Bastian Mawatha.

Using Survey Form SF133 (Appendix A-1) the following data was collected from 4.00 a.m. to 12 noon on 29/01/2000 in all the four locations. A total of 1,912 (1,035 in bound and 877 outbound from Manning Market) vehicles were observed during this period.

The following information was collected for each vehicle entering or leaving the market area for this time period.

- Time that the vehicle passed the survey location.
- Registration number of the vehicle
- Vehicle type
 - Two axle large lorries
 - Two axle small lorries
 - Vans
 - 3-wheelers
 - Other
- Load Level
 - Fully loaded
 - Partly loaded
 - Empty

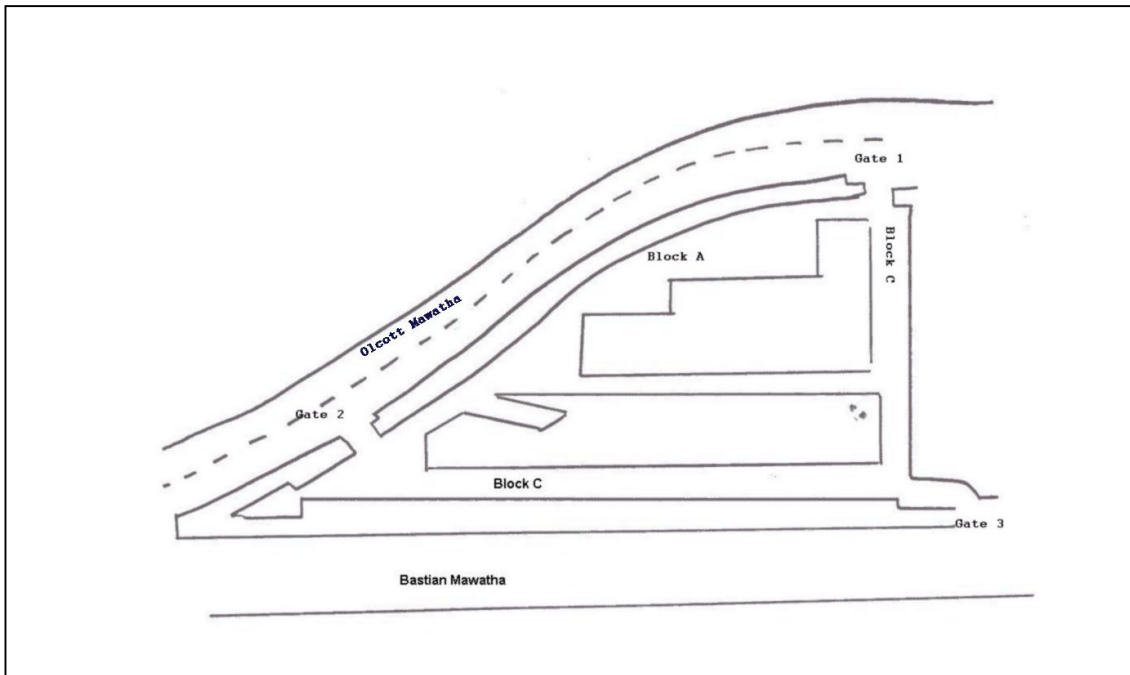
2.2.3. Origin-Destination Survey for Lorries

After an initial pilot survey, the Survey Form SF134 (Appendix A-2) was prepared by including the following questions to ascertain the details of the nature of the trips made by these lorries.

- Place of origin of the lorry
- Time of arrival
- Types of goods carried in
 - Vegetables
 - Fruits
 - Other agricultural products
 - Meat
 - Dry foods
 - Industrial Goods
 - Empty
- Schedule time when unloading is expected to be completed
- Destination of the lorry
- Types of goods carried out
 - Vegetables
 - Fruits
 - Other agricultural products
 - Meat
 - Dry foods
 - Industrial Goods
 - Empty
- Next stops (if any) for loading/unloading

For next three stops, each of the locations and the types of goods load/unload was asked separately. The questions were asked from the lorry driver and this was done for a sample of lorries that were within the Manning Market or in adjacent areas.

Figure 2.6: Survey Area of Manning Market



The Pettah Bazaar was also included in this survey, as it was held that a significant proportion of lorries which bring vegetables to Manning Market also go to 4th and 5th Cross Streets to load dry foods and industrial goods for the back hauls to their places of origin. Therefore the study was expanded to find the effect of 4th and 5th Cross Streets on the transport activity related to the Manning Market. In the O-D survey we found out the 'in goods' and the 'out goods' of the lorries that came to Manning market and Pettah Bazaar separately.

The O-D surveys were carried out by interviewing the drivers of parked lorries at both these locations. This was done from 4 AM to 6PM by enumerators who were moving within these areas. A total of 432 (126 in Manning Market and 306 in Pettah Bazaar) lorries were interviewed during this period.

2.2.3 Interviews of People in Manning Market

The main purpose of these interviews were to identify the people who arrive to the market and the places that they come from and the modes of transport that were used to get to the market. The people were randomly chosen and following data was collected using the Survey Form SF132 (Appendix A-3).

- Type of interviewee
 - Vendor
 - Vendor Assistant
 - Buyer
 - Buyer Assistant
 - Loaded/Unloader (Natami)
 - Other
- Place of trip origin
- Time of arrival
- Mode of arrival
 - Walk
 - Bicycle/Motorcycle

- Car/Van
- Bus
- Train
- Lorry
- 3-Wheeler

The purpose of finding the arrival mode was to determine the impact of the adjacent Pettah bus stand and the Railway station on the Manning Market. These interviews were done by enumerators moving within the market area randomly selecting different types of people for the interviews. These interviews were also conducted between 4 AM and 6 PM. A total of 632 interviews were collected.

2.2.4 Transport Activities of Pettah Bazaar

The current location for trade in storable vegetables and grains is situated in the 4th and 5th Cross Streets in Pettah, one of the oldest sections of town, where streets are narrow and where some buildings are nearly a century old (Figure 2.7). These streets were not designed for a high volume of traffic, particularly lorries that in fact scrape the sides of buildings as they load and unload goods each day. Since parking spaces are limited, often lorries are double parked during loading and traffic flow is at a stand still resulting in lost time and revenue to traders.

There are approximately 325 shops selling storable vegetables and grains in this area. The trading volumes of each of these is given in Table 2.1. The large scale traders in Pettah have been in business for 20 years or more. Some of these shops were established as early as the 1940s, but a majority began operations in the 1970s or 1980s. Some of the stocks of these traders are held in private stores outside Pettah.

Table 2.1: Distribution of Traders in 4th and 5th Cross Street⁴

Categories of Traders	Approximate Number Shops	Bags Traded/Day (changes by season)	Characteristics of Trading
Large Scale	14	Over 1000	Import, wholesale, commission
Medium High	88	500	Import, commission, wholesale
Medium Low	140	300-500	Commission from big & medium
Small Scale	83	Less than 300	Commission from big & medium
Total	325		

⁴ Source : Study of Agricultural markets in Sri Lanka, April 1998

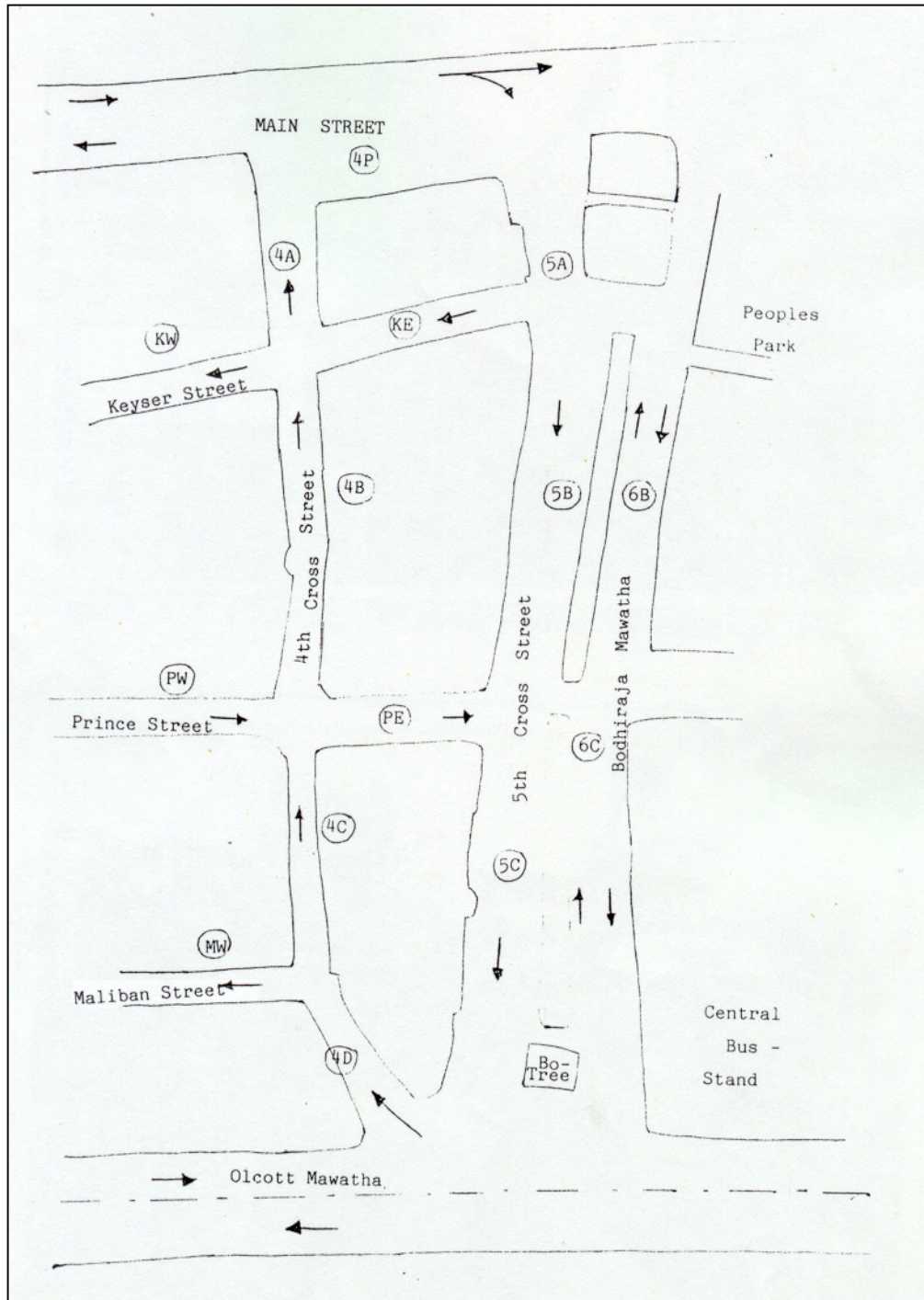


Figure 2.7: 4th and 5th Cross Street in Pettah

Lorry Traffic: In the Survey of Agricultural Markets it was reported that approximately 1380 lorries entered the 4th and 5th Cross Street area during a four-day survey period. Days with the highest traffic were Monday and Friday as lorries from outstations arrived to deliver their goods to traders in the 4th and 5th Cross Streets area. Due to limited space on 4th Cross Street-lorries must line up on 5th Cross Street, waiting for a traffic warden to permit them entry. Some lorries circle the area several times searching for a parking space. Since there are no sidewalks, pedestrians and natamis must weave around the lorries to enter the shops.

Lorry unloading typically takes place in the early morning. The busiest time is usually 7 am and 9 am when business are opening. Imported grains and storable vegetables coming from the port, bonded warehouses and private storage facilities in contrast are delivered in the afternoons and evenings.

Lorry departures from the bazaar are fairly evenly distributed throughout the day. According to Menegey et al (1998), 45 percent of the lorries were loaded and departed by noon. This is in contrast to Manning Market where loading occurs primarily in the morning.

2.2.5 Parking Surveys at Pettah Bazaar

A parking survey was carried out on the same day within the Pettah Bazaar area (Figure 2.8) including the following roads:

- Abdul Mawatha;
- Bandaranayake Mawatha;
- Bodhiraja Mawatha;
- Central Road;
- Dam Street;
- Mahavidyala Mawatha;
- Massenger Street;
- Meeraniya Stree;
- Mihindu Mawatha;
- Mohomad Mawatha;
- New Moor Street;
- Oilman Road;
- Old Moor Street;
- Prince Street;
- Quarry Road;
- Sangaraja Mawatha;
- Sumanathissa Mawatha;
- Wolfendal Street

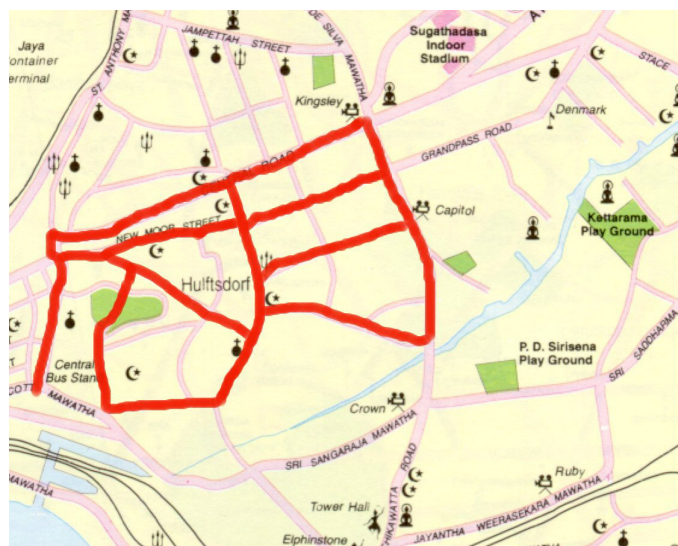


Figure 2.8: Pettah Bazaar Area

This survey was done by a designated vehicle making a number of circuits of these roads throughout the day recording the registration number plate of the vehicles that were found parked at a given time. All types of motorised vehicles (except motor cycles) were included in the survey. Due to the extremely high levels of traffic congestion found in this area, only three circuits were made during the period 8 AM and 4 PM on 29/01/2000. During this survey a total of 3 separate observations were made for each road, identifying a total of 1,255 vehicles that were found parked on the roads. Off street parking was not included in this survey. The Survey Form SF133 was used (Appendix A-4) for this purpose.

