

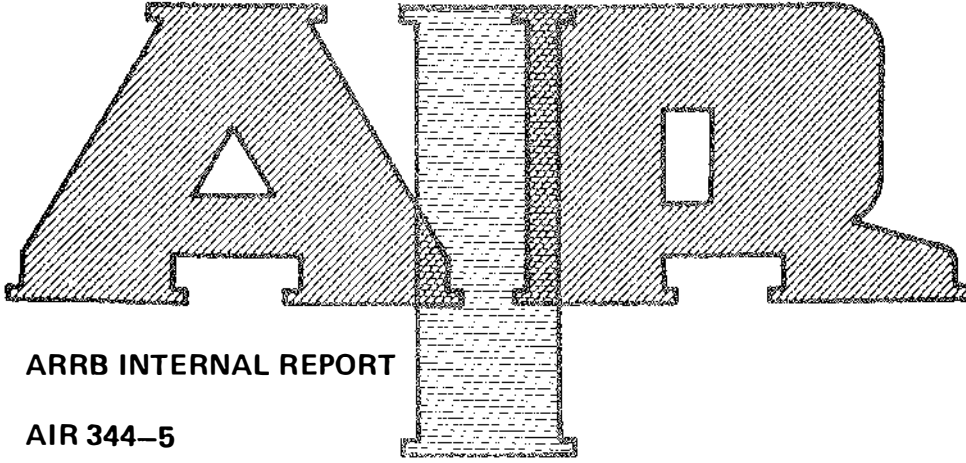
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ARRB INTERNAL REPORT

AIR 344-5
September 1983

**PATTERNS OF HOUSEHOLD ACTIVITIES UNDER
DIFFERENT ENVIRONMENTAL CONDITIONS:
A PROPOSAL FOR APPLIED RESEARCH**

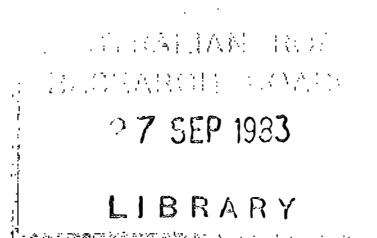
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P344 - Constraints on travel behaviour



**AUSTRALIAN ROAD RESEARCH BOARD
INTERNAL REPORT**

**AUSTRALIAN ROAD RESEARCH BOARD
500 BURWOOD HIGHWAY
VERMONT SOUTH, VICTORIA**



REPORT SUMMARY

THE PURPOSE OF THIS REPORT

- to specify a research proposal to develop an appropriate and economical assessment procedure for local transport issues

THIS REPORT SHOULD INTEREST

- transport analysts, traffic planners, local authorities and social research scientists

THE MAJOR CONCLUSIONS OF THE REPORT ARE

- it is now time to apply the accumulated body of knowledge on household activities and constraints to develop cost-effective evaluation and assessment tools for local planning issues
- an effective program would entail extensive analysis of existing data sources, together with consultation and experimentation at the local level.

AS A CONSEQUENCE OF THE WORK REPORTED, THE FOLLOWING ACTION IS RECOMMENDED

- implementation of the issues raised by the program detailed in the report.
- reporting of the analysis of Berwick undertaken to date, in conjunction with the Melbourne IIS materials

RELATED ARRB RESEARCH

- P340 - Trip Generation
- P352 - Traveller Decision Making
- P380 - Vehicle Ownership and Use

CUT OUT INFORMATION RETRIEVAL CARD.....

MORRIS, J.M. and WIGAN, M.R. (1983) : PATTERNS OF HOUSEHOLD ACTIVITIES UNDER DIFFERENT ENVIRONMENTAL CONDITIONS: A PROPOSAL FOR APPLIED RESEARCH. Australian Road Research Board. Internal Report AIR 344-5. 27 pages, including 4 tables, 3 figures and 1 appendix.

KEYWORDS : Evaluation (assessment)/location/region/urban area/activity report/household/interview/method/time/budget/journey/demand (econ)/accessibility/town planning/Melbourne, Victoria*/environment/local authority/transport

ABSTRACT : Analysis and reporting of different types of constraints on households and their influence on transport usage have now reached a sufficiently developed stage to make it reasonable to draw together these different (and occasionally rather abstract) streams of work into an applied tool. This report outlines the program which ARRB proposes to undertake to apply some of the results of P344 (Constraints on travel behaviour) and P380 (Vehicle ownership and use). The basic tool is the use of activity analysis of household interview surveys (P380) to make fresh local area activity interviews more cost effective. Examples are drawn from activity interviews in Berwick (Victoria), and the proposed selection of a series of test areas in Melbourne is covered in detail. The planned research method was firstly to analyse the 1976 Berwick Household Activity Survey in some detail as a pilot study. If this proved satisfactory, a number of other areas would be selected. To do this, background information would be collected on their social, economic and accessibility aspects. Home interview data would then be looked at on a broad scale before returning to a local government level in the selected locale.

*Non IRRD Keywords

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ABSTRACT

Analysis and reporting of different types of constraints on households and their influence on transport usage have now reached a sufficiently developed stage to make it reasonable to draw together these different (and occasionally rather abstract) streams of work into a applied tool. This report outlines the program which ARRB proposes to undertake to apply some of the results of P344 (Constraints on travel behaviour) and P380 (Vehicle ownership and use). The basic tool is the use of activity analysis of household interview surveys (P380) to make fresh local area activity interviews more cost effective. Examples are drawn from activity interviews in Berwick (Victoria) and the proposed selection of a series of test areas in Melbourne is covered in detail. The planned research method was firstly to analyse the 1976 Berwick Household Activity Survey in some detail as a pilot study. If this proved satisfactory, a number of other areas would be selected. To do this, background information would be collected on their social, economic and accessibility aspects. Home interview data would then be looked at on a broad scale before returning to a local government level in the selected locale.

The authors wish to acknowledge Max Pawsey for allowing access to the 1976 Berwick Household Activity Survey.

1. INTRODUCTION

Analysis and reporting of different types of constraints on households and their influence on transport usage have now reached a sufficiently developed stage to make it reasonable to try to draw these different (and occasionally rather abstract) streams of work together into an applied tool. This report is an outline program of the steps that ARRB proposes be undertaken in this important and practical area as a result of work done under projects P344 (Constraints on travel behaviour) and P380 (Vehicle ownership and use).

Comment and criticism are welcomed, as the task of producing a usable tool is far from straightforward, and often suffers from insufficient interchange with the putative target users.

2. AIM

The primary aim is to apply an increased understanding of household activities and constraints to develop an appropriate and economical assessment procedure for local transport issues.

The key phase of the work is to identify the effects (if any) that differing environmental conditions between local government areas (LGAs) have upon household activity patterns in those areas. This will determine how much activity, travel and personal linkages are modified by differing environmental constraints. The approach to be adopted brings together research interests in time and activity constraints on the one hand and spatial accessibility constraints imposed by differing environmental conditions on the other. It draws on and extends the improved understanding of travel behaviour achieved by work carried out since 1975 on the influences on transport of time and budget constraints at the household and individual level : for ARRB work in this area see Wigan and Morris (1981) and Barnard (1981). This now provides a sound basis for undertaking experimental applied survey work with the prospect of an application cost which is low enough for the methods and findings to be applied in local evaluation and impact issues. Case study examples drawn from discussions with Local Government will be the subject of experimental survey methods in a proposal now under development from the basic framework in this report.

