Sampling Processes for the National Travel Survey

Occasional Paper

This particular Paper describes the methods used to determine sample frameworks and sizes for the National Trend Survey (NTS), and also outlines the methods finally adopted for selecting a sample.

BUREAU OF TRANSPORT ECONOMICS

SAMPLING PROCESSES FOR

THE NATIONAL TRAVEL SURVEY

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CORRIGENDA

During preparation of this Occasional Paper,
a group of table headings was inadvertently
reproduced in an incorrect form. The following
corrections should be made:

(a)   On page 73, the words 'row' and 'column'
      should be interchanged in the fourth
      point;

(b)   In the table covering pages 74 to 84, the
      words 'origin' and 'destination' should be
      interchanged in the heading on each page.

FOREWORD

The BTE has been aware for some time that information
on non-urban passenger travel in Australia was inadequate, or
(in some cases) completely unavailable. Since much of the BTE's
work involves research in this part of the transport sector,
this inadequacy has led to considerable problems. These factors
led the BTE to consider carrying out a nation-wide survey of
non-urban passenger travel. The general aims of the survey
were to determine current travel levels, to obtain suitable
origin/destination flow data on a regional basis, and to collect
information on seasonal variations in this type of travel.
Subsidiary objectives included the establishment of a data base
for econometric models of travel as a supplement to other BTE
research work in this area.

The National Travel Survey (or NTS), as this
exercise was called, was planned mainly within the Transport
Resources Investigation Branch of the BTE. However, the
Transport Costs and Information Branch and the Economic Evaluation
Branch were also involved in the study. Various other
organisations (including the Australian Bureau of Statistics
and the Australian Tourism Commission) also provided valuable
assistance in the planning stages of the NTS.

Due to current restrictions on BTE resources, the
operational phase of the NTS has been deferred. However,
much of the planning work associated with this project is of
general interest and value even though the main value would,
of course, be in the final results. In view of this, the
BTE is producing a series of Occasional Papers describing the
more generally interesting planning and research work associated
with the NTS. This action serves two purposes. The first is
to continue the BTE's tradition of making its research activities
known as widely as possible, while the second is to ensure that
the NTS is properly documented if it proceeds to the operational
phase.

This particular Paper describes the methods used to determine sample frameworks and sizes for the NTS, and also outlines the methods finally adopted for selecting a sample.

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INTRODUCTION

As part of its continuing program of research into non-urban passenger transport in Australia, the BTE decided (in 1975) to carry out a large-scale survey of passenger movements throughout the country. This survey, which is described in more detail in another paper[1], is known as the National Travel Survey (NTS). The initial general aims of the NTS were to identify and measure various travel parameters for non-urban passenger travel within Australia, and to assess the relative importance of a fairly wide range of socio-economic and other factors in determining travel habits. While the form and scope of the NTS changed considerably as its planning progressed, certain of the more important objectives of this project remained unaltered. These were:

- Estimation[2] of general and specific generation levels for non-urban travel;

- Collection of adequate and reliable information on inter-regional travel; and

- Collection of information on seasonal variations in travel patterns and other travel parameters.

A fully national survey on the lines of the NTS clearly involves a very considerable amount of prior planning and research. It is the aim of the BTE to describe most of the facets of the planning and research activity related to the NTS in several Occasional Papers. This paper is a member of the series. The general objective of the series is to outline the techniques involved in carrying out this particular type of survey. The aim of this Occasional Paper is to describe the methods used in determining appropriate sample sizes for the NTS. A brief description of the actual procedure used in drawing a sample is also provided.

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(1) Bureau of Transport Economics, National Travel Survey - Objectives and Strategies, Occasional Paper, 1976 (to be published).

(2) Including assessments of variations in generation rates with mode, area (rural, major urban and so on), occupation and other allied social and economic factors.