2.3 Surveys at Other Regional Markets

The study carried out two surveys at the regional markets of Dambulla and Embilipitiya. Both these are markets that have developed in recent years. The purpose of carrying out these surveys was to determine how the transport functions at these places and what impact these markets have on the movement of produce to Manning Market.

2.3.1 Dambulla Dedicated Economic Centre

There are a number of reasons cited for the establishment of a strong regional market at Dambulla. These are:

- As a result of the war in the north, the wholesale market at Vavuniya had to be shifted to a safer place. Dambulla was chosen to relocate the market (1985/86) due to the easy accessibility from all parts of the country.
- The farmers of Mahaweli areas needed a place to sell their products quickly. Earlier their product had to be brought to Colombo. But with the establishment of the Dambulla market, they preferred to sell their produce quickly without depending on intermediates.

- The availability of fresh vegetables and the possibility of buying them direct from farmers have led to the popularization of this place. The absence of too many middlemen is conspicuous here. The mechanism at Dambulla is very simple unlike at Manning market.

One of the primary aims of establishing a market at Dambulla was to help the farming community in the local areas. As such, during various stages of later development of the market, prime consideration has been given to safeguard the interests of local farmers.

Shifting of Market to Present Location: During the early years of the Dambulla market it was located alongside the A9 (Kandy-Jaffna) Road. The primary reason for the shift of market to the present new location is the traffic congestion that was caused due to marketing activities. There weren't adequate parking spaces for arriving lorries as such they had been parked along the main highway. In addition, congestion problems had further aggravated due to frequent movement of goods across the road (by natamis and handcarts) as vehicles could not be parked in front of the stalls. As a result there had been number of accidents too.



Earlier the market had spread over a lengthy narrow stretch (basically on either side of the A9 road). Therefore, especially the buyers had found it difficult to explore the whole market and buy from cheapest place. In the process of shifting, there were 218 competitors for the 144 shops. The priority had been given to those who possessed shops at the earlier market.

A grading system had been used to select traders depending on the magnitude of business they had at the former premises. Before shifting, an agreement has been reached between traders and authorities so that no other wholesale business is allowed within the town area.

The present system of operation and administration at the new market is basically the continuation of the earlier system.

The New Market: The new market had been constructed at a cost of Rs. 125 million provided by Ministry of Finance. It has been built on a land of 8 acres. There are 144 shops all of which are currently operational. In addition, there are 7 canteens, 94 toilets, a bank, a police station, ancillary buildings which houses administrative staff of the Dambulla Dedicated Economic Centre and the Rangiri Dambulu Wholesale Traders Association, Dambulla Janatha Farmers Union and the Natami's society.

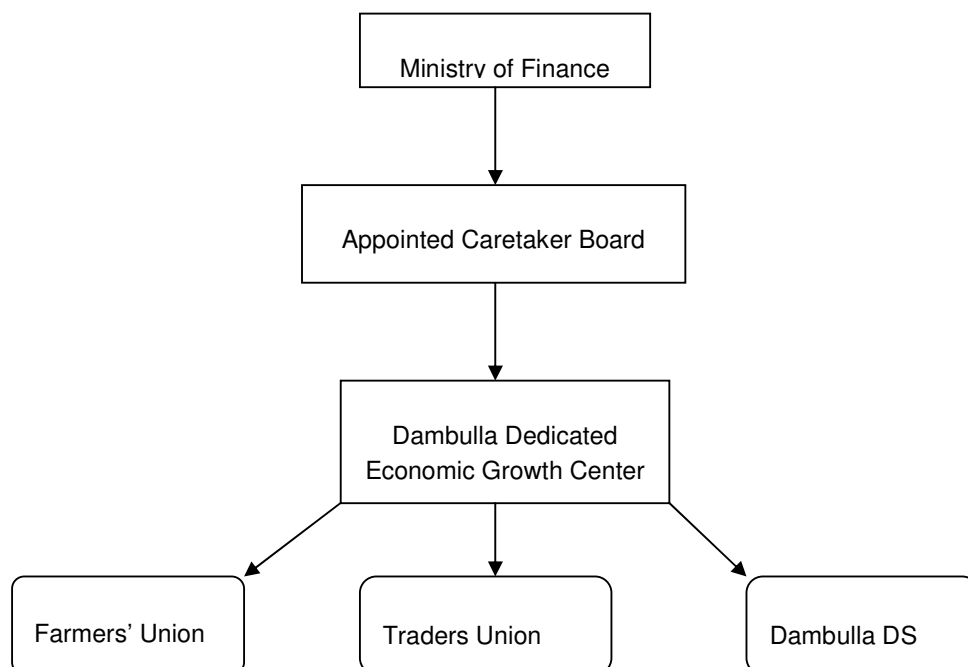


Figure 2.9: Administrative Hierarchy of the Dambulla Dedicated Economic Center

The approximate size of a shop is 20 feet by 10 feet. Each shop has electricity. A floor space extending 12 feet has been allocated for shop front lorry parking for loading/ unloading. This area is also utilized for storage purposes as well. There is space for empty lorry parking within the market. It can accommodate around 300 lorries (as reported by the Manager Dambulla DEC). There is also room for further expansion of the market. In order to minimize traffic congestion within the market area, a one-way traffic flow system is in operation during nighttime. The new market is spacious and well organized. The administrative hierarchy of the market is shown below.

Shops have been leased for a period of 10 years. An advance payment of Rs 100,000 is required. The monthly rental is Rs.5,625. The manager claims average maintenance cost, including utilities per shop is Rs.1,225 per month. The Economic Centre Management has so far invested Rs.17.5 million on treasury bills from the earnings.

Changes Observed after Shifting: The number of buyers coming to market has increased 4 to 5 fold after the shifting. As the market gained popularity, the goods from all parts of the island has also begun to arrive here. Due to the arrival of vegetables from other parts of the country, local farmers are facing a stiff competition to gain a reasonable price for their product. The buyers on the other hand, get the opportunity to know the price of goods at all shops as the market is spacious, visible and is away from other activities. Since the buyers can meet together, they usually decide on a common price and influence the market. This has however worked to the disadvantage of sellers especially the vegetable farmers.

The following factors have also been reported as benefits derived from the shifting.

- The wastage of vegetable has reduced due to the availability of space for storage.

- The traffic congestion in the city has reduced by 25-35 percent as reported by the manager of the DEC.
- Traffic accidents have reduced (as reported by the Police), as there is no interaction between main road traffic and goods handling.
- The trading activities continue day and night.

Details of Market Activities: The majority of traders sell vegetable and fruit. Some traders however, sell only imported dry foods such as potatoes, onions and dhal. Usually sale of rice, meat and fish is not permitted. Goods are brought virtually from all parts of Sri Lanka. Suppliers from Nuwera Eliya arrive throughout the year as vegetable is grown there during both seasons. Other major supply areas include Mahaweli zone, Amparai, Dambulla, Monaragala, Vavuniya, Embilipitiya, Kurunegala, Matale, Matara, Gampaha etc.

The major destinations of the loaded lorries are Colombo, Kegalle, Trincomalee, Anuradhapura and Matara. It is interesting to note that goods are taken from Dambulla to be sold at the wholesale market at Kegalle. This is mainly due to the fact that vegetable, which is supplied direct by the farmers, can be bought at a cheaper price.

An estimated 7,000 persons arrive at the market on an average workday. These include buyers, sellers and other categories of workers. Around 500,000 kgs. of vegetable and other foods are sold at the market on an average day. The value of daily trading is between Rs.7.5 to Rs.10 million. The total collection earned as commission is around Rs. 400,000 per day and the average profit on trade earned per stall by means of commission is about Rs. 3, 000 per day. The sale of produce brought by farmers and collectors takes place through the dealers (shop owners) at the market. They get a commission for each kg sold. The commission system is as given in Table 2.2.

Table 2.2: Commissions for Trading at Dambulla DEC

Price per kg (Rs)	Commission (Rs)
Up to 10.00	0.50
11.00 – 29.00	1.00
30.00 and above	2.00

Like at Manning Market, the goods are loaded and unloaded from lorries mainly by natamis. The unloading rate is Rs.1 per piece whereas loading rate is Rs.4 per piece. There are few carts available for loading. These are used to load to lorries parked away from the shops. There are about 160 natamis. Some of them have formed a society. They collect a membership fee and hopes to expand the scopes by introducing a welfare system. The garbage collection and disposal task has been tendered and awarded to the Wholesale Traders Union. It has been observed that the price of produce varies sharply from day to day. This is basically dependent on the supply and demand. In some situations when goods cannot be sold at a reasonable price, they are taken to other wholesale market including to Manning Market in Pettah.

Transport Related Details: On average 500 lorries arrive daily. Mondays, Wednesdays and Fridays are identified as higher activity days when over 600 lorries arrive. The imported foods are usually transported directly from port in containers. It was observed that on average day, 3-4 lorries come to a particular trade stall. There are around 10 employees per shop including salesmen, natamis and lorry crew.

There is some congestion during high activity days. On such days, some lorries are loaded on the corridors meant for internal circulation. There is a charge of Rs.10 from each lorry that enters the market except those from Dambulla. The Dambulla Divisional Secretariat (DS) is presently collecting this. However, the Economic Centre has filed a petition against this, claiming that it is their right to collect the parking toll.

A significant proportion of lorries that arrive to take goods from the market come empty. It seems that the opportunity to buy vegetables from farmers at a relatively cheap price make it affordable to undertake one empty trip. But most lorries coming from Nuwara Eliya have loads in both directions as they bring in up country vegetables and take back low country vegetables and fruit. For transport to Trincomalee, the lorries of Prima factory in Trincomalee are hired to take goods on their return trip which is usually empty.

Small-scale farmers use buses to bring their produce directly to the market. There is also a place for 3-wheeler parking within the market. Small scale buyers use 3-wheelers and (sometimes) buses to take goods to the destinations.

From the procurement perspective, Dambulla traders obtain vegetables from several parts of the country. Periodically they send their lorries to buy low country vegetable from producer polas during peak harvest periods.

Figure 2.10 illustrates the extent of the towns and cities from which buyers come to procure fresh vegetables from this market.

Farmers Association & Wholesale Traders Union: The Dambulu Janatha Farmers Association is comprised of 26 regional farmers' societies. There is an office as well as a shop belonging to the association at the market. The farmers' shop is used to sell the product of the members of the association. Usually try to sell the vegetable to the highest value so that the farmers get the benefit. The quality of the vegetables sold here reportedly better. The average daily trading of this shop is around Rs.40,000. In addition, the association demands for a standard price for their produce. Raises grievances of the farmers. They complain about the inadequate transport facilities, wastage in transport and having to sell their produce to traders who provide loans to farmers for cultivation at a very low price.



All traders are members of the Rangiri Dambulu Traders Union. It is a very influential organization. They have introduced a standard commission system for traders. It also oversees the garbage collection and disposal systems

at the market. They also provide loans and transport facilities to farmers.

The Market and Town: The relocation of the market has significantly contributed towards the growth of the town. New shops, business activities and institutions such as banks (i.e. 6-8 new banks) have been opened due to the space opened up by the shifting of the market and the increased trading activity of the market.

The value of land in Dambulla has sharply increased. The transport system too has improved. Even though the relocation of the market has eased the congestion at the town, rapid expansion of the market has resulted in increased traffic. This may again give rise to future traffic related problems. There is however an increase in the crime rate reported at Dambulla. This is attributed to the market as activities mainly take place during night.

Plans for Future Development: Plans are being drawn to build another 40-50 shops at this same location. Some of these are to be used to manufacture goods packing cartons and produce canned vegetable & jam so that excess supply is not wasted.

There is a proposal to start collection centers at village level. Further a goods transport system is to be started. It is also intended to introduce efficient goods packing and transport system to minimize wastage. It has been estimated by the management of the DEC that 45% of the vegetable production go waste before reaching the end user due to poor transport, handling and storage facilities. In addition, vegetables are to be classified and brought to separate traditional vegetable markets. The expertise of graduates from local universities is to be used for the above process. It is anticipated to start medium-scale vegetable sales outlets in other towns especially near bus terminals and rail stations.

Figure 2.10 : Distribution of Vegetables from Dambulla

2.3.2 Embilipitiya

There are a number of polas and markets in the Embilipitiya area. The wholesale market in Embilipitiya (8th Ela) predominately sells bananas. The premises are owned and managed by the farming community- the sellers. A monthly membership of Rs 25 is collected from each member. There is no involvement of the local authority hence they do not pay taxes or rents.

The trading activities start early morning and continue till noontime. On average 20 lorry loads are traded each day. The main buyers arrive from Kalmunai area (8 to 10 lorries per day). The balance arrives mainly from Colombo and its surrounding areas and also from Ratnapura, Badulla and Matara. The charge per lorry load is around Rs 3,000 to Rs 4,500 to all these destinations except for Kalmunai that is around Rs 10,000 to Rs. 12,000 per return trip.

There are several other markets in the Embilipitiya area. The Suriyawewa market is one of the largest which attracts between 40-80 lorries per day. These lorries carry both vegetables as well as fruits. The majority of these vehicles carry these products to the terminal market of Colombo and the transshipment market at Dambulla. Other destinations are the consumer markets of Kalmunai and Badulla.

2.3.3 Kegalle/Talduwa/Horana

The **Kegalle** transshipment market consists of a group of about 15+ wholesalers who procure and transport both upcountry and low country vegetables from production areas. This urban pola is located immediately behind and adjacent to the public supermarket in the center of the town. It does not have adequate lorry access and no designated storage areas. Yet the volume of wholesale trade is reportedly substantial, with natamis carrying vegetables a long distance to their pola stands.

The **Talduwa** transshipment market that is located 1 km north of Avissawella attracts around 15 lorries on each of the two days of the week that the Pola is held. These lorries come from Welimada, Nuwera Eliya, Embilipitiya, Dambulla and Puttalam. This is a growing market, but is poorly located with many activities spilling on to the main road, disrupting traffic.

The **Horana** market which began as a producer Pola has now become a small transshipment market with around 5 lorries arriving on Pola days mainly from the up country. This market too is congested as it is located at the center of the town and parking facilities especially for lorries is limited.