The objective now being addressed is to develop evaluation tools for assessing the impacts on, and monitoring changes in, household travel and activity behaviour. This line of approach is potentially capable of being applied to the planning of recreational and shopping facilities as well as to traffic management and transport proposals, as it takes fuller account of the whole household pattern of demand for activities

and mutual constraints on their achievements.

The City of Berwick has undertaken a small activity survey for their own use (Pawsey 1980), prior to the availability of results from the 1978-79 Melbourne Home Interview Travel Survey (Victoria: MoT (1981)). Consultation with the City Engineer was therefore a basic first step, and the City of Berwick has been selected as one of the candidate areas for this project. Berwick has been subjected to many non-transport changes in the last few years, and may prove too complex an area for further study. This position could be reviewed in the first stage of the new proposal for which this report is the basis, and as a result of fresh analysis of the Berwick data already undertaken.

The key new feature is that the effective use of Transportation Study household interview surveys (HISs) for a sampling and scaling framework is now a practical step. It is now clear how far these often excellent socio-economic surveys can be exploited by judicious supplementation with local activity surveys. This would be established in the course of the proposed research.

The major investment in the ARRB Adelaide Activity and Travel Behaviour survey (ARRB Project P352) can reasonably be expected to provide an excellent basis for analytical comparison between Adelaide 1977 HIS and the 1981 Activity Survey (Barnard 1981) and special assistance from the South Australian Government has been provided at ARRB for this purpose. Much of what follows on the use of the HIS base can therefore be considered in either an Adelaide or a Melbourne context. The practicality of following up new projects on the ground in Melbourne is (ceteris paribus) better than Adelaide, due to the distances and costs involved.

3. RESEARCH METHOD

1. The 1976 Berwick Household Activity Survey would be analysed in an initial pilot study. The analysis will attempt to build up a picture of time use, travel and activity linkages, and interactions between people. Comparison will be made where possible with results from the 1978-79 Melbourne Home Interview Travel Survey for the Berwick municipality. An important objective will be to establish whether the extra information provided by activity surveys is necessary to develop evaluation and assessment tools. This is an important issue given the extra expense associated with the collection and analysis of activity diaries. In other words, do the simplified activity schedules deduced from HISs provide a powerful enough description of behavioural responses to enable discrimination between different population groups and different environmental conditions? Additional sources will

be used for validation purposes, such as information on Australians' use of time contained in the Cities Commission's (1975) report, and information on trip rates, produced for the Berwick Transportation Study.

2. Pending satisfactory results from the initial pilot study the next step requires the selection of a number of geographic areas with contrasting accessibility characteristics and types of problems in the traffic and roads field. It is suggested that the following local government areas in Melbourne encompass a range of environmental conditions suited to a study of this kind. They are: Fitzroy, Hawthorn, Port Melbourne, Sherbrooke, Broadmeadows and Berwick. Figure 1 shows the location of these study areas and Table I outlines a number of the features of each area to provide a rationale for their selection for initial study. A similar set of areas in Sydney and Adelaide are under consideration, but due to the need to establish and maintain continuing contact with officials and residents in the area at a later stage, Melbourne is preferred for this study.
3. Background information will be collated to establish an inventory of social, economic and accessibility characteristics of each of the six areas. A number of existing sources would be tapped including the national censuses, other official surveys and other studies (e.g. by King (1978, 1979, 1981, 1982), Morris (1977, 1982), Wigan (1982a, (b)), Godfrey (1981)).
4. Transportation study household interview data on trips and activities would be analysed initially at a comparatively gross level (LGA survey zone) to establish broad activity (purpose) profiles and travel profiles for each area. These can be directly compared with those produced by Wigan (1982b) for Melbourne as a whole as part of a special study for the Victorian State Bicycle Committee on the role of the bicycle in a broader transport context. The objective of this is not to attempt to confirm the findings of the considerably larger and more reliable Adelaide work, but to check on the specific data already available for the proposed test city of Melbourne.
5. At a more detailed level, transportation study data on each household of a specified type would then be examined in selected traffic zones in each area. It is anticipated that much of the work will involve manual inspection of household records to identify major differences in responses from area to area. In so doing an attempt will be made to build up a picture of local variations in response to differing levels of environmental constraints.
6. Returning once more to the LGA level, further empirical analyses would be conducted for population groups with differing life cycle and economic characteristics. Prototypical activity patterns will be built up (initially again through manual inspection) for each population group in each case study area. The focus will be on the interaction between the activities performed over a given day and between

the activities undertaken by other members within the household. In so doing it is hoped to establish how the patterns of interpersonal linkages and activity linkages are modified by contrasting urban situations. The implications for journey structure (e.g. trip chaining) and activity participation (e.g. transfer of household tasks to another person) may then be deduced. As this analysis produces 'time at home' as one output, the direct impacts of traffic conditions on opportunities can be deduced.

7. The final step is to seek LGA consultation for application to local evaluation issues. With the cooperation of local authorities, it is planned to conduct pilot experiments among a small number of households in a local government area (or areas). The experimental survey methods will be developed to provide a better picture of expected user impacts and possible response to specific issues (e.g. road closures, major changes in traffic management, administrative changes, such as school zoning or rescheduling of school hours and impacts of major shopping centres). In view of the social response to a number of major road openings in Melbourne, follow up studies in those areas may be of special value. The proposed program is outlined in Appendix I.

The 1978-79 Melbourne data set can be used for the earlier stages of this work, but the availability of the detailed Sydney 1981 Transport Survey materials will mark the time that the most effective work can be undertaken. The need to visit Sydney on a number of occasions will increase costs, and should be prefaced by an extensive analysis of this very large set of data (on 20,000 households) at an early stage under this new project or P380. It would therefore be preferable to pursue the possibility of using the Melbourne data for the initial work. The available analyses by King of Census data for Melbourne are of substantial value. Previous work in Sydney by Ravallion (1974) is likely to be considerably less useful in support of the 1981 Sydney HIS data; however useful experimental work has been undertaken by Faulkner (see Faulkner (1978) and Faulkner and Rimmer (1982)).

The ideal solution might be to do the initial trials in Melbourne followed up by work in sample areas of North-Eastern Adelaide (drawing on P352, P380), Sydney, and Melbourne : however our attention here is concentrated on Melbourne and the initial phase.

4. REVIEW OF BASIC MATERIALS

As already indicated, the initial phases of the proposed research would draw heavily on existing studies. It is useful to review these briefly here, to indicate both the potential and the limitations of those sources in meeting the study objectives. For the present, emphasis will be placed on the pilot study and

only cursory attention will be given to subsequent stages since the exact nature of these may change.