In general, the sample size required for a survey depends on the degree of variability in the parameters to be estimated. For example, estimation of trip generation levels for a particular city or region would usually involve a considerably smaller sample than that which would be required to estimate the distribution of destinations of trips by inhabitants of the same area. In view of this, a sampling procedure involves a fairly strict assessment of the objectives of the survey, together with some prior knowledge of the relative magnitude of variations in specific parameters which are to be estimated. This latter point is, of course, the one which creates a number of problems. In a project such as the NTS, which has not been attempted in Australia before, it is very difficult to get an estimate in advance of the relative magnitudes of such things as the numbers of trips between an origin and particular destinations. Accordingly, it is necessary to carry out a considerable amount of background research to obtain these initial estimates. Equally, the overall geographic framework used to carry out an NTS must be integrated with the objectives of the survey and with such things as budgetary constraints, time factors and other existing zoning and statistical systems.

This Occasional Paper has been broadly divided into four parts, each dealing with a separate aspect of sampling for the NTS. The matters treated in these parts fall into the following categories:

- Selection of a suitable set of defined geographic regions, which would be adequate for the purposes of the NTS, and which would also fit reasonably well into existing regional and statistical frameworks in Australia;

- Establishment of a rationale for determining sample sizes, together with details of the relevant analytical background;

- Details of methods used to obtain preliminary
  estimates of likely parameter values, so that
  the sampling method could be applied to give
  a reasonable estimate of the sample sizes
  required for the NTS;

- Details of the method actually used to select
  households for the NTS sample.

Clearly, there is a fairly large degree of inter-
action between these aspects of the sample selection process.
However, this interaction has been largely ignored in this
Occasional Paper, since it would tend to confuse the analytical
background to sample determination and selection procedures.
While the interactive nature of sample design and selection
poses many problems in the background planning and research
phases of any survey, it is not necessarily an integral part
of the sampling procedures themselves. In view of this, it
was considered appropriate to omit details of this interaction,
which would in any case normally be solved along conventional
decision-making lines.

In addition, it should be noted that the sampling
process described in this paper has not been carried through
to the stage at which specific sample sizes for each region
could be stated. This is simply because it can be shown that
actual sample sizes ultimately depend on research priorities[1],
given a finite budget. Accordingly, the process of determining
final sample sizes reflects the degree to which trade-offs can
be made between competing interests within the overall survey
framework. At the time when this paper was written, the
consultation required to determine the appropriate trade-offs
had not been completed.

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(1) For example, with a particular total sample size (which is
     usually determined by budgetary constraints) it might be
     possible to obtain moderately accurate estimates of all
     interregional travel. However, an assessment of research
     priorities might make it more desirable to concentrate
     the sample in corridors or areas which are of greater
     short-term interest, and consequently increase the accuracy
     of estimates in these areas. This would then reduce the
     accuracy of estimates in some or all other areas, depend-
     ing on the philosophy adopted. Clearly, trade-offs such
     as this can not be resolved analytically, and sample
     design serves mainly to indicate the results of such
     manipulation.

REGIONAL FRAMEWORK

A fundamental precept of the NTS was that it should
provide realistic estimates of travel patterns on a regional
basis. At the planning stages, it was clear that the nature
of the system of regions defined for the project was an
important parameter in influencing the accuracy of the results.
Clearly, a small number of regions covering Australia would
provide highly accurate results for estimates of travel between
individual pairs of regions, but the regions themselves would
have to be so large as to be meaningless[1]. On the other
hand, a system involving a large number of regions would adequate-
ly cover socio-economic and geographical variations throughout
the nation, but would require very large samples to obtain
acceptably accurate estimates of interregional travel.

Preliminary analysis of this problem showed that
about 50 regions would be the absolute minimum number required
to cover Australia on a reasonably rational basis. At the other
end of the scale, a regional system comprising more than 100
regions would quickly increase required sample sizes to the
point at which the task would outstrip the resources available
for the project.

In the event, the BTE investigated existing regional
systems, and decided that the Australian Government Regions
(AGR's)[2] formed a sound base from which suitable regions for
the NTS could be derived. Nevertheless, even this well-
researched system of regional boundaries left something to be
desired from the viewpoint of the NTS. In particular, the AGR's
were unsuitable for the following reasons:

> The regional boundaries had not been completely
> finalised;

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(1) At least in terms of common social, industrial and
     commercial interests, which are frequently used as bases
     for defining regions.