CHAPTER 3 : DATA ANALYSIS

The data collected during the surveys at Manning Market and Pettah Bazaar have been analysed and the results are discussed in this chapter.

3.1 Manning Market

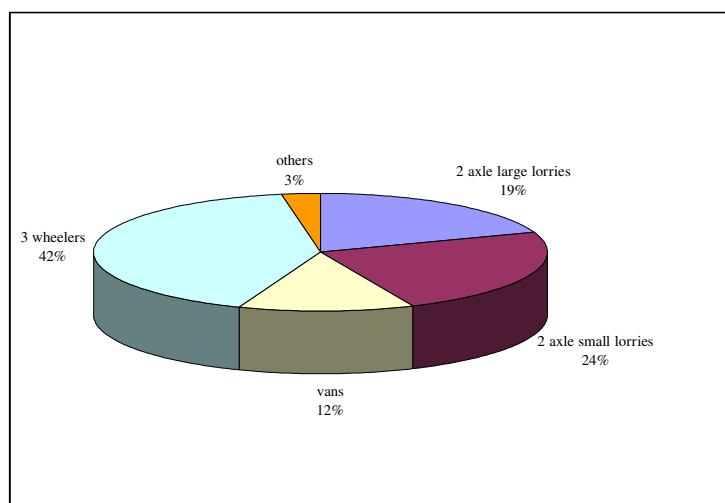
3.1.1 Vehicle Distribution

The total numbers of vehicles that are considered to have come to the Manning Market (including those that were stopped on Bastian Mawatha) were 1,035 for the period of 8 hours from 4 AM to 12 Noon. The Table 3.1 gives the distribution of the vehicles that arrived during this period by type of vehicle.

Table 3.1: Vehicles Arriving at Manning Market on 29/01/2000

Type of Vehicle	Number of Vehicles	Percentage
2 Axle Large Lorries	200	19%
2 Axle Small Lorries	249	24%
Vans	129	12%
3 Wheelers	427	42%
Others	30	03%
Total	1,035	100%

Figure 3.1: Distribution of Vehicles Arriving at Manning Market



The percentage distribution is shown in Figure 3-1. Accordingly, 44% of the vehicles that come to the Manning Market are lorries. While this is to be expected, what is surprising is that 41% are 3-wheelers and a further 12% are vans.

A further analysis by vehicles carrying loads in and loads out are shown in Figures 3.2 and 3.3 respectively. It is shown here that two thirds of all vehicles carrying loads in are lorries, while two-thirds of all vehicles carrying loads out are three wheelers. It is evident that the smaller vehicles such as three-wheelers and vans are used predominantly for distribution. The small vehicles are used to carry individual lots to retailers and large users discussed in Chapter 2.

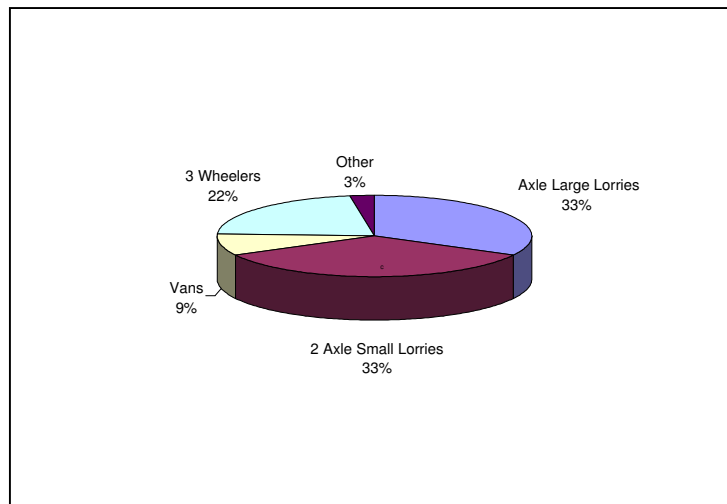
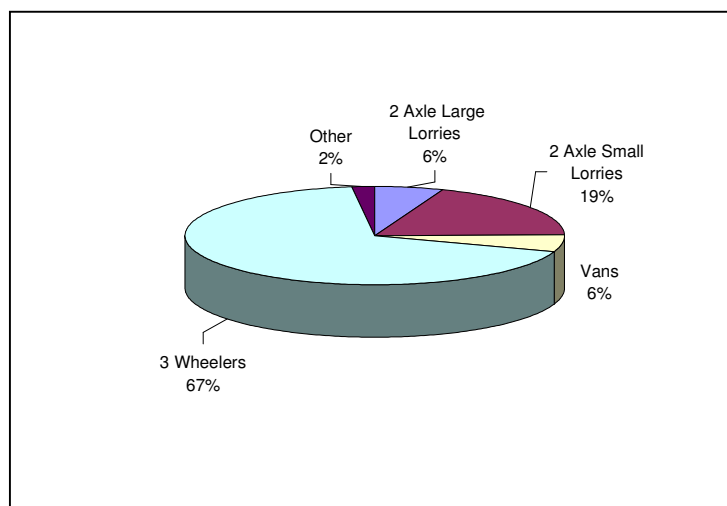


Figure 3.2: Distribution of Vehicles Arriving Loaded to Manning Market

Figure 3.3: Distribution of Vehicles Leaving Loaded from Manning Market



3.1.2 Arrival Rate of Lorries

The rate of which these vehicles arrive at the Manning Market is also important for purposes of traffic management and parking, both of which have become critical problems at the present time. The arrival rates for lorries have been plotted against time in Figure 3.4. It can

be shown that the peak arrival rate is around 5 AM, when a lorry arrives every one minute or so. The market is officially open at 6 AM, and around 60% of the lorries arrive before this time. However, this rate rapidly declines to one lorry every two minutes by 7 AM. The rate remains fairly constant thereafter till 11AM when it drops further. Of these lorries it is also evident that the loaded vehicles arrive mostly before 7 AM. Thereafter, the lorries that arrive are mostly for distribution purposes. Many lorries come to the market during the night and park inside the market. Therefore, by 6 AM when unloading begins, the market premises is already highly congested. The majority of empty lorries that arrive for picking up vegetables are parked outside the market premises (at Bastian Mawatha) and the arrival rate of these reduces after 10.00 a.m.

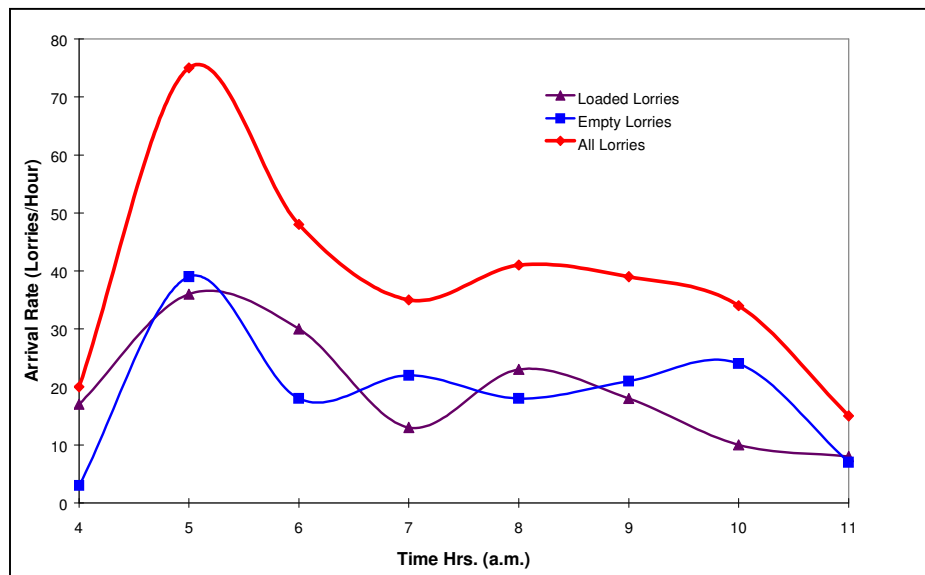


Figure 3.4: Arrival Rate of Lorries to Manning Market

3.1.3 Departure Rate of Lorries

Early in the morning the departure of lorries is very low and it reaches the peak only around 8.00 AM. Both loaded and empty lorries appear to peak departures around this time. But even at 12 noon the departure rate of empty lorries is still high because the process of unloading takes a long time and with the congestion in the market the lorries have to wait until the way to the exit gates is clear. This is largely because the lorries parked inside the market premises cannot move out even if they are unloaded, because of the present parking arrangement which prevents individual lorries moving out. Even if one lorry remains unloaded the entire queue is held up. Thus as shown in Figure 3.5, the empty lorries have a sharp departure peak starting around 7 AM and continuing till noon. Since most of the trading activities are made during 6 AM and 7 AM, the loaded lorries that are parked on Bastian Mawatha begin leaving around 7 AM and reach a peak around 8AM. This rate declines steadily till afternoon.

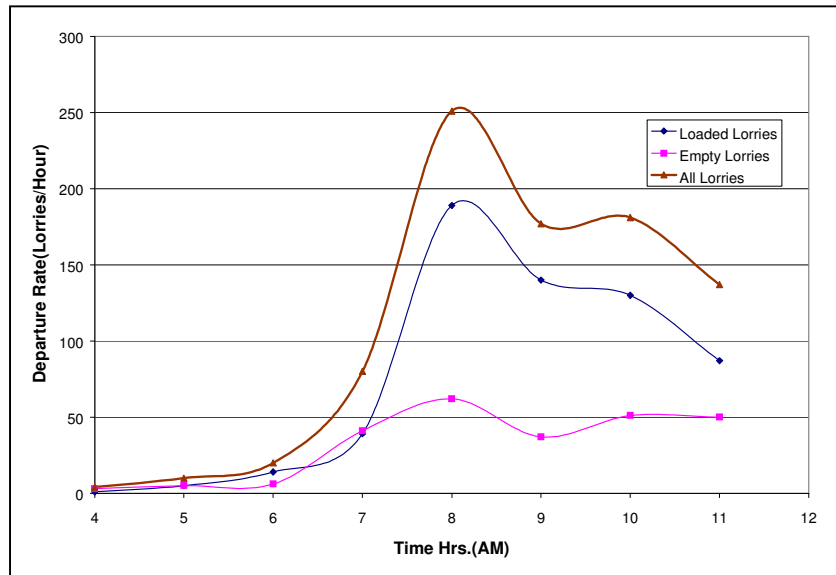


Figure 3.5: Departure Rate for Lorries

3.1.4 Storage (Parking Requirements) for Lorries

The parking requirement for lorries at a given time can be calculated by taking the difference between the total vehicles that have arrived up to that point in time and the total number of vehicles that have left up to that point. This is shown in Figure 3.6, which gives the cumulative arrivals and departures of lorries at the Manning Market. It is seen that by 4 AM there are about 150 lorries parked within the market. The maximum parking (storage) occurs around 6.00 in the morning when there are about 250 lorries parked both inside and outside the Manning Market. Even at 11 AM, there were still around 150 lorries inside the market premises.

The time taken for loading and unloading of vehicles in the Manning Market is given in Table 3.2. This includes time for circulating within the market. Because of the slow speed of movement lorries once loaded or unloaded cannot move out quickly enough (Table 3.3). This results in a higher storage requirement. If circulation were clear then the storage requirement would be much less. If loading and unloading was aided by mechanical devices it is anticipated that the time required would be even less thus reducing the parking requirements even further.

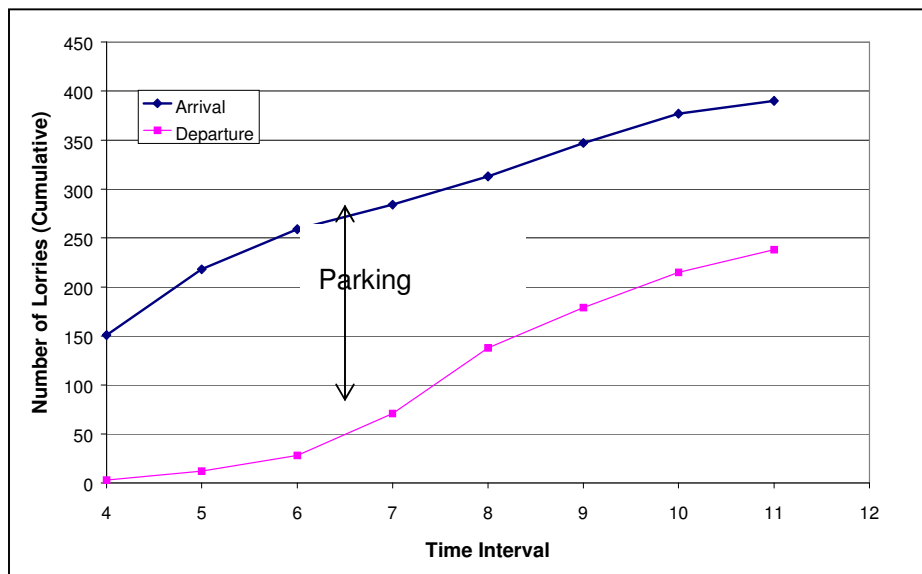


Figure 3.6: Cumulative Parking Demand for Lorries

Table 3.2: Mean Waiting Times at Manning Market

Vehicle Type	Mean Waiting Time (min)
Medium & Large Lorries	80.2
Small Lorries	103.6
Vans	67.0
Cars, S/Wagons	38.3
Three Wheelers	62.0
Motor Cycles	35.1

Table 3.3: Time Spent by Vehicles in Different Activities inside Manning Market

Activity	Average Time Spent (min)
Loading/Unloading	37.6
Waiting	34.5
Moving	12.7
Total	84.8

3.1.5 Three Wheelers

Three wheelers also make a significant impact on the transport movement of goods as they do on the traffic movement in and around Manning Market. The arrival and departure rate of three wheelers is given in Figure 3.7. It can be seen that unlike in the case of lorries, three wheelers start to arrive mostly after 5 AM, peaking at 8 AM. This is because many buyers and their assistants arrive by three-wheeler. Their departure pattern of course is very similar to that of lorries, where the peak is at 8AM and departures continue in substantial numbers even till as late as 11AM.