4.1 BERWICK HOUSEHOLD ACTIVITY SURVEY

The main source of data for the initial pilot study is an activity survey carried out in the City of Berwick in 1976. This survey was conducted for the City by the consultants, John Paterson Urban Systems (1976), with the aid of a grant from the Ministry of Transport in Victoria. Preliminary analysis and reporting of the data has been undertaken by Council staff (Pawsey 1980), but the full potential of the data has yet to be realised.

The survey covered 100 households, taken from four most rapidly developing sectors of the City at that time. The sampling frame was structured so as to capture the range of household types to be found in the City, and to preserve a fair degree of spatial cluster.

The survey included two interview schedules which furnished information on household characteristics and personal details of each household member. The main feature of the survey, however, was an activity diary maintained by each household member of school age and above. The diaries were kept for a period of one week, and provided a continuous record of activities and trips undertaken during the survey period. An example of the diary format is shown in Figure 2.

Relationships may thus be established at the individual and household level between daily activities and travel patterns and key background variables, contained in the interview schedules. Such key variables include geographic area (Hallam, Narre Warren, Fountain Gate and Berwick), socio-demographic characteristics and transport resources (including accessibility to public transport for work and school journeys). The survey also furnished detailed information on residence histories and work journeys. Full documentation of the survey procedures is contained in a report which was prepared for the City Council by the consultants (see John Paterson Urban Systems 1976).

Unfortunately the survey information pertaining to the 25 households from Fountain Gate has subsequently been lost. Data coding has been completed by Council Staff for a further 25 households, from the Hallam area (including Endeavour Hills). These households will form the basis of the initial study. As presently coded, however, the information is set up to analyse trips, not activities. Any detailed analysis of time use (including in-home activities) would involve going back to the original source (i.e. the diaries themselves). A decision not to process this additional information at this stage was made. Figure 3 gives some indication of the detailed information on travel patterns contained in the diaries - but not in the data set as it is currently encoded. It shows the pattern of activities undertaken by a family of five living in one household with no car. For ease of presentation only activities undertaken

outside the home are displayed, although a full description of in-house activities is contained in the diaries.

The overwhelming impression gained from this example is the heavy dependence upon people from outside the household for any motorised travel made by this family.

The father, a machinist in a factory in Springvale, gets a lift to work with a workmate each day, but since their shifts do not coincide exactly on weekdays this arrangement means that he must wait for an hour and a half at the end of the day for the lift home. As there is no public transport his only alternative is to cycle the several kilometres to work and back, an option which was not realised during the survey week.

The wife spends her time looking after the home and family. Most of her activities outside the home revolve around the children's education and the household shopping. She walks to the local pre-school and primary school to assist with the children's schooling needs, and catches the bus to the Dandenong market for her shopping trips.

The two older sons, aged 6 and 8, attend the local primary school. They undertake the 15-20 minutes walk together, sometimes also in the company of a friend or relation. The youngest child, not yet at school, attends pre-school twice during the week, and is accompanied there by his mother.

The eldest child played soccer twice during the survey week and this was the only 'extra curricular' activity pursued outside the home by the children (apart from a short visit to a local playground on the weekend). And even then, his attendance at training during the week and his participation in the match on Saturday morning were dependent upon gaining lifts from a friend's father and the trainer of the team.

Interestingly, no bicycle trips were observed during the survey week, even though the family indicated that it had two bicycles at its disposal. Also of interest is the complete absence of multipurpose trips (apart from trips to simply change mode). Another striking feature is this family's low level of participation in social and recreational activities outside the home. This is especially evident for the parents, and on Sunday. A visit to Church on Saturday evening was the only activity outside the home which involved the whole family.

Overall, the pattern of activities undertaken by this family is heavily dependent upon good accessibility to local facilities and strong personal linkages with (and reliance upon) friends (providing car transport). The opportunity to build such networks of mutual reliance may well be a function of the length of time the family has been at that specific location, or in the general area as a whole. This particular point has some importance for assessing the likelihood and cost of disruption of alteration to transport or other services in the area.

4.2 COMPARISON WITH CONVENTIONAL TRAVEL SURVEYS

How does this kind of data compare with the information from more conventional travel surveys? The 'best' answer to this question for Australia will be one of the results of P352 for Adelaide, but there is a certain amount of overseas evidence to draw upon already. The activity study is already a powerful tool for small area analysis, whereas the HIS is -necessarily - a larger scale exercise, generally with few households in any specific local area. Using HIS results to enhance the effectiveness of comparatively few extra activity based interviews is likely to be of special value for local area impact assessments.

Other studies have found activity surveys to be superior to the ordinary household interview travel survey in a number of respects. Specifically it has been shown that the main strengths of activity diaries lie in providing detailed information on:

- (a) in-home activities
- (b) multiple activities at destinations
- (c) week-long travel, including weekends.
- (d) personal linkages, within and outside the household unit
- (e) all trips, including trips for discretionary purposes and those covering short distances
- (f) finely coded (geographic and activity codes), and land usage categories.

By contrast, most HISs (including the 1978-79 Melbourne survey) contain no information on the first three of these items, and less complete information on the remaining two items. Activity diaries are not only richer sources of information, but they also provide more reliable information on travel patterns. For instance it has been shown overseas (Clarke 1981) that an activity survey yields a significantly higher level of trip making than a conventional travel survey (see Table II) and similar results are emerging from P352. The main discrepancies arise in respect of discretionary trips which are known cases of under-reporting in conventional travel surveys. These differences probably arise because an activity framework is a more natural way of describing and recalling travel patterns. Most HIS's require the interviewer to recall his previous day's travel, by abstracting trips from his total pattern of activities. Activity surveys, on the other hand, cover all activities and require the respondent to account for his time in a continuous way. As such, an activity survey is more likely to pick up short trips (such as a walk to the corner store or a stop on the way home from work to buy an evening newspaper) which may be overlooked or simply not perceived as a separate trip by the interviewee. Consequently, the trip generation rates which can be derived from each type of survey differ substantially in two ways:

- (a) fineness of detail in trip and destination type categories;
- (b) levels of capture of trips of different types and lengths;

(c) accuracy in local application.

In addition, the structure relationships within the household are of considerable importance when the responses to local measures are involved.

The various kinds of information supplied by each type of survey are summarised in Table III. Possible applications of the survey data are also listed. An important question to be addressed by the proposed research is whether the simplified activity schedules contained in conventional travel surveys are sufficient either:

- (a) to develop sensitive evaluation and assessment tools; or
- (b) to act as efficient sampling frames to make wider and more economic survey methods for local problems or policy issues as they subsequently arise at a local level.

Of course, it should be remembered that activity surveys also have some limitations. Besides the extra expense involved in collecting and analysing activity diaries, it must be noted that maintaining an activity diary demands a much higher level of co-operation from respondents than participation in conventional travel surveys. This is because respondents are required to furnish considerably more information when completing activity diaries. Partial co-operation and incomplete diaries are to be expected, therefore, and this raises problems in clearly defining survey response rates.