(2) These regions had been formulated by the (then) Department
     of Urban and Regional Development, and had gained wide
     acceptance among Federal and State authorities. They are
     described in: Department of Urban and Regional Development,
     Australian Government Regional Boundaries, AGPS, Canberra
     1975.

- The State capital cities (except Brisbane and Hobart) consisted of several regions, whereas it would have been more appropriate to consider each capital city as one region for the NTS;

- Some of the regions (particularly those in Western Australia) were not closely comparable to the remainder in terms of general trip generation and attraction parameters;

- Some regions had unusual geographic shapes which would have inhibited their use for the NTS[1];

- Brisbane was aggregated with a large surrounding area to form one region (this was also the case with Hobart, but the Tasmanian situation was regarded as rather less serious for a variety of reasons);

- The ACT and the Northern Territory were not included in the system.

The BTE then examined each AGR to determine whether it could be used directly for the NTS, or whether some amalgamation or division was desirable. This process was carried out in as critical a fashion as possible, since it was strongly felt that a complete divergence from existing frameworks was highly undesirable. On the other hand, there was a clear requirement to develop a suitable transport framework, whereas some of the existing systems were based on many factors, and were therefore not entirely suitable in the context of a transport study.

In the event, 64 regions[2] were ultimately defined. Of these, 43 were identical in all respects to existing AGR's. Of the remaining 21 NTS regions, 17 were formed by amalgamating

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(1) This problem was never fully resolved, but the revised regions at least overcame such gross problems as those caused by having one region completely contained within another.

(2) Referred to as NTS regions.

or dividing AGR's (of which there were originally 76), while
the last 4 related to the ACT, the NT and northern South
Australia, which were not included in the AGR's. Where regions
were amalgamated, this was invariably carried out by joining
two or more complete AGR's to form one NTS region. On the
other hand, where an AGR was divided into a number of NTS
regions, the divisions were always made along Local Government
Area (LGA) boundaries. In this way, the value of the existing
regional system was preserved as far as possible, while the
specific requirements of the NTS with regard to regional
definition were met.

Details of the NTS regions are given in Appendix I.

SAMPLING THEORY

The fundamental concepts of the NTS included the necessity to derive sample sizes for estimating various parameters of non-urban passenger travel. From the sampling viewpoint, it would be fairly obvious, intuitively, that the sample size required to estimate the value of a certain characteristic[1] to a specific degree of accuracy would vary inversely with the frequency with which the characteristic appeared in the population. As an example, it would clearly require a larger sample to obtain a reasonably accurate estimation of a characteristic which appeared in 1% of the population than it would to obtain a similarly accurate estimate of a characteristic appearing in 50% of the population. In the first case, a small sample could quite easily result in literally no record of the characteristic whatsoever, whereas in the second case, even a small sample would almost certainly include enough observations of the characteristic to make at least some estimate of its value.

This, then, is the qualitative base for a sampling theory for the NTS. However, actual sizes of the samples required to give estimates of any particular accuracy for specific characteristics could only be derived by rather complex analytical processes. Since the exact details of these processes would vary somewhat with the characteristics to which they might be applied, it was necessary to form some preconceptions of those characteristics which would be primary determinants of sample size. Fortunately, this was not difficult. It was quite clear that travel patterns (that is, the distribution of trips from each region to every other region) would yield the greatest degree of dispersion in potential values, and hence the sample size would be effectively determined[2] by the requirements for accuracy in estimating

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(1)   'Characteristics' in this context could include such things as proportions of trips between 200 and 400 km in length, proportions of trips made by air, and so on.

(2)   Although it should be noted that tradeoffs between the accuracy of trips from various regions (as mentioned previously) could affect this situation. However, that possibility has not been treated in this paper.

these patterns. Accordingly, the remainder of this section is written in terms of the sample sizes required to measure travel patterns with various degrees of accuracy.