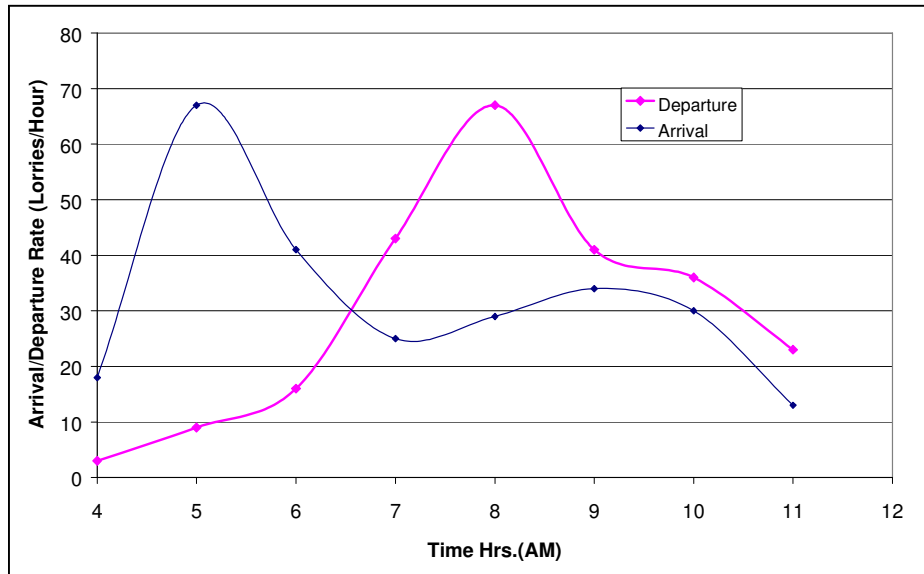


Figure 3.7: Arrival and Departure Rates for Three Wheelers

3.1.6 Traffic Movement from Manning Market

Lorries and three wheelers dominate the overall traffic movement to and from Manning Market. The arrival and departure patterns of each of these vehicle types when added up can be plotted to show their contribution to traffic. This is given in Figure 3.8 in terms of Passenger Car Units (PCUs) where a large lorry has been given a PCU value of 3.0 and medium sized lorries a value of 1.5 units. Three wheelers have been given a value of 0.8. It can be seen that the average trip generation and attraction to the Manning Market is around 308 PCUs per hour during the period 7 AM to 11 AM. The peak is at 8 AM where it is 430 PCUs per hour. Given that many of these vehicles have to do a series of U-turns and left turns to enter and leave the market area, their contribution to traffic flow is significant. Moreover, due to the lack of adequate parking as well as the ad hoc arrangement of parking, vehicles are often compelled to do several sorties before they find a suitable parking place. This too compounds the problem.

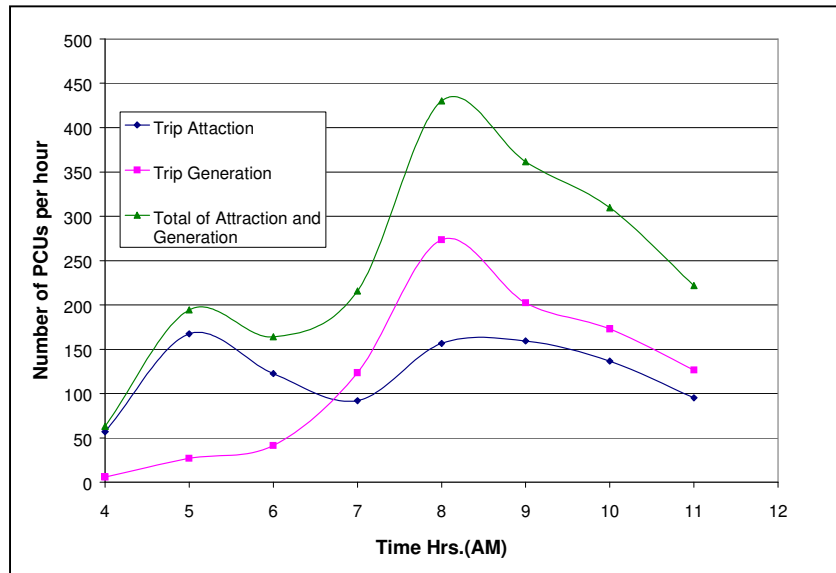


Figure 3.8: Total Traffic Impact due to Lorry & 3 Wheeler Movements: Manning Market

3.1.7 Load Distribution of Lorries

From a sample of 125 lorries that were surveyed at the Manning Market it can be seen that around 32 percent of the lorries arrive empty, while another 46 percent leave empty. Only 54 percent carry loads in both directions of haul. This is given in Figure 3.9. It is evident that lorries that carry vegetables and fruits in to the market, there out goods are distributed among other agricultural produce, industrial goods and dry goods. However, in the case of lorries carrying vegetable away from the market, the vast majority arrives empty.

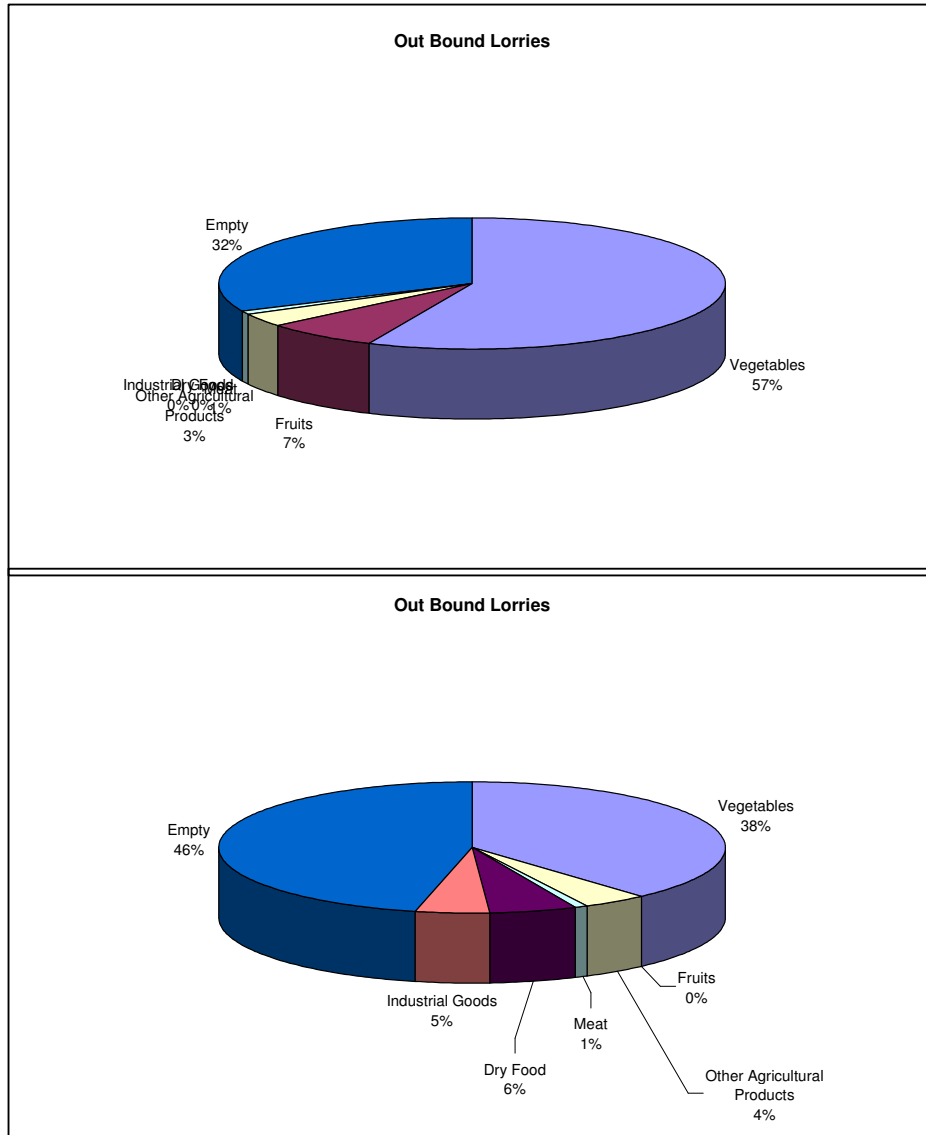


Figure 3.9: Load Distribution of Lorries at Manning Market

3.1.8 Nature and Location of Return Loads

The survey reveals that of the vehicles that arrive with a load of fruits or vegetables to Manning Market, 62 percent return empty direct to the origin of their trip (Figure 3.10). 25 percent are loaded within the Manning Market with different fruits and vegetables. In the case of the others, 27 percent make a stop in the Pettah Bazaar (including 4th and 5th Cross Street), while a further 4 percent making a stop within Colombo City but outside Pettah. Only 7 percent were to make a stop outside Colombo City.

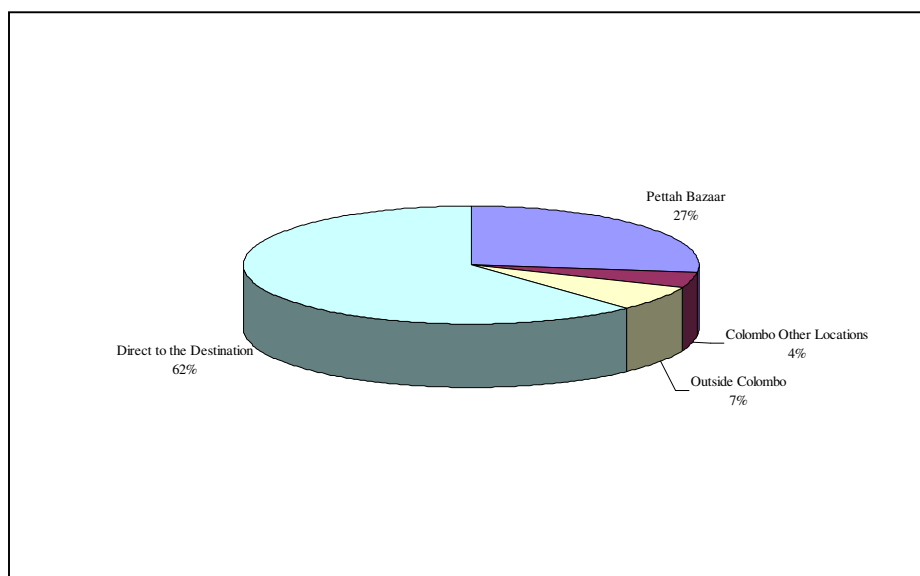


Figure 3.10: Location of Picking up Return Loads

3.1.9 Trip Patterns of Lorries Arriving at Manning Market

According to the lorries surveyed at the Manning Market, 97 percent returned through the routes by which they arrived at the market. Figure 3.11 shows that of the lorries arriving at Manning Market use by many different routes. The Kandy route dominates with 32 percent, while High Level Road carries 17 percent and Galle Road carries a further 18 percent. However, 23 percent of lorries are from within the CMC. The balance is spread across the other roads.

Table 3.4: Matrix of In and Out Routes of Lorries: Manning Market

	Colombo DSD	Galle Road DSDs	High Level Road DSDs	Negombo Road DSDs	Kandy Road DSDs	Hanwella Road DSDs	Horana Road DSDs	Total
Colombo DSD	21	0	0	0	1	0	0	22
Galle Road DSDs	0	8	0	0	0	0	0	8
High Level Road DSDs	0	0	48	0	0	0	0	48
Negombo Road DSDs	1	0	0	3	0	0	0	4
Kandy Road DSDs	1	0	1	0	38	0	0	40
Hanwella Road DSDs	0	0	0	0	0	3	0	3
Horana Road DSDs	0	0	0	0	0	0	0	0
Total	23	8	49	3	39	3	0	125

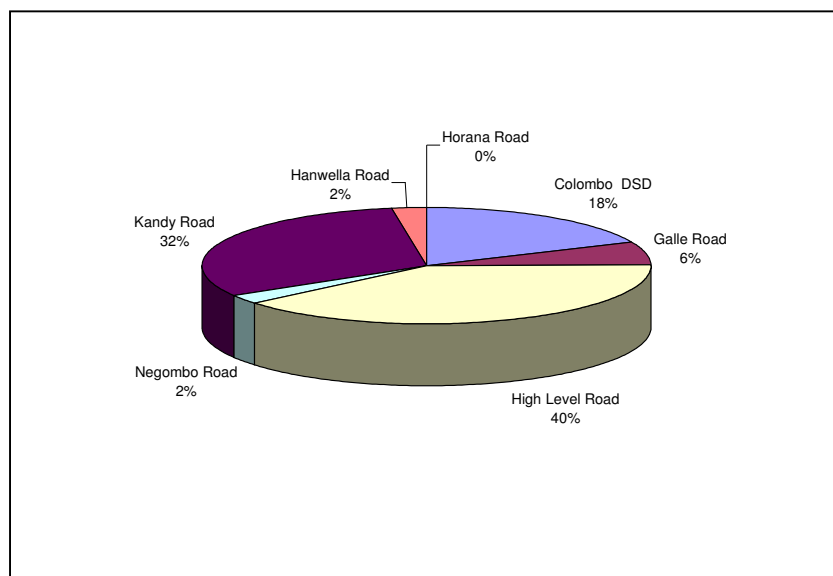


Figure 3.11: Travel Routes In and Out of Lorries to Manning Market

3.1.10 Person Arriving at Manning Market

From the survey of 632 persons interviewed at the Manning Market, it was observed (Table 3.5) that around 25% had originated their travel from within the Colombo DS Division (CMC area). In the case of natamis, it is seen that nearly 60% of them live within the CMC area, probably very close to the Manning area. The largest proportion of persons, around 30 percent appear to arrive via the Kandy Road. This is followed by the Negombo Road- at 8 percent; Hanwella (Low Level) Road- at 6 percent; High Level and Nugegoda total 13 percent and the Galle Road and Dehiwela areas total 14 percent.