For instance in the illustrative example shown in Figure 3 we see that only two members of the family completed their diaries for the entire week. Possibly the other household members did not document their activities every day because the pattern was basically a repeat of earlier days. Equally possibly, however, the respondents may have been busier on these days and hence may not have found the time to fill in their diaries. Then again, other studies have identified a 'fatigue effect', whereby the amount of information supplied by respondents declines the longer the survey is in progress (Jones et al. 1980)

Activity diaries allow some checks to be made on the consistency of responses (e.g. by cross-checking with the diaries of other household members). But there are limits on how far this can be undertaken. Continuing with our illustrative example in Figure 3, we see that the youngest child is escorted to pre-school on Monday but there is no mention of the return trip. Was this an oversight, or did the child come home with a friend? Then, on Tuesday, the mother appears to go shopping by herself. Again, did she simply forget to record the company of her youngest child or was he left with a babysitter? As diaries were not completed for pre-school children in the Berwick Survey, we are unable to check these anomalies in the mother's recorded activities. Clearly, some errors are inevitable, however comprehensive the survey technique, and the extra information on the relationships between different identified members of the

household are at present captured only by activity surveys as they are currently specified.

4.3 SOCIAL AND ACCESSIBILITY INDICATORS

Finally, it is useful to draw together background information on the study areas. A detailed inventory of social and accessibility characteristics is presented in Table IV. To facilitate comparisons the six areas are listed in approximate order of age of development.

The bulk of this information is drawn from King's (1979) study of accessibility and behaviour in Melbourne. In cases where other sources have been used, these are indicated in the table.

It should be noted that the information drawn from King's study is based on only part of each local government area and may not necessarily be representative of the overall area characteristics. This is because King's study areas were a sample of residential (origin) zones defined for the tabulation of journey to work data from the 1971 Census. Each local government area contains at least two (and usually more) of these origin zones, but the information presented in Table IV is based on only one zone per Local Government Area (LGA). Nevertheless the information drawn from King's study provides a broad indication of the range of conditions prevailing in each of the chosen areas. This is because the actual units of analysis in King's study were sub-areas and residential sites within the selected origin zones. Specifically, the social area analysis was based on randomly sampled census collector's districts within these origin zones, and the accessibility measures were calculated for randomly selected dwelling units within each of these census collector's districts (see King 1978).

The information taken from the other sources listed in Table IV pertains to whole LGAs, but does not give any indication of the level of variation within the study areas.

The good local and regional accessibility of the three inner areas contrasts markedly with the distribution of services in the three outer areas. This is reflected in turn in levels of vehicle ownership in the respective areas. Berwick residents would seem to be especially poorly served by radial public transport, secondary school facilities (including private schools) and local shopping centres, even by comparison with their near neighbours in Sherbrooke. By contrast, Fitzroy residents have excellent levels of accessibility to most local and regional services. Some minor variations are evident among the three inner areas, possibly the most important being the superior access to private schools enjoyed by Hawthorn residents.

5. FUTURE WORK

A program has been outlined to apply the increasing understanding of household activities and constraints to local evaluation and assessment issues. The objective is to develop appropriate and economical evaluation tools for assessing the impacts on, and monitoring changes in, household travel and activity behaviour using the sampling frame provided by large scale household interview surveys to reduce the heavy commitment currently required to apply activity survey methods. A major phase of the work is to identify the effects (if any) that differing environmental conditions between local government areas have upon urban household activity patterns in these areas, and determine how much activity, travel and personal linkages are modified by differing environmental constraints. An initial pilot study would be conducted for the City of Berwick in Melbourne. This would draw on results from an activity survey as well as more traditional transportation study data. The findings would provide some measure of the sensitivity that can be achieved by using conventional transportation data for evaluation and assessment procedures. The project would then broaden to consider a number of geographic areas with contrasting accessibility characteristics and types of problems in the traffic and roads field. This phase of the work would draw extensively on conventional transportation study data and other existing sources. The analysis would build up the picture of time use, travel and activity linkages, and interactions between people which can be deduced from these materials. Experimental survey methods will be developed for case study areas in the later stages of the project, based on consultation with relevant Local Government authorities. This line of approach has the potential to be applied to a number of significant but local planning issues, including recreational and shopping facilities as well as traffic management and transport proposals. An initial selection of candidate areas in Melbourne is given in the report, together with a detailed inventory of their social and accessibility characteristics.

6. CONCLUSION

This report outlines a detailed research proposal which seeks to build on understanding gained of travel activities and constraints to develop evaluation and assessment tools for applications to local transport and planning issues.

The proposed research rests on three basic premises. The first is that our knowledge of the constraints acting upon travel behaviour is now sufficiently developed to begin to translate research into practice. The second is that many of the basic methods and techniques can be developed by drawing upon existing sources of data. Many of these sources have yet to be fully exploited for analysis and evaluation. The third key premise is

that detailed consultation and experimentation at the local level is necessary to refine these basic methods for application to evaluation and assessment issues.

The research foreshadowed here could well come to require a substantial research commitment, and close relationships with several Local Councils over quite some time. Comments on the proposed application of this research are therefore particularly welcome at this stage, and the intentional restriction to Melbourne as the initial phase. This report recognises the existence of important gaps in this area of applied social research, and represents but a first step in facing the challenge to achieve similar results to those derived from the full scale research oriented activity surveys by applying methods which draw on cost-effective results from applications at a very local level.

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TABLE I: CANDIDATE AREAS IN MELBOURNE

CITY OF FITZROY

Characteristics

Mixed racial and income population : Small area (one of the smallest LGAs in Victoria)

Access

Very close to inner city (adjacent to central City LGA)

Recent Major Transport Impacts

Eastern freeway opening
Considerable area management by street closure

Number of Households in 1978 Melbourne Study : 149

CITY OF HAWTHORN

Characteristics

Large professional population
Innovative planning teams

Access

Near inner city
Close to population centre of Melbourne

Recent Major Transport Impacts

Adaptation to steadily increasing levels of traffic

Number of Households in 1978 Melbourne Study : 199

CITY OF PORT MELBOURNE

Characteristics

Stable blue collar population
Highly localised activity patterns

Access

Near inner city
Major changes from bad to good with Westgate Bridge
Extremely localised employment

Recent Major Transport Impacts

Westgate Bridge : Truck routing experiments

Number of households in 1978 Melbourne Study : 144

CITY OF SHERBROOKE

Characteristics

Significant self-help in population
Stable, non-homogeneous population (old and young)

Access

Isolated
Significant number of CBD commuters

Recent Major Transport Impacts

None : however additional resources are available.

Recent study by Godfrey (1981) of the aged;
Activity Survey of neighbouring area (see Pawsey 1980)

Number of households in 1978 Melbourne Study : 154.

CITY OF BROADMEADOWS

Characteristics

Homogenous blue collar population
Major adolescent youth population
Substantial social problems

Access

Poor access
Large number of commuters

Recent Major Transport Impacts

None : however strong public reaction to vandalism on
public transport has led to the possibility of service

curtailments. Resources include Hamilton-Smith's (1972) study of Broadmeadows, and also King and McGreggor's (1977) study of leisure facilities in the nearby municipality of Diamond Valley.