The first stage in this process is to establish the required relationship[1] for the total population of trips for a particular region:

$$p_{ij} = \frac{N_{ij}}{N_i} \qquad (1)$$

where p_{ij} is the proportion of all trips from region i which end in region j,

N_{ij} is the number of trips from region i to region j,

and $N_i = \sum\limits_{j} N_{ij}$ is the total number of trips from region i.

If a random sample of trips from region i is taken, it is possible to derive an estimate of the proportion of all trips from that region which end in region j:

$$\hat{p}_{ij} = \frac{n_{ij}}{n_i} \qquad (2)$$

where $\hat{p}_{ij}$ is the estimate of p_{ij},

n_{ij} is the number of trips recorded in the sample which end in region j,

and $n_i = \sum\limits_{j} n_{ij}$ is the sample size (in trips) for region i.

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(1) In assessing the distribution of trips from a particular region, it is usual to deal with fractional distributions rather than actual numbers. This practice has been followed here.

The relative error in the estimated value of p_{ij} may be defined as follows:

$$r = \frac{(\hat{p}_{ij} - p_{ij})}{p_{ij}} \tag{3}$$

where r is the relative error.

The requirement is, therefore, to find a value of n_i which is such that the absolute value of r does not exceed a predetermined limit (R, say) with a probability equal to an appropriate value (Q, say). Alternatively, this proposition may be expressed formally as:

$$\text{Find } n_i \text{ so that } Pr(-R \leq r \leq R) = Q \tag{4}$$

The population of trips for region i is a binomial population[1]. Accordingly, if the sample is chosen with replacement, the mean and variance of the sampling distribution[2] for p_{ij} will be

$$E(\hat{p}_{ij}) = p_{ij} \tag{5}$$

$$\text{Var } (\hat{p}_{ij}) = \frac{f\, p_{ij}\,(1 - p_{ij})}{n_i} \tag{6}$$

where $E(\hat{p}_{ij})$ is the expected value of $\hat{p}_{ij}$,
Var $(\hat{p}_{ij})$ is the variance,

and $f = \dfrac{N_i - n_i}{N_i - 1}$ is a finite population correction factor.

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(1) Each trip from region i may have the characteristic of ending in region j, or it may not; there are no other possibilities.

(2) A more complete treatment may be found in standard reference texts, e.g. Taro Yamane, Statistics – An Introductory Analysis, Harper and Row, New York, 1967.

The finite population correction factor (f)[1] only becomes significant if n_i is relatively large compared to N_i. This is not usually the case for surveys such as the NTS, and it is safe to use the following approximation:

$$Var(\hat{p}_{ij}) = \frac{p_{ij}(1 - p_{ij})}{n_i} \tag{7}$$

The sampling distribution approaches a normal distribution if n_i is relatively large. While the validity of this approximation depends on a number of factors, it is usual to regard the distribution as normal if $n_i \geqslant 25$. That would certainly be the usual case in the NTS, so that this assumption may be regarded as valid. Accordingly, the sample size requirements may be based on a normally distributed sample proportion.

Basically, the problem of determining the relationship between sample sizes and errors can then be resolved by a simple application of a two-tail test. It is clear that the variable:

$$z = \frac{(\hat{p}_{ij} - p_{ij})}{(Var(\hat{p}_{ij}))^{\frac{1}{2}}} \tag{8}$$

is normally distributed with mean 0 and variance 1. Equally, manipulation of this result yields:

$$z = \frac{(\hat{p}_{ij} - p_{ij})}{p_{ij}} \qquad \frac{p_{ij}}{(Var(\hat{p}_{ij}))^{\frac{1}{2}}} \tag{9}$$

which is also normally distributed with mean 0 and variance 1 (for $p_{ij} \neq 0$). Since:

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(1) The finite population correction factor corrects the variance of the sampling distribution as the sample size approaches the population size. In the NTS, sample proportions would not exceed 5% of the population, so this factor can be disregarded with little error.