Table 3.5: Origins of Persons Coming to Manning Market

Interviewee	Colombo DSD	Galle Road DSDs	High Level Road DSDs	Negombo Road DSDs	Kandy Road DSDs	Hanwella Road DSDs	Horana Road DSDs	Total
Vendor	28	16	27	13	59	18	8	169
Vendor Assistant	48	22	21	18	68	18	8	203
Buyer	30	29	16	13	25	4	1	118
Buyer Assistant	5	20	4	1	8	2	1	41
Loader/Unloader	35	2	4	4	16	0	0	61
Other	15	2	10	2	10	0	1	40
Total	161	91	82	51	186	42	19	632

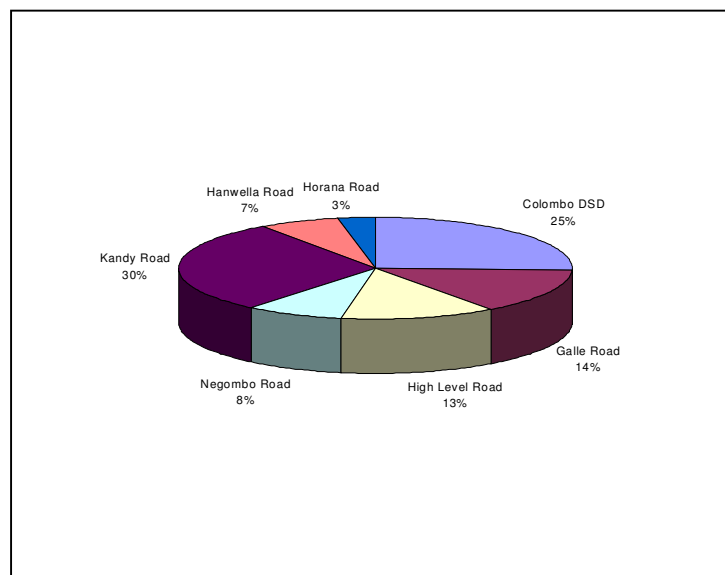


Figure 3.12: Origins of Persons Coming to Manning Market

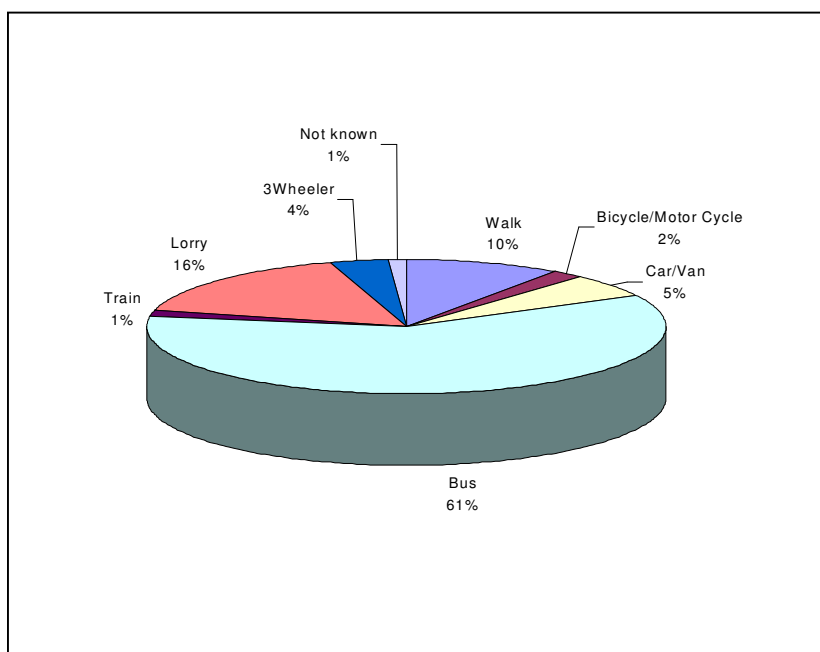
3.1.11 Mode of Travel of Persons Arriving at Manning Market

From the survey, it is also revealed that more than 60% of the people come by bus to the Manning Market. A further 20 percent arrive by either lorry or three wheeler- that is vehicles intended to carry their goods out and a further 10 percent come walking. Though the market is adjacent to the Fort railway station less than 2 percent arrive by train (Table 3.6 and Figure 3.13).

Table 3.6: Mode of Travel of Persons Coming to Manning Market

	Arrival Mode								Total
	Walk	Bicycle/ Motor cycle	Car/Van	Bus	Train	Lorry	3 Wheeler	Not Known	
Vendor	13	2	11	124	2	15	1	1	169
Vendor Assistant	22	2	4	151	4	15	1	4	203
Buyer	8	3	15	55	1	27	9	0	118
Buyer Assistant	1	0	2	3	1	27	6	1	41
Loader/Unloader	15	2	2	36	0	6	0	0	61
Other	3	3	0	13	1	13	6	1	40
Total	62	12	34	382	9	103	23	7	632
%	9.8	1.9	5.4	60.4	1.4	16.3	3.6	1.1	100.0

Figure 3.13: Mode of Travel of Persons Coming to Manning Market



According to the data analyzed, the following proportion of each category uses the bus to get to the Manning Market.

Vendor/Vendor Assistant	-74%
Buyer/Buyer Assistant	-36%
Loader/Unloader (Natamis)	-59%
Other	-32%

Thus, a good bus service appears critical in serving the needs of access to the market. The reason why a lower percentage of buyers arrive by bus is that 43 percent of buyers and assistants use lorries and three wheelers as their mode of access to the market.

3.2 Pettah Bazaar

3.2.1 Distribution of Loads of Lorries

Of the 301 lorries interviewed in the Pettah Bazaar it was found that 56 percent were empty lorries that had come to Pettah Bazaar to carry out goods. 60 percent carry out dry goods and storable vegetables (except fruits and vegetables). Industrial goods also make up 12 percent. Moreover, 21 percent of lorries were found to have either an ‘in load’ or ‘out load’ that carried fruits and vegetables. Thus it could be concluded that only this percentage of lorries could have gone to Manning Market. It was also observed that some of the lorries at Pettah Market carried fruits and vegetables even though they did not go to Manning Market itself. This was because of traffic congestion and parking problems in the area, and once they are parked within the 4th or 5th Cross Streets, carts are employed to carry fruits and vegetables to or from the Manning market.

Table 3.7: Matrix of Goods Carried In and Carried Out by Lorry: Pettah Bazaar

In Goods	Out Goods							
	Vegetables	Fruits	Other Agricultural Products	Meat	Dry Food	Industrial Goods	Empty	Total
Vegetables	2	0	10	0	8	2	3	25
Fruits	0	0	2	0	0	0	3	5
Other Agricultural Products	0	0	3	1	12	6	14	36
Meat	1	1	0	0	3	1	1	7
Dry Food	2	0	9	0	13	5	21	50
Industrial Goods	0	0	2	0	0	2	5	9
Empty	23	3	84	3	34	20	2	169
Total	28	4	110	4	70	36	49	301

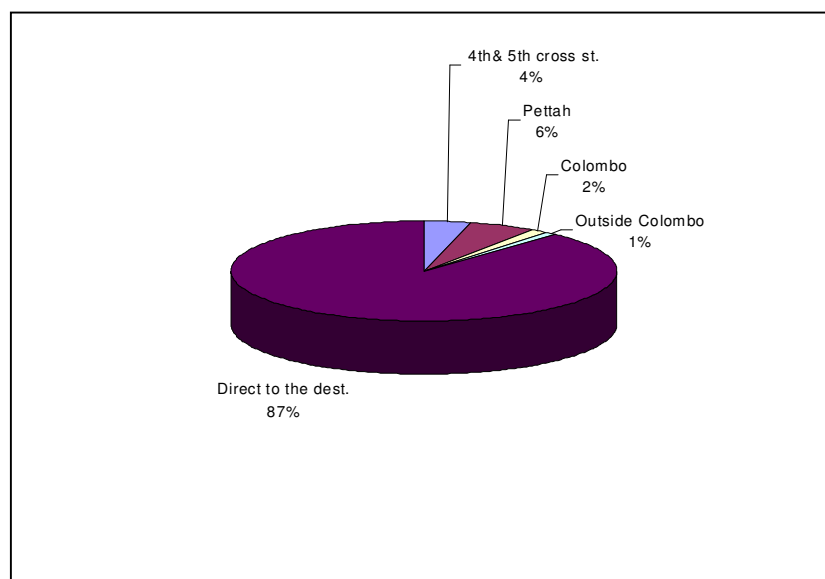


Figure 3.14: Nature of Return Trip of Lorries at 4th and 5th Cross Street

It is also noted that according to the interviews, as shown in Figure 3.14, around 87 percent of lorries at the 4th and 5th Cross Street returned returned direct to their origins. Only 10 percent intended to make a further stop in the Pettah area, while less than 3 percent were to make a stop outside Pettah.

3.2.2 Nature of Travel Routes of Lorries

According to the lorries surveyed at the 4th and 5th Cross Streets, 82 percent returned through the routes by which they arrived. Nearly 18 percent of lorries use the High Level Road, while Kandy Road is used by 31 percent and a further 23 percent travel only within the CMC areas. Galle Road has 10 percent share which all the other corridors including

Low Level Road and Negombo Roads only account for 9 percent share of the lorry traffic to 4th and 5th Cross Streets.

Table 3.8: Matrix of In and Out Routes of Lorries: Pettah Bazaar

	Colombo DSD	Galle Road	High Level Road	Negombo Road	Kandy Road	Hanwella Road	Horana Road	Total
Colombo DSD	64	0	1	0	2	1	0	68
Galle Road	1	47	7	0	0	0	0	55
High Level Road	0	10	38	0	3	0	0	51
Negombo Road	0	0	3	14	1	0	0	18
Kandy Road	5	0	4	0	73	1	0	83
Hanwella Road	0	0	0	0	16	10	0	26
Horana Road	0	0	0	0	0	0	0	0
Total	70	57	53	14	95	12	0	301

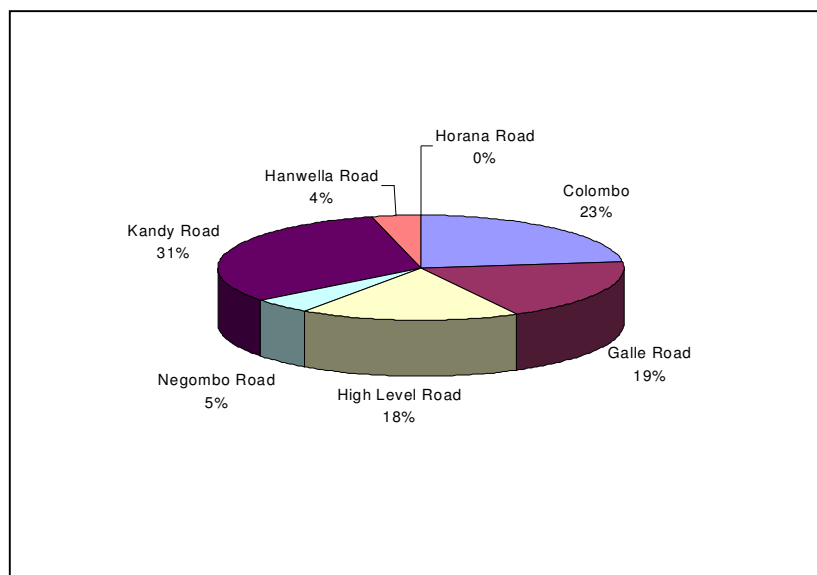


Figure 3.15: Share of Lorry Travel to and from Pettah Bazaar

3.2.3 Parking in Pettah Area

The survey for parking carried out in the Pettah Bazaar area is given in Figure 3.16. This shows that there were over 1,000 vehicles parked during the three surveys. Of these vans constituted nearly 45 percent, lorries a further 40 percent and 2 wheelers around 10 percent. Excluding motor cycles, cars were almost insignificant. Most of the lorries and vans have parked for duration of less than 2.5 hours. Only around 100 (or 10 percent) of vehicles were parked continuously for over 5 hours. Hardly any vehicles were observed parked for periods of over 7.5 hours. Many of the lorries parked in these areas were those for hire.

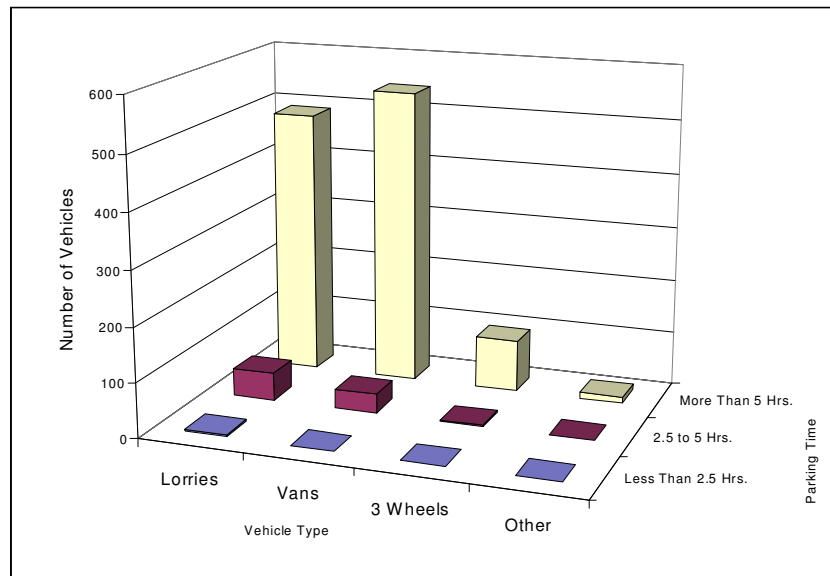


Figure 3.16: Distribution of Parking in Pettah Bazaar by Duration and Vehicle Type

CHAPTER 4 : MOVEMENT OF MANNING MARKET TO ORUGODAWATTE

The proposed shifting of the Manning Market to Orugodawatte should not be limited to a physical reproduction of the existing market at a different location. The decline that the market has experienced in the past few years and the competition that it faces from regional and satellite markets and the changing land use patterns in Pettah and Colombo should also be considered in evaluating the scope and functionality of the new market.

4.1 Historical Background

The history of events surrounding moving the Colombo Wholesale vegetable market began around 1983 with the transfer of about 301 traders to the temporary Manning Market so that a new marketplace could be constructed on the former site. However, after the traders transferred to the sugar warehouse complex, residential accommodations were constructed on that site. The government had also decided that vegetable traders, fruit traders and retailers from near by as well as others who sold storable vegetables and grains in the Bazaar on 4th and 5th Cross Streets, should move outside of the Pettah area. This situation initiated a long period of controversy between various officials and the trading community, which continues until today.