Number of Households in 1978 Melbourne Study : 276

CITY OF BERWICK

Characteristics

Mixed population (32 per cent Housing Commission homes)
Distant from CBD
Dispersed

Access

Poor within LGA: car use essential for most purposes
Good to CBD (via Freeway)

Recent Major Transport Impacts

Mulgrave Freeway

The whole city has developed from green fields in eight years with forward planning for road reservation widening and subdivision.

Resources include the 1976 Activity Survey conducted by John Paterson Urban Systems (1976) (See also Pawsey 1980).

Number of Households in 1978 Melbourne Study : 151.

TABLE II

COMPARISON OF TRIP-MAKING ESTIMATES FROM TWO DIFFERENT SURVEYS: BANBURY, U

Trip Category	Trips per Person per Day		
	Activity Survey	Travel Survey	Difference
All	4.37	3.86	0.51
Home-based			
Work	0.88	0.79	0.09
Education	0.54	0.55	-0.01
Other	2.16	1.93	0.23
Non-home-based	0.80	0.60	0.20

Source: Clarke et al. (1981)

TABLE III

CATEGORIES OF INFORMATION SUPPLIED BY ACTIVITY SURVEYS AND CONVENTIONAL
TRAVEL SURVEYS, AND POTENTIAL APPLICATIONS

Category of Information	Availability (✓=yes; x=no)		Potential Application in Transport Planning
	Activity Surveys	Travel Surveys	
<u>Time Use</u>			
Total time spent outside the home	✓	✓	. Improved understanding of travel demand (including latent demand)
Time spent on specific out-of-home activities	✓	✓	
Ratio of leisure time spent at home to leisure time spent in out-of-home activities	✓	x	. Assessment of impact of technological developments (e.g. video recorders, home computers) and potential for trip substitution
<u>Travel Patterns</u>			
Activity linkage	✓	x	. Land-use planning (esp residential and commercial areas)
Activity frequency	✓	x	
Trip consolidation (more than one activity at one destination)	✓	x	. Impact assessment of transport and non-transport changes (i.e. increased sensitivity is achieved by considering a range of adaptive responses)
Linked journeys or trip chaining	✓	✓	. Delineation of constraints on travel, useful for impact assessment
Inter-personal linkages	✓	✓	
Trip frequency	✓	✓	. Trip generation, modal split, trip destination
Mode of travel (including walk and car passenger)	✓	✓	
Distance travelled	✓	✓	. Transport innovations (e.g. para transit)
Origin-destination patterns	✓	✓	
Time of day profiles	{ - out of home - at home	✓	. Road safety measures based on exposure profiles . Impact of altered time constraints . Assessment of environmental impacts (noise and other external effects of traffic).
		✓	

TABLE IV

INVENTORY OF SOCIAL AND ACCESSIBILITY CHARACTERISTICS OF THE CASE STUDY AREAS

	Fitzroy	Hawthorn	Port Melbourne	Sherbrooke	Broadmeadows	Berwick
<u>Social Characteristics</u>						
Average age of dwelling stock	1904	1914	1917	1943	1954	1960
Socio-economic status	low	medium to high	low	very mixed, but medium to low	low to medium	low
Lifecycle	early to late	middle to late	early to late	middle to late	early to middle	early
Ethnicity (esp S. European)	high	generally low	mixed population with localised high concentrations	low	very localised concentrations, generally mixed population	average
Car ownership at 1976* (vehicles per household)	0.7	0.9	0.6	1.4	1.3	1.4
<u>Local Accessibility</u>						
Radial public transport within 550m	100% h'holds (v. close)	89% h'holds (close)	100% h'holds (close)	14% h'holds (generally distant)	12% h'holds (generally distant)	0% h'holds (very distant)
Walking distance to radial public transport	147m (S.D. 76m)	310m (S.D. 202m)	229m (S.D. 121m)	1078m (S.D. 524m)	1215m (S.D. 561m)	4432m (S.D. 1155m)
Walking distance to all public transport	147m 76m (S.D. 16m)	234m (S.D. 234m)	183m (S.D. 102m)	630m (S.D. 612m)	261m (S.D. 170m)	494m (S.D. 257m)
Walking distance to State Primary schools	502m (S.D. 180m)	607m (S.D. 315m)	524m (S.D. 270m)	1209m (S.D. 624m)	693m (S.D. 311m)	791m (S.D. 513)
Walking distance to State High schools	1409m [‡] (S.D. 271m)	1682m (S.D. 631m)	1422m (S.D. 647m)	1856m (S.D. 767m)	1216m (S.D. 709m)	3207m (S.D. 1634m)
Walking distance to public open space	505m (S.D. 147m)	391m (S.D. 240m)	260m (S.D. 169m)	914m (S.D. 721m)	1068m (S.D. 825m)	1124m (S.D. 956m)
Walking distance to local shopping						
local centres	183m (S.D. 78m)	471m (S.D. 247m)	395m (S.D. 159m)	1090m (S.D. 619m)	639m (S.D. 404m)	2181m (S.D. 1299m)
all shops including corner shops	139m (S.D. 50m)	297m (S.D. 168m)	227m (S.D. 150m)	922m (S.D. 444m)	496m (S.D. 308m)	357m (S.D. 194m)
Number of General Practitioners (as at 1970) [†]	13.1	22.0	3.9	8.6	32.0	8.7
Number of Specialists [†]	0.0	1.3	0.1	0.0	1.7	0.0
Population per G.P. and Specialists [†]	2031	1626	2975	2314	2920	3701
<u>Regional Accessibility</u>						
No. of jobs within 40 mins by public transport	433,000+	287-380,000	360,000+	6-13,000	26-39,000	9-15,000
Private schools within 10 mins by car	15-16	31-35	5-9	0	0	0
Travel time by car to nearest and next nearest regional shopping centre	6, 7mins	4-5, 5-8mins	4-5, 6-7mins	10-15, 18-23mins	3, 6-8mins	3-7, 8-11mins
Accessibility to major tertiary institutions (travel time by car to nearest and next nearest)	3, 4mins	9-11, 10-13mins	7-9, 10-11mins	22-27, 41-46mins	16-17, 17-18mins	16-19, 41-44mins
Recreation facilities travel time by car to (nearest resource) :						
Dandenong Ranges	41mins	34-36mins	45-47mins	4-8mins	53-55mins	23-25mins
Bayside beach	10mins	10-12mins	3mins	36-39mins	22-23mins	17-20mins
Regional park	3mins	3-5mins	5-7mins	4-8mins	9-12mins	8-13mins
City centre	6mins	9-11mins	6-7mins	40-46mins	18-19mins	41-44mins
Public Open Space [†] (hectares per 1,000 population as at 1972)	0.7	1.5	2.9	83.5	1.8	30.3

Note: [‡] Accessibility has subsequently been improved to State High Schools in Fitzroy.