$$r = \frac{(\hat{p}_{ij} - p_{ij})}{p_{ij}} \quad \text{(from Equation (3))} \tag{10}$$

it follows that

$$z = \frac{r \, p_{ij}}{(\text{Var}(\hat{p}_{ij}))^{\frac{1}{2}}} \tag{11}$$

is also normally distributed with mean 0 and variance 1. By substituting the value of $\text{Var}(\hat{p}_{ij})$ from Equation (7), the variate (z) derived in Equation (11) may be converted to:

$$z^2 = \frac{r^2 \, p_{ij} \, n_i}{(1 - p_{ij})} \tag{12}$$

In terms of sample size, Equation (12) may be rewritten as follows:

$$n_i = \frac{z_a^2 \, (1 - p_{ij})}{R^2 \, p_{ij}} \tag{13}$$

where Z_a is the value of the normal variate z which yields probability a to the proposition that $r \leqslant R$,

$$a = \frac{1 + Q}{2}$$

and R is the predetermined value of the relative error.

The relationship between sample size (n_i), relative error (R) and proportion of trips (p_{ij}) is given in Table 1 for a range of values of the latter two variables, with Q = 0.950. This relationship is also plotted as a family of continuous curves for different values of p_{ij} in Figure 1.
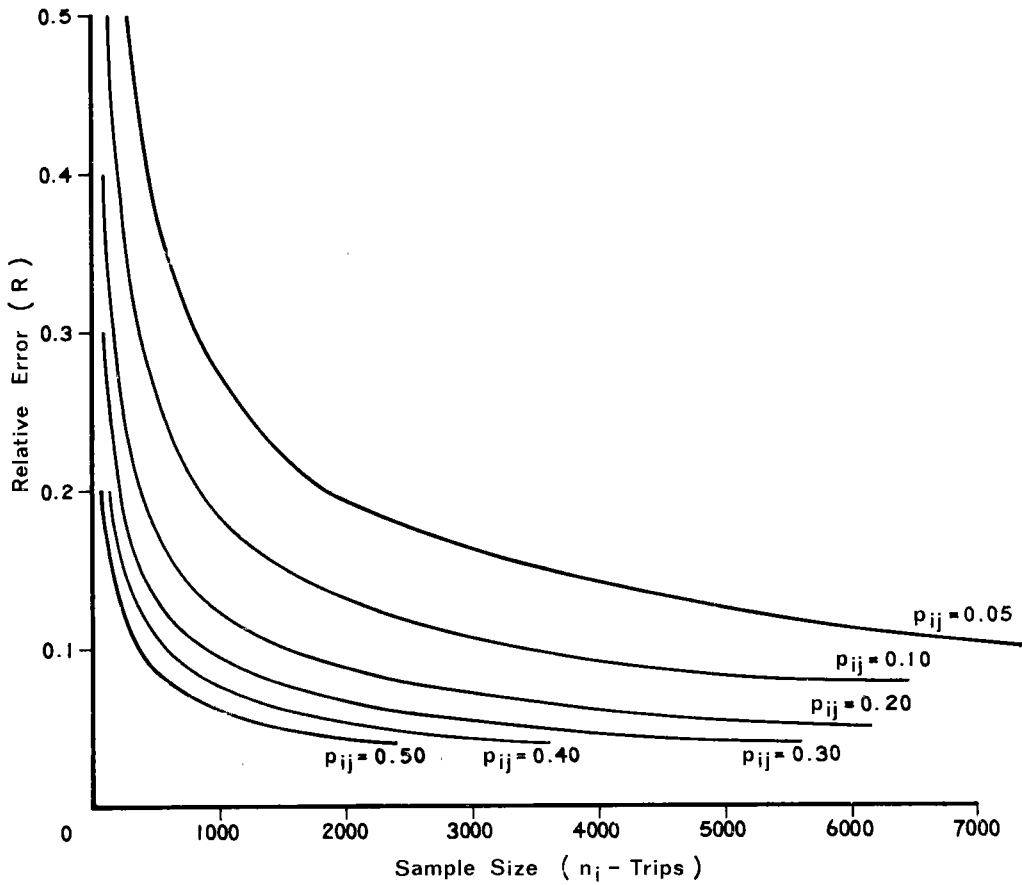
Figure 1
Relationship between Relative Error
and Sample Size
(Probability , Q = 0.95)