Since then, there have been several unsuccessful government efforts to "relocate" this market to another designated site at Orugodawatte. The trader's had been unwilling and their objections were based on their judgment that the site was inappropriate for this type of business. Today, the conflicting differences in viewpoint between national public agencies, the CMC and the traders themselves continue to hamper a resolution to this stalemate

Meanwhile the Manning Market is still active, but operate in temporary, inappropriate and dilapidated warehouse complex. The long process of dialogue as well as the poor infrastructure seems to have weakened the commission agent's ability to effectively compete with the wholesale-based system which has emerged during this period.

4.2 Possible Future Scenarios

There are several changes that are possible concerning the future of the Manning Market. These are:

- a) Continue as it exist (no change scenario)
- b) Move Manning Market to Orugodawatte
- c) Move both Manning and 4th/5th Cross Street trading activities to Orugodawatte
- d) Develop two Satellite markets in suburban areas

In the light of this observation a fundamental question that arises is the role that the Manning Market should play in the future. In this report each of the above alternative scenarios is discussed with respect to their transport implications and other direct impacts.

4.2.1 Scenario I: No Change

Left as it is, the most probable scenario would be:

- The gradual escalation of cost of operations in the Manning Market due to high waste and delays of transport and circulation, so that margins of profit kept by the traders (both buyers and sellers) would reduce and consequently a portion of these traders would relocate to suburban markets or even go out of business.
- The trading activities at the Manning Market would reduce in turnover, together with the number of traders and number of buyers, reducing some of the existing problems along with.
- This reduction would mean more demand for trading activities in satellite markets around the suburban areas as well as regional markets in producer areas.
- The retail activities of the Manning Market will continue for a greater period of time, until other competitive retail markets are designed and built with proper facilities for retail trade and the requirements of both buyers and sellers.
- The traffic problems in Pettah would continue. In particular, those arising from conflicts between the operations of the market and through traffic and those between the activities of the market and the movements of buses and bus passengers to and from the central bus terminals. These would result in sub optimal operations for the market, the bus terminal and the road network in Pettah, resulting in major economic losses to the country.

4.2.2 Scenario II: Move Manning Market to Orugodawatte

Under this alternative, the following features are anticipated:

From the origin-destination survey of all lorries arriving at the Manning Market, it is observed that there are a total of 900 lorry trips (both directions) making up an estimated 1,800 equivalent passenger car units (PCUs) of road space. This is shown in Table 4.1, where 698 PCUs are anticipated through High Level Road, while 568 PCUs are expected through Kandy Road.

Table 4.1: Lorry Traffic to Manning Market and its Traffic Implications (per day)

	Negombo Road	Kandy Road	Hanwella Road	High Level Road	Horana Road	Galle Road	Within CMC	Total
Trips	25	284	22	349	0	58	162	900
PCUs	50	568	44	698	0	116	324	1,800
%	3%	32%	2%	39%	0%	6%	18%	100

By shifting the Manning Market to Orugodawatte the following changes to traffic patterns are anticipated:

- Lorries carrying only vegetables and fruits into and out of Manning Market will now terminate or begin at Orugodawatte. This represents approximately 90 percent of all lorries arriving at Manning Market.
- Lorries carrying dry foods in addition to vegetables and fruits will after unloading at Orugodawatte proceed to 4th and 5th Cross Street in Pettah and this represents 8 percent of all lorry trips.
- Lorries carrying other goods to be delivered elsewhere in Colombo make up around 2 percent.

This will result in the following transport implications:

- Accordingly, there would be a reduction in traffic amounting to around 3,240 PCU kilometers (that is *number of lorries x EPCU x kms travel reduced*) spread throughout the day. This means that there is a net reduction of lorry travel within the CMC area during a day which will lead to improving traffic speeds for other users.
- The majority of these movements would be made during the period 5 AM to 12 AM, wherein it is estimated that the reduction in traffic rate would be around 500 PCUs kms per hour. The contribution during the period 7 AM to 9 AM would be even higher averaging around 800 PCU kms per hour. The total traffic demand for a day on the roads within CMC area is estimated to be around 600,000 PCU kms. Thus the reduction of lorry traffic would improve traffic space availability by an average of around 2 percent on a daily flow, while it is possible to improve space availability by around 4 percent during the morning peak period. In the Pettah area this improvement may be estimated to be around 12 percent during the peak.
- In addition to the lorry traffic there are an estimated 600 other vehicles (counted as 586 in the survey) made up mostly of three wheelers and vans that contribute 2,000 PCU kms that would be reduced from the system. Thus the improvement to overall space availability resulting from the diversion of both lorries and other vehicles would be even higher at around 3 percent in all of the CMC area. During the morning peak period, a 5 percent improvement is estimated, while a 19 percent improvement is anticipated in Pettah area during the morning peak period.

- The conflicts between motorised through traffic on Olcott Mawatha and load carrying pedestrians and carts would be minimized since with the relocation of Manning Market, trade activities would only be concentrated on one side of Olcott Mawatha. Furthermore the elimination of the loading and unloading of lorries and three wheelers would also benefit the traffic movements on Olcott Mawatha and Bastian Mawatha. The large number of bus movements made on these roads will be especially benefited.
- According to the TransPlan traffic demand estimation model outputs, there would be both increases as well as decreases to individual traffic flows due to a possible relocation of the Manning Market to Orugodawatte. This is given in Figure 4.1. It can be seen that traffic on Baseline Road will increase while those to the West of Baseline Road, namely Srimavo Bandaranayake Mawatha, Armour Street as well as High Level Road and Galle Road north of Dehiwela will decrease. The increase on Baseline Road is not a matter of concern as additional capacity has been provided with the widening and rehabilitation of Baseline Road. In the case of the other roads, the reductions would be significant as shown in Figure 4.1.
- The land presently occupied by the Manning Market could be used as part of the bus/rail terminal that has been planned by the Colombo Urban Transport Study and the Urban Development Authority.

4.2.3 Scenario III: Shifting of Both Manning Market and 4th /5th Cross Streets to Orugodawatte

Relocation of both Manning as well as the trading on 4th and 5th Cross Street will have an even greater impact with more heavy vehicular traffic being prevented from coming to the Pettah area. This will result in a further reduction of around 3,000 lorry trips and 6,000 PCUs as shown in Table 4.2.

Table 4.2: Lorry Traffic to 4th/5th Cross Street and its Traffic Implications (per day)

	Negombo Road	Kandy Road	Hanwella Road	High Level Road	Horana Road	Galle Road	Within CMC	Total
Trips	150	930	120	540	0	570	690	3,000
PCUs	300	1,860	240	1,080	0	1,140	1,380	6,000
%	05	31	04	18	0	19	23	100

**Figure 4.1: Change in Traffic Due to Relocation of Manning Market to Orugodawatte
(in PCUs per day- both directions)**

The survey revealed that only 10 percent of lorries in the 4th and 5th Cross Street would be loading or unloading elsewhere in Pettah. Thus the vast majority of these vehicles would not be traveling to Pettah in the event that the trading activities of the 4th and 5th Cross Streets are relocated also to Orugodawatte, leaving the other trading activities in Pettah as they are.

- Surveys have indicated that the ratio of lorries to other vehicles in 4th and 5th Cross Street was 1: 1.3. Thus an estimated 3,900 such vehicles trips can be assumed to be attracted or generated due to the 4th and 5th Cross Streets. Since these vehicles are usually shorter distance vehicles we shall assume that around 50 percent of these may come from outside Colombo (compared to 90 percent for lorries).
- The eventuality that the trading activities on 4th and 5th Cross Streets would be moved to Orugodawatte an estimated 15,000 pcu-kms would be reduced from the existing traffic load on the road network. This reduction would then lead to an improvement of road space availability of around 4 percent within CMC. Its contribution to road space availability during the morning peak period may be as high as 6 percent, while in the Pettah area the morning peak period improvement may be even up to 25 percent.
- Thus the relocation of both Manning Market and the dry goods in 4th and 5th Cross Streets will improve overall road space availability within Colombo City by 7 percent. The improvement to the morning peak is 11 percent while the improvement in Pettah during the morning peak period is 44 percent.
- The total impact of traffic of moving both markets to Orugodawatte is shown in Figure 4.2. In this case also, Baseline Road will have an increase while most other major corridors within the CMC will have a significant decrease.

4.2.4 Scenario IV: Development of Satellite Markets

It was noted in Chapter 2, that several regional markets have developed in the producer areas and simultaneously, a number of satellite consumer markets too have developed around Colombo. Some of these have also become popular transshipment markets. It was also observed that the trends seem to suggest a movement away from a central hierarchy to a decentralized system. The Study on Agricultural Markets notes that,

'in most Asian countries the dominant urban wholesale marketplace servicing the largest number of urban consumers is in the national capital, i.e.- a terminal market. This central marketplace has traditionally been the critical is as the pivotal; point or hub, around which the national market network for vegetables was traditionally coordinated, organized and expanded over time. However give the increasing size of many capital cities today several national market networks have been reconfigured to support a couple of 'satellite' terminal markets often on the periphery of the city. This arrangement for satellite markets provides the essential market coordination role while reducing urban traffic congestion and facilitating economic land use in central city area'.

Figure 4.2: Change in Traffic Due to Relocation of Manning Market & 4th/5th Cross Street Trade to Orugodawatte (in PCUs per day –both directions)

The origin-destination of the lorries bringing vegetables as well as those carrying vegetables away from the Manning market indicate that there is much potential for developing satellite markets that can as effectively become transshipment centres.

Satellite Market at Kottawa: For example, it is seen that there are 215 lorries arriving at Manning Market on the Low Level/High Level Roads and Galle Roads. This constitutes 47 percent of the total lorry turnaround at Manning Market. Thus a large satellite market closer to this route would be beneficial if they were able to terminate their trips without entering Colombo City. The other criterion would be to investigate if it would be equally beneficial to distribution lorries leaving with vegetables. The location of the retail markets of Hanwellla, Padukka, Homagama, Maharagama, Delkanda, Nugegoda, Kirulapone, Piliyandala, Bandaragama, Horana, Kalutara, Panadura, Moratuwa, Mt. Lavinia and Dehiwela in close proximity to Kottawa would prove that even for purposes of distribution this would be a suitable location.

The most suitable location for a satellite market in this quadrant is Kottawa. The reasons for this are many:

- The proposed Southern Highway will be meeting the present High Level Road around Kottawa. Thus there would be good access from the south.
- The proposed New Road from Ratmalana to Ratnapura (as proposed by the RDA and also as recommended by the UDA's CMRSP) is also to meet at Kottawa, thus forming an important intersection. This would then be a natural meeting point of traffic from Uva, Sabaragamuwa, Southern Province and the Eastern Provinces. Moreover, the westward connection to Ratmalana will provide access to retail markets along the Galle Road.
- The proposed Outer Circular Road is to provide connection north of Kottawa to other roads such as Kandy Road and Negombo Road. It will thus provide convenient connections to produce even from the regional markets at Dambulla and Kegalle.
- The Kottawa-Piliyandala Roads provides another important connection westwards, while the Kottawa-Athurugiriya Road will provide a similar connection eastwards.
- Such a satellite market should have capacity for a turnaround of at least 200 lorry loads of vegetables. This is because it will become a strong center that will in addition to absorbing a share of the Manning Market will also attract transshipments from other smaller markets such as at Talduwa and Horana.
- Kottawa also qualifies as a possible location since new land would be opened up resulting from the highway constructions.
- Kottawa also has the added advantage of not having a major market at present, so that there would be no protest on the impacts to the existing system there.
- Kottawa also has good connections by bus. There is also a rail connection that could be made use of in the future.

Satellite Market at Kadawatha: This market may provide a counter-magnet to the one at Kottawa. It would be directly accessible to lorries arriving from the North-East and Central

Province as well as Mahiyangana and Dambulla areas. It also can be accessed by lorries from Kalpitiya in the North Western Province. The lorry traffic at Manning Market from these areas at present constitutes around 154 lorries or 35 percent of total lorries arriving with vegetables. A satellite market at Kadawatha will also be beneficial for distribution to the retail markets at Gampaha, Yakkala, Negombo, Wattala, Ja-ela, Kadawatha and Kiribathgoda.

The transport advantages of a satellite market at Kadawatha are also many fold:

- Kadawatha will be most probably the location of the intersection between the present A1 Highway from Colombo to Kandy and the proposed outer circular road
- It would also be close enough to be connected by a link to the Colombo-Katunayake Expressway.
- It would most probably either lie in the path or be close to the new road to Kandy that is being studied by the RDA at the present time.
- Similar to Kottawa, the placement of this market in the northeast quadrant will ensure that agricultural produce coming from that direction will converge to this market. Because of the linkage between Kadawatha and Kottawa via the Outer Circular Road, these two markets could also be accessible one from the other.

If both these satellite markets were to be developed, it is unlikely that there would be much scope for another large wholesale market within the CMC. In such a scenario, even shifting Manning Market to Orugodawatte may not be necessary.

The transport implication of this scenario indicates that there would be a substantial reduction of lorry traffic on the Colombo-Kandy Roads up to Kadawatha (454 PCUs) as well as on the High Level Road up to Kottawa (558 PCUs). There would also be reductions on Galle Road up to Katubedda (93 PCUs), Negombo Road up to Wattala (40 PCUs) and the Low Level Road (35 PCUs). There would be some increases on the proposed roads such as the Outer Circular Road. Overall this scenario provides the best impact on traffic movement as much of the lorry traffic can be confined to the proposed new highways such as the Southern Highway, New Road to Kandy and the Outer Circular Road.

Thus if we assume that 50 percent of lorries passing these two satellite markets only would proceed to Orugodawatte, then there would shall be significant traffic reduction on the roads in this section. These have been calculated and shown in Figure 4.3.

4.3 Development of Land Vacated by Shifting of Manning Market

It should be noted that the shifting of the Manning Market should not be naively interpreted as an automatic reduction of traffic within the CMC and in the Pettah areas. This is because, the development of the land freed by the relocation of the Manning Market and the trading activities in 4th and 5th Cross Streets could result in different type and level of traffic attraction. Thus the net traffic levels in Pettah may remain unchanged, and even possibly increase, unless some thought is given on how the land vacated by the markets should be put to use.