Source: King (1979) unless otherwise indicated (*1976 Census, [†]UDPA Planners (1975)).

APPENDIX IA BASIC APPROACH FOR APPLICATION OF CONSTRAINT ANALYSIS
ON HOUSEHOLD BEHAVIOUR

STAGE 1

Objective

Extract detailed HIS data on selected Melbourne LGAs.

Sources

1. R. King (P311) - Census analysis Method: Literature
2. MOT(Vic) - HIS data - Method: as specified for activity file construction in P380 work.
3. City of Berwick activity survey, and consultation with the City Engineer.
4. Consultation with the City Engineer of Brighton (Godfrey 1981).
5. UDDA Planners report for Cities Commission Time Budget study, and Cities Commission Time Budget study.

STAGE 2

Objective

Analyse and collate small area characteristics of the selected areas.

Sources

Detailed household records on HIS computer files.

Method

SPSS on lifecycle strata (following the categories derived under P380).

STAGE 3

Objective

Trace activity patterns for households to identify linked constraints.

Sources

Correlation of time and location patterns of members of each household studied.

Method

Manual analysis

STAGE 4

Objective

Use results of Stage 2, 3 to assess small sample scaling problems.

Sources

Zonal and LGA level broader analyses of the whole Region on the lifecycle strata utilised for detailed time/space mapping.

Method

SPSS and special programs on the overall HIS at a broad level.

STAGE 5

Objective

Identify small area impact issues with LGAs, and design survey test.

(At this point Sydney 1981 HIS may be available to carry out stages 2-5 on Sydney data).

STAGE 7

Objective

Undertake impact survey of selected households in the light of stage 4 and 5 recommendations.

STAGE 8

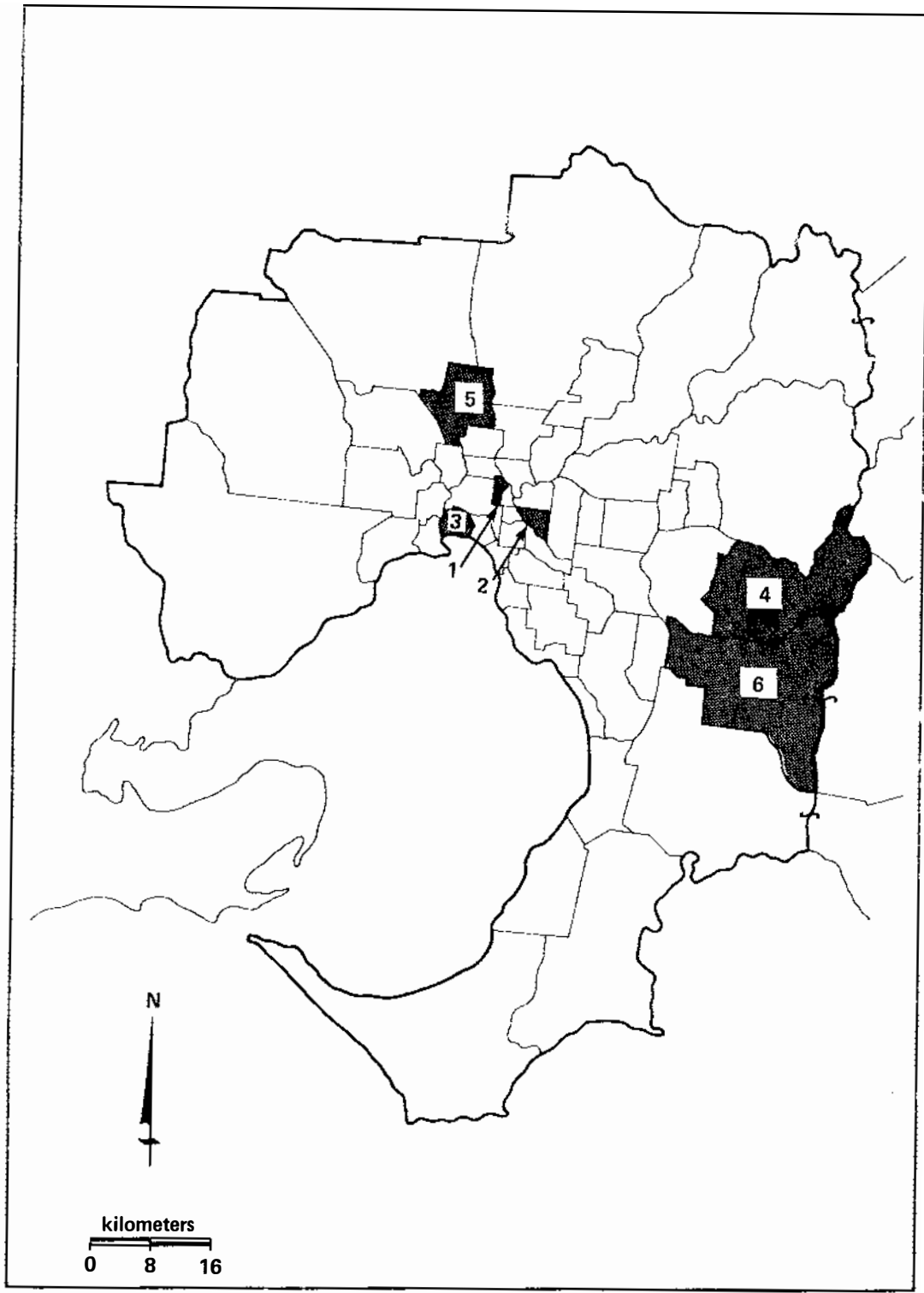
Analyse results manually.

STAGE 9

Feedback to LGAs in the areas and households studied.

STAGE 10

Report on mutual (LGA-ARRB) cost and effectiveness findings, with user feedback from both official and household levels.



- | | |
|-------------------------|-----------------------|
| 1 Fitzroy | 4 Sherbrooke |
| 2 Hawthorn | 5 Broadmeadows |
| 3 Port Melbourne | 6 Berwick |

Fig 1 – Location of the study areas in Melbourne

Fig 2 — Sample format of Activity Diary used in the
1976 Berwick Household Activity Survey

day Tuesday
date July 2
weather Cloudy - some rain

ACTIVITY DIARY

* Write 'home' if at home; otherwise
give name and/or street and suburb

Time of Start	DESCRIBE ACTIVITIES		DESCRIBE TRAVEL				With anyone else?	Time of finish
	describe	location*	from*	to*	method of travel	purpose of journey		
7.15	got up, showered prepare breakfast	home						7.45
7.45	breakfast	home					family	8.00
8.00			home	bus stop 2 St	car driver	drive husband to bus stop	husband	8.10
8.10				home	car driver	return home		8.20
8.20	read papers	home						8.40
8.40			home	school primary	car driver	take children to school	children	9.00
9.00				shops	car driver	shopping		9.10
9.10	local grocery shopping							10.30
10.30			Smith St. shops	home	car driver	return home		10.45
10.45	housework and lunch	home						1.30
1.30			home	hairdresser X St	car passenger	visit hairdresser	1 friend	1.45
1.45	getting hair done	hairdresser X St					1 friend	2.30
2.30				school primary	car passenger	pick up children	1 friend	2.45
2.45				home	car passenger		1 friend plus children	3.00
3.00	housework, set dinner	home						6.45
6.45	dinner	home					family	7.30
7.30	wash up watch T.V.	home					family	10.30
10.30	go to bed.	home						