TABLE 1 - SAMPLE SIZE AS A FUNCTION OF RELATIVE ERROR
        AND TRIP PROPORTION (WITH Q = 0.950)

Trip Proportion (p_{ij})	Sample Size (n_i) for specified values of R					
	0.05	0.10	0.20	0.30	0.40	0.50
0.05	29,119	7,300	1,825	811	456	292
0.10	13,831	3,458	864	384	204	138
0.20	6,147	1,537	384	171	86	62
0.30	3,586	897	224	100	56	36
0.40	2,305	576	144	64	36	23
0.50	1,537	384	96	43	24	15

While the foregoing analysis sets out the basic
theory behind sample design for the NTS, it is clear that a
good deal of additional information is required before this
theory can be applied in particular sets of circumstances.
In particular, a rational approach to sample size determination
requires the following additional information:

- Estimates of the number of trips which might
  be expected from a particular sample based on
  some other fundamental sampling unit (in this
  case, households);

- Estimates of the likely response rates for
  the NTS;

- Estimates of the range of values of trip
  proportions (p_{ij}) which might be encountered
  for corridors or areas of particular interest
  in the context of NTS objectives.

Details of the way in which this additional
information was obtained and used are given in the following
sections.

SAMPLE SIZE DETERMINATION

The theoretical basis for determining sample sizes for the NTS has been described in some detail in the previous section. However, this basis has only been set out in notional terms, and two major questions remain before actual regional sample sizes can be proposed. These questions are:

. What sample size, in terms of trips, would satisfy the BTE (and other) objectives in relation to travel from particular regions?

. What are the implications of these regional samples, in terms of trips, for distribution of NTS questionnaires to basic sampling units (in this case households)?

It has already been shown that the sample of trips required for a particular region depends on the distribution of trips from that region to other regions, for a given predetermined level of accuracy. In view of this, it is clear that a reasonable estimate of these proportions must be derived before decisions on sample sizes for particular regions can be made. In some ways, this is an example of a truly differential process, since a major objective of the NTS was to obtain such information, yet the NTS could not be properly planned in advance of the information. The BTE therefore set out to find methods by which preliminary (and approximate) values could be assigned to the required proportions. Essentially, there were two possibilities:

. The usual approach of conducting a pilot
survey to obtain approximate values for
the required parameters;

. An analytical appraisal of existing
information to determine an appropriate
model for interregional travel.

The first possibility was quickly discounted. A
brief glance at the previous section (and particularly at
Table 1) would demonstrate that a pilot survey would have to
be nearly as big as the NTS itself[1] before trip proportion
estimates of even the most modest accuracy could be obtained.
This problem is built in to surveys such as the NTS, since
the nature of the sample proportion distribution (Equation
(11), among others) is such that reasonable accuracy cannot
be expected for samples of the size encountered in pilot
surveys. Accordingly, the BTE conducted extensive research
into the availability of models of interregional trip
distribution in Australia.

The end result of this research was that there
was no model available to cover non-urban passenger travel
in Australia, although several models had been developed to
cover medium-distance travel within particular parts of the
country. The BTE decided, therefore, to develop its own
trip distribution model specifically aimed at estimating

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(1) Although there are, of course, other valid reasons for
    conducting a pilot survey, and one was, in fact, carried
    out for the NTS.

sample requirements for the NTS. Fortunately, a suitable recent set of data for such a model had been generated through the Survey of Australian Travel[1], which was carried out by the Australian Travel Research Conference (ATRC) in 1973/74. Essentially, the object of the BTE exercise was to develop a basic 'gravity' model of inter-regional travel which could be used to estimate trip distributions for each NTS region. There were considerable difficulties associated with this, and the way in which the gravity model was ultimately generated is described in some detail in Appendix II.