From a transport perspective, the following suggestions are made for optimum utilization of this valuable land without causing unsustainable traffic conditions.

- Since Pettah has evolved to be a strong bus and rail passenger hub, priority should be given for the setting up of the Pettah Transport Terminal as proposed in the UDA's CMR Structural Plan (1999). This will actually ease congestion further as it would then be possible to shift on-street bus terminals and stands to well-designed off-street facilities. The large flow of passengers crossing Olcott Mawatha in an effort to move from one bus terminal to another will also reduce, and thus, the circulation of traffic on Olcott Mawatha will improve significantly.
- The nature of development planned to replace the trading activities in the 4th and 5th Cross Streets should also be considered carefully. It should exploit two central transport nodes located on either - i.e., the port and the bus/rail terminals. Thus preference should be given to activities that will depend on the import or export activities of the port, perhaps those that require large numbers of passenger travel either with respect to employees of such institutions or consumers. The latter can be provided convenient public transport due to the proximity of the bus and rail terminals that is located within walking distance.

Figure 4.3: Traffic Reductions from Development of Satellite Markets at Kottawa and Kadawatha (In PCUs per day –both directions)

4.4 Advantages of Shifting

The shift of the Manning Market to either Orugodawatte or any other location should be based on achieving some improvements that would make (a) the market, (b) the agricultural sector and (c) the Pettah more competitive in the modern market world.

The following objectives are most important in such a move:

- Reduce lorry and three wheeler traffic in and around Pettah,
- Reduce lorry and three wheeler traffic on the road approaches to Pettah,
- Reduces pedestrian traffic, carts and particularly the manual carriage of goods across Olcott Mawatha,
- Improve lorry turn around time by better circulation within the market,
- Reduce loading and unloading time and associated costs by design of bays and lifts,
- Reduce damage and waste of vegetables by providing proper storage and handling facilities
- Minimize the impacts on the existing traders and changes to trading patterns,
- Minimize the impact on the natamis who are from the general locality,
- Minimize the impact on trading activities on 4th and 5th Cross Street,
- Minimize the impact on trading activities in other parts of the Pettah Bazaar,
- Improve the efficiency of lorry transport and in particular that of backhauls for lorries bringing vegetables.

These impacts are both economic and social. It also has the potential to greatly alleviate some of the traffic-related problems both within Colombo and the major road approaches to the city. Thus the decision to move the market should be taken only after due consideration is given to all these objectives and how each option to be considered will contribute towards achieving these objectives.

4.5 Transport Requirements in the Move of the Present Manning Market

The present Manning Market has two primary components- i.e. wholesale and retail trading. The transport related requirements for each of these two activities is different as discussed below:

Wholesale Market: The relocation of the wholesale agricultural trading facility from Pettah should ensure:

- an upgraded facility,
- adequate space for each type of trading activity,
- provide for increased commodity turnover which will reduce the price margins,

- provide good access and proximity to public transportation
- eliminate one major cause of traffic congestion in Pettah and
- open up centrally located land in Pettah for higher value investments.

Retail Markets: The retail markets should have the following features:

- provide for good access and proximity to public transportation
- have convenient arrangement of the facility layout and its goods;
- have comfortable walkways free of garbage and useable especially in wet weather and
- adequate parking and availability of three wheelers.

4.6 Site Details of Orugodawatte

According to the Study of Agricultural Markets, a food marketplace is most effective when it is located near the main bus stand, covers adequate area to accommodate traders and has good road access for the delivery of goods and arrival of consumers.

The location of the proposed Orugodawatte site is shown in the Map of Colombo City given as Figure 4.4. It is located strategically at the northern point of entry to the city by road and rail. It also has an eastern access through the Avissawella (Low Level) Road. It is also located alongside the Baseline Road that has recently been widened to six lanes standard from Kelanitissa Roundabout to Kanatte. It will be widened similarly up to the High Level Road at Kirulapone. There are proposals for its southward extension to Ratmalana where it is intended to meet the Galle Road. This road will thereafter effectively perform as an inner by-pass road to the Colombo City. Thus moving the Manning Market to Orugodawatte will involve relocating the market from the centre of the city to its periphery. In fact the proposed land falls within the Wellampitiya Urban Council.

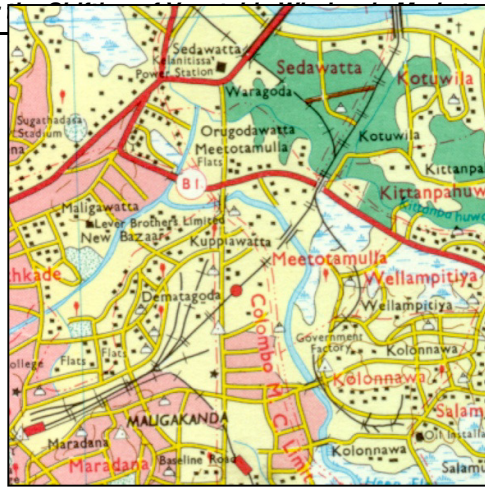


Figure 4.4: Location

of Orugodawatte

From a transportation point of view this is a strategic location where good connections are provided by both rail and road. It is at a key nodal point ideally located for transshipment and distribution. Transshipments can take place both northwards and southwards via the Baseline Road and distribution can occur on the Baseline Road as well as the intersecting roads in the eastern directions to Kotte and Wellampitiya Urban Council areas and to the west to the City of Colombo.

As shown in Figure 4.5, the area is identified as the Proposed Wholesale Complex at Orugodawatte shows four stages of development. Stage I and Stage II have been partially developed with industries and warehouses located there. Stage III is yet to commence as some issues pertaining to acquisition and relocation are preventing implementation. Stage V is presently occupied by the State Timber Corporation and has been identified for the relocation of Manning Market.

This area has 10 acres, and is much larger when compared to the present Manning Market which seems to occupy around 3-5 acres when the entire operational area even if the surrounding roads are included. The present system has extremely low space for circulation, parking and for services.

Most of the space at Manning Market is utilised by the 1,000+ traders. By comparison, Dambulla DEC, is 8 acres in extent, part of which is yet to be developed. It has only 144 trading stalls. The vast proportion of its space is utilised for parking and circulation purposes and for supporting services. It is qualitatively much better than the Manning Market. It is estimated to have turnover of 500,000 kgs of vegetables and food with a throughput of 500 lorries.

By comparison Manning Market has a throughput of 450 lorries and about 300 three wheelers. However, only around 200 of these are large lorries with 10 ton load capacities. The others are smaller distribution lorries of much lesser capacity. Most three-wheelers may take up to 200 kgs. Thus the total volume throughput is estimated to be around 300,000 kgs, much less than those reported for Dambulla DEC.

The maximum parking demand at the present time in Manning Market is around 250 lorries. This includes the parking of lorries during loading and unloading as well as those stuck in traffic unable to move out or move in to the premises. The parking availability is actually nil if

one considers the fact that presently parking occurs in space taken away for circulation. Thus when parking takes place, circulation stops.

It is therefore evident that as the circulation space reduces as a proportion of space utilized by trade stalls, the efficiency of the market reduces. This is one of the reasons why the 1000+ traders at Manning Market have a lower throughput than the 144 traders at Dambulla. The other primary reason is that most transactions at Dambulla are for the entire lorry load, whereas in the case of Manning Market, each lorry load has a few packages for several shops. In the latter case the loading and unloading need greater circulation, which actually does not exist.

4.7 Space Requirements for Orugodawatte

Trade stalls in Manning Market are around 100 square feet or less and have no dedicated loading or unloading facility. By comparison, the Dambulla DEC provides 200 square feet per shop along with a dedicated loading strip immediately outside each shop.

The type of complex that is needed at Orugodawatte may need to follow the general trading pattern existing at present at the Manning Market. This is very different to Dambulla. The pattern at Manning Market requires much greater circulation of lorries and of natamis carrying packages from one lorry to several shops when unloading and the reverse when loading.

A preliminary analysis to formulate a guide for the utilization of space within a new complex for Manning Market has been made by comparing the different markets and their pattern of trade.

The following general guidelines may be used:

Number of Shops: The minimum number of shops that would support a wholesale trading complex may be placed at around 100. Space available and the demand for shop space will determine the maximum number of shops that would be sustainable within a single complex.

Shop floor area: This needs discussion with the relevant persons concerned. For the purpose of the transport study we have assumed 150 square feet of shop floor space.

Lorry loading/unloading area: The lorry parking requirement is a function of the throughput of the market. If the market is assumed to have a throughput of say 600,000 kgs (an increase of 100%) of the present times, then the total number of lorries (or lorry equivalents) would be around 600. Based on present arrival/departure patterns, the peak would need to accommodate around 50% of the total lorry arrivals. Thus around 300 lorry loading/unloading bays would be required. However, as discussed in Chapter 3, the lorry parked time (dwell time) can be reduced with better layout of the market and the use of mechanical implements to load/unload and to move the packages between lorry and shop. In such a well-designed and operationally advanced market the peak storage requirement may be around one third of the total arrivals. This would mean parking for 200 lorries. In other words, one lorry parking stall would be required for every 3,000 kgs of trade.

Parking space for lorries – (overflow parking): It is recommended that an additional 25% parking spaces should be provided as overflow parking for fluctuations in lorry arrivals caused by seasonal peaks, holidays and other variations. Each lorry parking space inclusive of circulation requirements would need around 400 to 600 square feet within the parking area, depending on the type of parking and circulation arrangement.

Parking Space for Other Vehicles: Vehicles used by traders, buyers and sellers that are not used for the carriage of goods may be located at a corner or periphery of the complex. It could even be located at an upper floor if space is limited. It may be reasonable to provide one parking space for a car or van for every two shops. Each such space may require around 400 square feet inclusive of circulation.

Area for Services: It is assumed in this study that administrative offices, Police Post, canteens, banks, toilets, garbage disposal sites should occupy not less than 10% of the floor area for shops. Some of these could however be located on an upper floor.

Circulating areas for buyers/sellers and for natamis with loads: This area should be equal to the area provided for loading and unloading of lorries. This will of course change with the type of circulation system that is used in the design. An efficient arrangement between loading/unloading and the shops will reduce the requirement for circulation space.

Circulation space for lorries: This is basically taken as a minimum of a road width of 30 feet for purposes of reversing and pulling out of the loading bay. Thus with an angle parked lorry of 25 feet length, the minimum circulation width should be 25 feet. Thus the circulation area, that is in addition to the parking area requirement should be calculated as 550 square feet for a 10 foot wide loading bay.

Determining the exact number of shops required is beyond the scope of this study. However, in order to draw up a conceptual plan, we shall assume a facility that is to be designed for 420 wholesale stalls and 30 retail stalls. The approximate space requirement would then be as set out in Table 4.3.

Table 4.3: Space Requirement for 450 Trade Stalls at Orugodawatte

Activity	Area (sq. ft.)
Shops (150 sq ft x 450 nos.)	67,500
Loading/Unloading bays (250 sq ft x 200 nos)	50,000
Overflow Lorry Parking (250 sq ft x 0.25 x 200 nos)	12,500
Other Vehicle Parking (200 x 225 nos)	45,000
Retail Parking & Circulation (30 stalls x 1 each x 300)	9,000
Area for Services	6,750
Pedestrian Circulation	80,000
Lorry Circulation (250 x 200)	50,000
Approach Roads & Open Spaces	50,000
Total	370,750

This area can be accommodated within a 10-acre land that is the extent of Stage V of the Orugodawatte Warehouse Complex that is ear marked for shifting of the Manning Market.

4.8 Internal Arrangements for Orugodawatte

The internal arrangement for Orugodawatte can only be finalized when the number of trade stalls and the nature of business activities planned are known. It is anticipated that a new complex should have areas for both wholesale and retail activities. The proportion of each should be decided after an appropriate study. The manner in which the unloading takes place and how the packages are taken to the respective shops is vital for the efficient operation of a market.

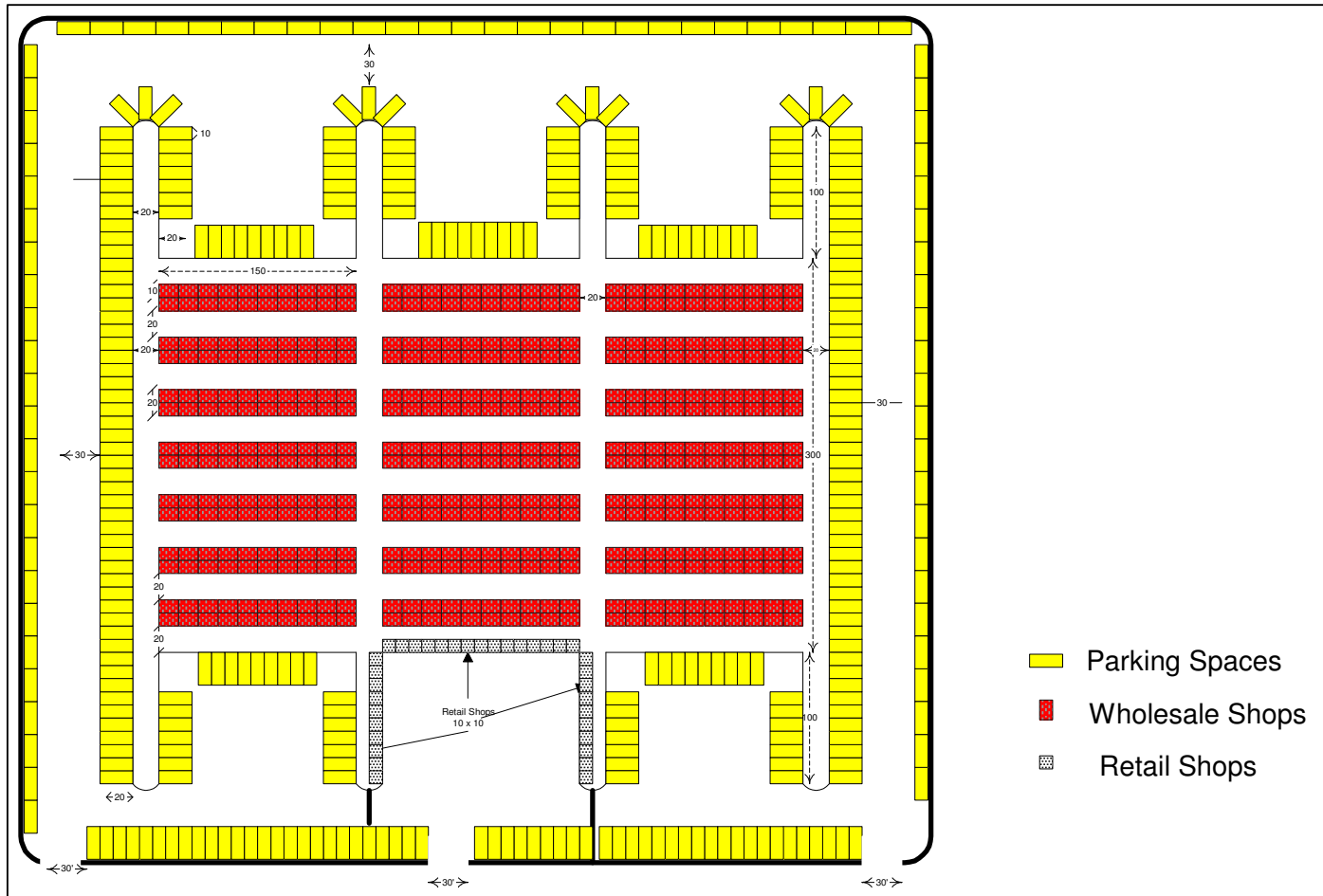
The type of operation in Manning Market means that the lorries have to be unloaded to many shops and in the reverse each lorry is loaded from many different shops. Thus access between lorries and shops should be all to all. This is different to the arrangement at Dambulla where it is often a case of one lorry to one shop and thus it is a one to one system.