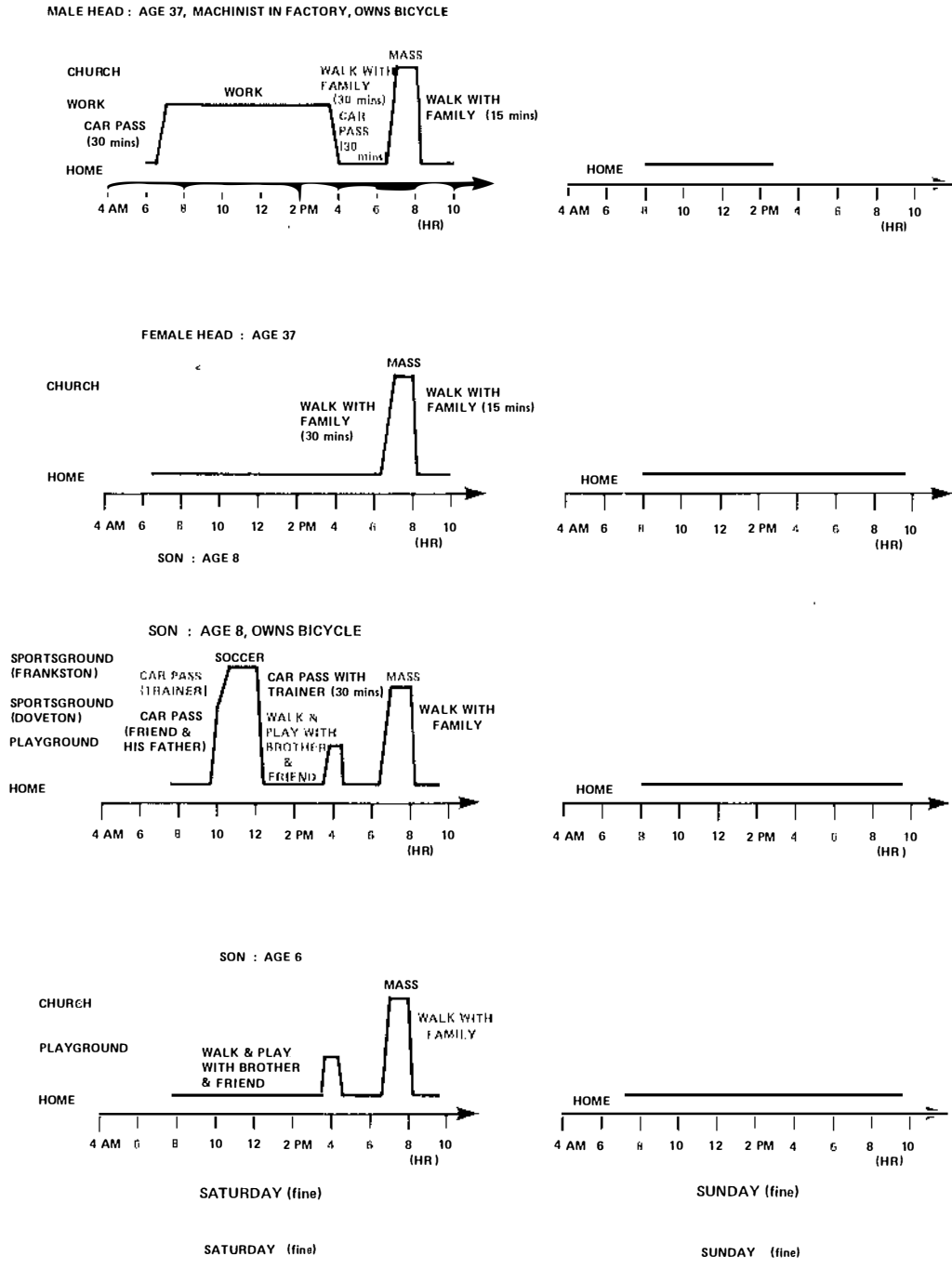
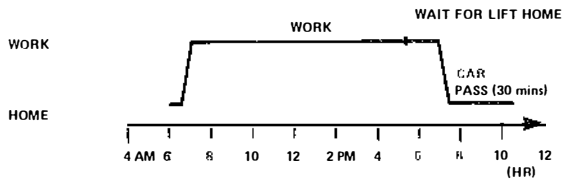
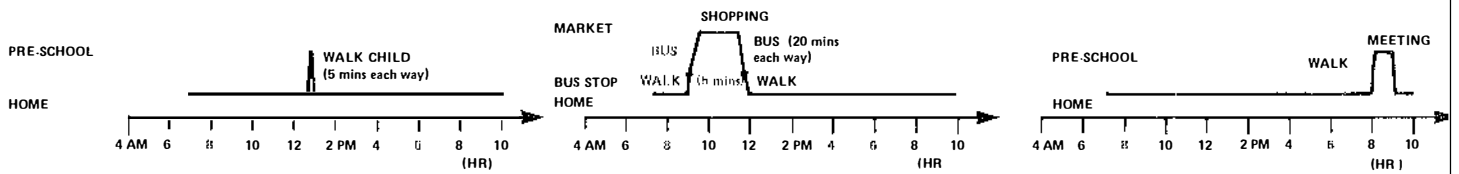


Fig. 3. Weekly activities of family of five with no cars

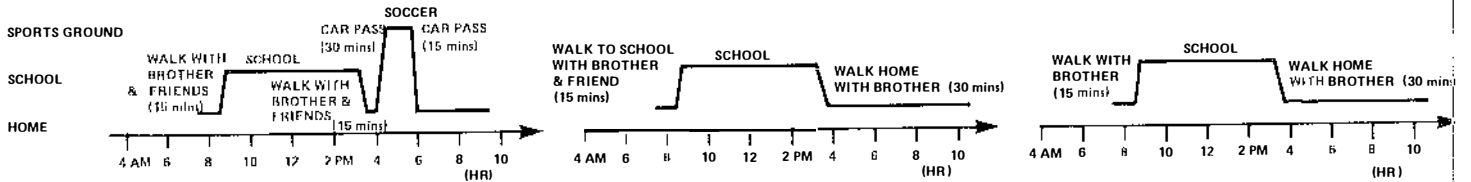
MALE HEAD : AGE 37, MACHINIST IN FACTORY, OWNS BICYCLE



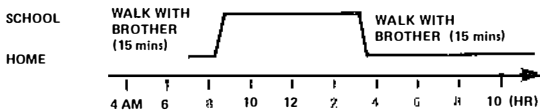
FEMALE HEAD : AGE 37



SON : AGE 8, OWNS BICYCLE



SON : AGE 6



What happens to youngest child while mother shops?