The lorry operations at Manning Market are made by transport unions, where a particular 'line' will share a certain loading and unloading staff. They may wish to use their parking bays for a particular group of lorries. Parking bays can then be even auctioned off so that each union has operating rights for certain parking bays. Use of mechanical means for this process will mean that they can reduce the delay of occupying a particular bay. This is very similar to airport operations and the manner in which gates are managed between different airlines. For a typical distribution network existing in the Manning market, the arrangement shown in Figure 4.6 seems to be the most efficient.

The site is assumed to be between 600 to 700 feet in each dimension and is approximately square. The arrangement is composed of a central concourse and a number of piers. Each pier could consist of a set number of loading bays, where lorries are parked at right angles. A pier of 100 feet in length can accommodate around 20 lorries. Each such pier can be given to one or more transport unions to share. A shorter length of say 50 feet may accommodate around 10 lorries. These dimensions can be altered depending on the final design requirements of the traders and the lorry operators.

In the proposed conceptual plan it is intended that the wholesale operations are towards the rear of the complex. This is to provide partial separation with the retail activities which are facing the road side. The entry and exits for the retail activities and the wholesale activities have been separated to minimize the conflicts between the operational requirements of the different types of vehicles.

Figure 4.5:
Internal



Arrangement for Market at Orugodawatte

The shops could be located within the main concourse in several back to back rows of shops with a 20 feet corridor between them. A wide corridor will facilitate easier movement of goods particularly if mechanized means are to be adopted in the future.

For a concourse with four piers on each side, the length total length would be around 530 feet, made up of the four piers of width of 20 feet separated by a space of 150 feet between each pier. This arrangement can accommodate 3 blocks of 20 shops each as shown in Figure 4.6. Thus for 7 such rows, 420 shops could be accommodated. Each shop has a 15 foot frontage and is 10 foot deep.

The main concourse would then be made of seven rows of shops and have dimensions of 530 feet width and 265 feet depth.

Lorry parking is arranged all around the concourse and the piers to balance the requirements between shops and loading bays. The length and widths of the concourse and the length of the piers can be changed to suit a different arrangement between shops and parking bays. The conceptual diagram shown can accommodate 20 lorries parked on each pier and 10 between piers. It can also accommodate 25 loading bays on each side. Thus a main concourse with four piers on either side can accommodate a total of 230 vehicles. In this arrangement 200 have been provided within the wholesale complex and 30 within the retail complex.

The arrangement provides for a retail trading area in centre section closest to the Baseline Road. This area can be designed according to the number of retail shops to be provided. If more shops are needed then more piers can be made available for retail activity. There can be around 30 retail shops in the area designated in Figure 4.6.. The parking stalls on these piers would be for consumers vehicles mostly three wheelers, vans and cars.

The traffic circulation is from two entry/exit gates for the wholesale establishment and a single entry/exit for the retail area. There should be no direct movement of traffic allowed between these two areas. The internal circulation should be set out in a clockwise direction. Overflow parking and parking for vehicles other than lorries would be permitted along the left-hand side of the traffic path as indicated. This provides adequate space for around 150 vehicles. These spaces can then be used for overflow parking of lorries as well as for other vehicles.

It is also important to provide a service road from which lorries can enter and leave the premises, so that there is only a single point of entry to the Baseline Road. Lorries arriving from the south can go up to the Kelanitissa junction and turn around to approach the gate from the north.

Services can be located either within the ground floor of the concourse or on an upper floor at the center of the concourse.

The entire land requirement for this conceptual plan is 368,000 square feet. The building area is 156,450 square feet, while the balance land area will be mostly paved for roadways, parking and circulation. Within the building area, the shop space for 450 shops is 67,500

square feet, thus ensuring that the balance of around 57% of the building space is kept for circulation of persons and goods movements.

4.9 Goods Handling Technology for a Market Complex

The present system of loading/unloading and the carriage of goods between shops and lorries have not seen any technological improvements since the inception of agricultural marketing in Colombo. All packages are moved either manually or by a push cart. Presently, the entire process of unloading and loading is also manual. These movements are time consuming and clumsy and the result is that a large portion of produce is lost due to damage.

A new market complex should anticipate the introduction of new technology even at a later stage if the high unemployment and traditional practices do not permit a sudden and immediate change. Thus modern loading and unloading bays as well as internal delivery systems should be planned. Mechanical systems either through using moving belt technology similar to baggage handling at airports or a system of mechanically operated trolleys that pick up and deliver between lorries and shops should be planned. The physical loading and unloading from lorries should also be planned to introduce forklift type of operations. For example the lorry loading ramps should be build up to platform level so that an unloading machine could be driven inside the lorry (Figure 4.7). This could be introduced in stages so as not to deprive the natamis out of jobs. However, this will become an important element of a successful market and improving efficiency would not be possible unless such measures are implemented.

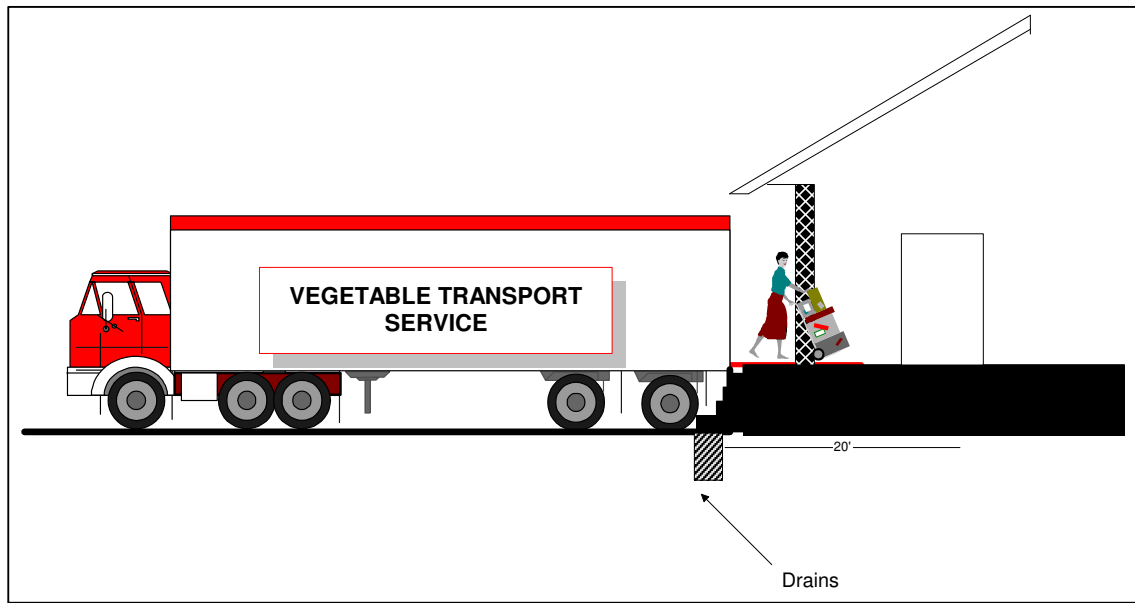


Figure 4.6: Typical Dock for Mechanical Loading/Unloading

4.10 Rail Linkages

The Orugodawatte site has railway access at the other end of the complex. The Stage V does not have direct access. Although the railway is not used at the present, the proximity would be useful for the future. It may be recommended that a railway station be established here to serve the needs of the entire complex both passengers' needs as well as the goods transport.

CHAPTER 5 : CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This report reaches the following conclusions:

1. Surveys conducted show that although the Manning market still has a national scope, it appears to be slowly losing its traditional role as the most important transshipment market for agricultural produce in the country.
2. The most identifiable reasons for this decline are the growing inefficiency of the present Manning Market, its inaccessibility, the growth of suburban satellite markets and regional transshipment markets.
3. The relocation of the Manning Market requires a clear understanding of the bigger picture of the current situation and the ongoing trends and transitions in agricultural markets.
4. The Manning Market has over 1,000 traders located within 3 acres of operational area. These traders appear to have fewer throughputs than the 144 traders in the newly set up Dambulla DEC, which occupies 8 acres.
5. The central city location as a terminal for food markets can no longer be endorsed.
6. The transport problems relating to the operations of Manning Market are:
 - Poorly located so that access is difficult and slow for produce as well as buyers and sellers.
 - Poorly designed internal roads are totally inappropriate for loading and unloading of goods.
 - Inadequate space for the parking of lorries, often overflowing to the Bastian Mawatha and beyond.
 - The large number of three wheelers used for distribution of produce, have increased congestion within the market.
 - The large fleet of push-carts and natamis milling around the lorries have little space thus making their movements slow and difficult.
 - Hundreds of individual consumers and commuters also use the retail facility of Manning Market thus adding to problems of congestion.
 - Loading, unloading and carriage of goods between lorry and shop is done entirely manually. No new technology has been introduced.
7. The shifting of the Manning market will result in
 - Reduction of lorry and three wheeler traffic in and around Pettah,
 - Reduction of lorry and three wheeler traffic on the road approaches within CMC,
 - Reduction of lorry traffic on major corridors closer to Colombo,

- Reduction of pedestrian traffic, carts and particularly the manual carriage of goods across Olcott Mawatha,
 - Improvement of lorry turnaround time by better circulation within the market,
 - Reduction of loading and unloading time and the associated costs by design of bays and lifts,
 - Reduction of damage and waste of vegetables by providing proper storage and handling facilities
 - Minimizes the impacts on the existing traders and changes to trading patterns,
 - Minimizes the impact on the natamis who are from the general locality,
 - Minimizes the impact on trading activities on 4th and 5th Cross Street,
 - Minimizes the impact on trading activities in other parts of the Pettah Bazaar,
 - Improves the efficiency of lorry transport and in particular that of backhauls for lorries bringing vegetables.
8. There are several possible trading systems that can be investigated as the future of the Manning Market. These are:
- Continue as it exist (no change scenario)
 - Move Manning Market to Orugodawatte
 - Move both Manning and 4th/5th Cross Street Trading to Orugodawatte
 - Develop two Satellite markets in suburban areas

5.2 Recommendations

The following Recommendations have been made in this report:

- e) There is a clear case for shifting the Manning Market from its present location.
- f) The site at Orugodawatte may be adequate for around 450 shops. It would be most efficient if these shops deal with both vegetables as well as dry foodstuff, so that it will replicate the business activities of Manning Market as well as 4th/5th Cross Streets. The transport and traffic impacts are substantial to justify such relocation.
- g) There is also a case for developing two satellite markets similar to the one proposed at Orugodawatte at Kottawa and Kadawatha. This could be done in conjunction with the relocation to Orugodawatte or instead. In either case the traffic reductions are significant.
- h) The internal layout and design of the facility at Orugodawatte should include separate areas for:
 - Lorry loading/unloading
 - Parking space for lorries – (overflow parking):
 - Parking Space for Other Vehicles:
 - Area for Services:
 - Circulating areas for buyers/sellers and for natamis with loads:
 - Circulation space for lorries:
- i) For an adequately functional market no more than 450 shops each of 150 square feet should be located at Orugodawatte.
- j) The layout of the market is recommended as a central concourse with four piers on each side. This is ideal for the many-to-many type of distribution activity that takes place between lorries and shops. The piers could be used for loading and unloading and separate piers could be given for different transport unions. The wholesale shops could

be housed in the central concourse so that they have central access to the loading/unloading piers. No shops should be housed in the piers or else efficiency would reduce.

- k) A retail section could be set up towards the Baseline Road end for about 30 shops with adjacent parking for consumers.
- l) The access to both the wholesale and retail sections should be from a separate access road, with two separate entrances/exits for the wholesale complex and a separate one for the retail section.
- m) A railway station should be opened at Orugodawatte to cater to both passenger and goods traffic in the future generated from the entire complex.
- n) The land presently occupied by the Manning Market could be used as part of the bus/rail terminal that has been recommended in the Colombo Urban Transport Study and the Urban Development Authority

▪ **REFERENCES**

Colombo Urban Transport Study, Working Paper 11: Freight Transport, Halcrow Fox Associates, Colombo, 1995.

Kumarage, A.S., 'Transport for Agricultural Development in Sri Lanka', Proceedings of the Annual Sessions, Chartered Institute of Transport, Colombo, 1999.

Menegey et al, 'Study of Agricultural Markets in Sri Lanka', April 1998.

University of Moratuwa, 'Pettah Lorry Parking Study', Department of Civil Engineering, Report No. TD/92-4, August 1992.

Urban Development Authority, 'Colombo Metropolitan Regional Structure Plan', 1999.