MONDAY (fine)
SON : AGE 4
Attends Pre-school
(how does he get home?)

TUESDAY (fine)

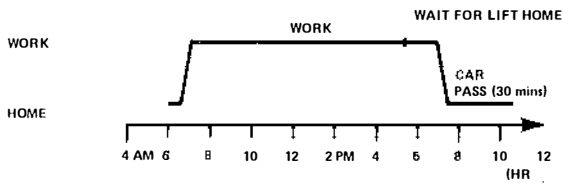
WEDNESDAY (fine)

Fig 3 - Weekly activities of family of five with no car,

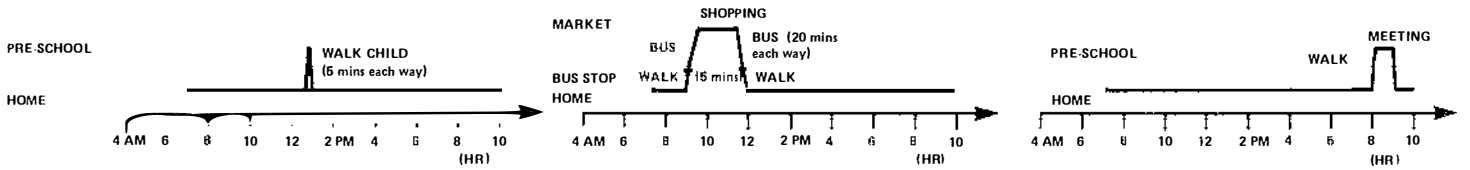
- continued

[Repeated over for clarity of reference]

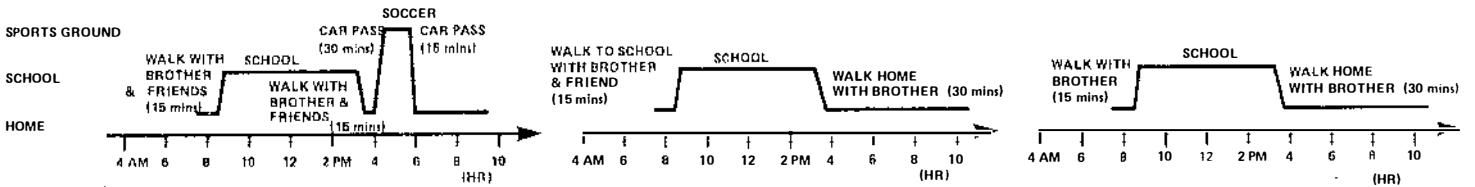
MALE HEAD : AGE 37, MACHINIST IN FACTORY, OWNS BICYCLE



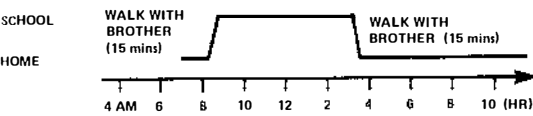
FEMALE HEAD : AGE 37



SON : AGE 8, OWNS BICYCLE



SON : AGE 6



SON : AGE 4
Attends Pre-school
(how does he get home?)

MONDAY (fine)

TUESDAY (fine)

WEDNESDAY (fine)

[Duplicate of last page to permit easy visual cross reference for]

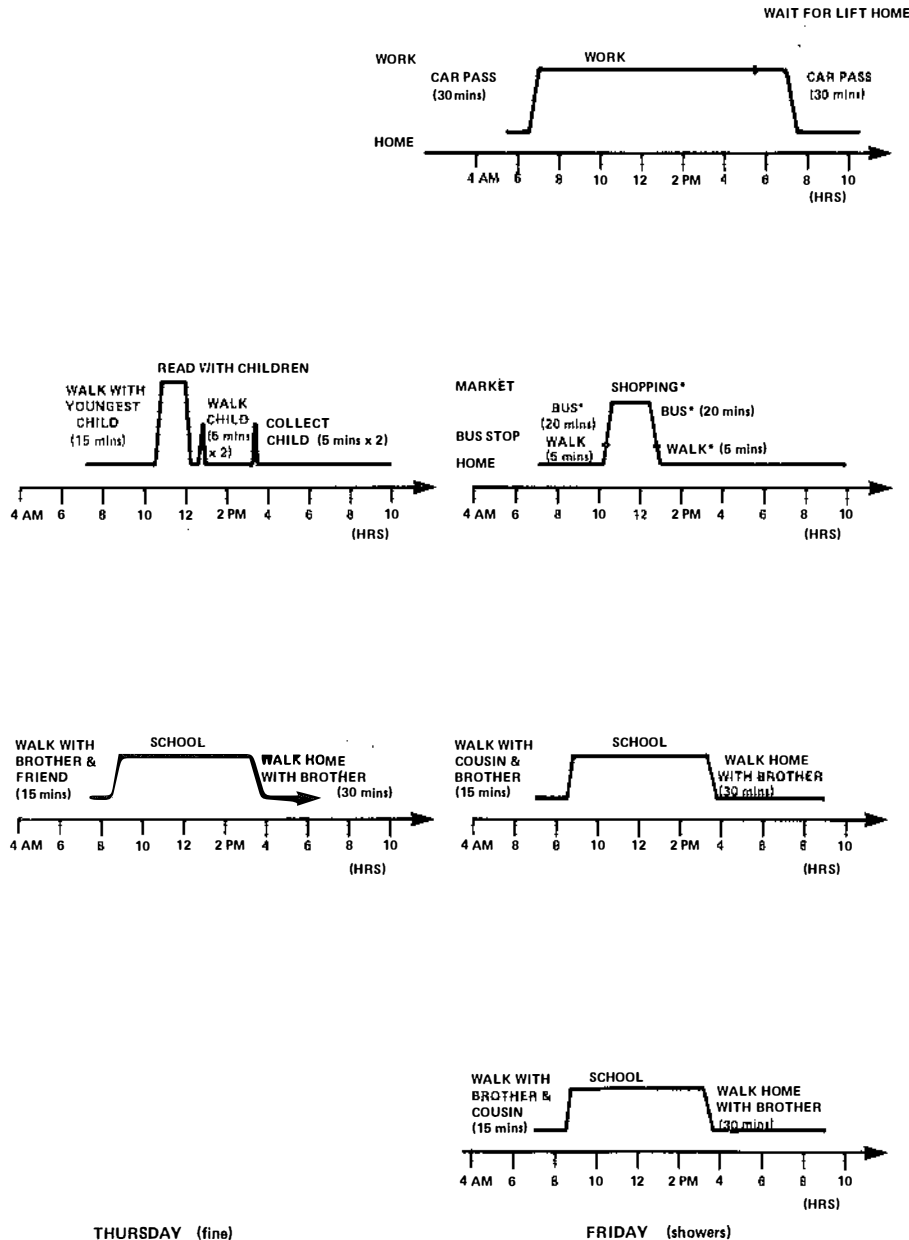


Fig. 3. Weekly activities of family of five with no cars [Continued]