The next stage in the process was to apply the gravity model to the NTS regions (described in Appendix I). A table of the distance between each pair of NTS regions was constructed as a first step, and this interregional distance matrix is reproduced in Appendix III[2]. These distances were then inserted (together with the population figures from Appendix I) in the gravity model, and estimated distributions of trips from each region to all other regions were obtained. The distributions were converted to fractional terms, so that the total travel from a particular region had the value 1.000, with the travel from that region to any other region being described by a decimal fraction between 0 and 1 (although values for particular destination regions

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(1) Australian Travel Research Conference, Survey of Australian Travel 1973/74, Canberra, 1974.

(2) It should be noted that this distance matrix is different from that shown in Appendix II. The matrix in Appendix II relates to modified ATRC regions, and is not as comprehensive as the matrix for the NTS regions, which were, in any case, defined on a different basis.

never approached 1, and only occasionally exceeded 0.300).
The total estimated trip distribution matrix for the NTS
regions is reproduced in Appendix IV.

The estimated values given in Appendix IV were
then applied directly to provide estimates of the sample
sizes (in trips) required for particular levels of accuracy
in estimating the distribution of trips from each region to
every other region. From a presentational point of view, it
was regarded as desirable to treat each region in isolation,
so that the effects of specifying a particular sample size
for a region could be assessed. In view of this, the
following steps were taken:

.   The fractional distribution of trips from
    each region was ordered by the magnitude of
    the proportion of trips to each other
    region[1];

.   The sample sizes (in trips) required to
    obtain specified accuracy levels were
    calculated for each destination region.

The accuracy levels treated were related to
relative errors of 0.10, 0.20 and 0.50, with a probability
(Q) of 0.950. It would be impractical to reproduce the
entire set of tables in this paper, since there is one such
table for each region (that is, 64 in all). However, the
tables relating to the regions for the six State capitals,
and those for the ACT, Newcastle, Wollongong and Geelong

(1) So that the region attracting most trips from the
     origin region would appear first in the list, and
     so on.

are given in Appendix V. It should be emphasised that the
sample sizes given in Appendix V reflect numbers of <u>trips</u>
in the sample for given accuracy levels. Since the NTS
sample was intended to be based on households, suitable
conversion factors had to be calculated before actual
household numbers in the regional samples could be
determined.

Notionally, there are two major aspects of the
process involved in converting a sample expressed in trips
to one expressed in questionnaires distributed to households.
These are:

. Each questionnaire distributed would not
  necessarily be returned - in fact, a postal
  questionnaire of the type envisaged for the
  NTS would normally attract a relatively low
  response;

. Each questionnaire <u>returned</u> would normally
  recount details of several trips.

The general nature of this problem can be expressed
in analytical terms as follows:

$$n_i = h_i \, v_i \, q_i \qquad\qquad (14)$$

where n_i is the sample size (in trips) for region
         i, as before,

         h_i is the number of trips per household for
         region i within the appropriate time-frame,

         v_i is the response rate (on a household basis)
         for region i,

and q_i is the number of questionnaires distributed
in region i.

Alternatively, Equation (14) may be written in
terms of the number of questionnaires to be distributed in
a particular region in order to obtain an effective[1]
sample of n_i trips for that region:

$$q_i = \frac{n_i}{h_i \ v_i} \qquad (15)$$

In the absence of consistent information on the
subject, it was particularly difficult to assign values to
the sampling parameters h_i and v_i. The Survey of Australian
Travel[2] suggested that there were 26 million person-trips
involving an overnight stay in 1973/74. However, it was
the BTE's view that this figure was a considerable under-
estimate, especially in view of the fact that it included
a substantial proportion of intraregional trips. In line
with the NTS trip definition (essentially any round trip
involving travel to a point at least 150 km from home) it
was estimated that there would be approximately 4.5 acceptable
trips per person per annum. This figure could only be regarded
as a very rough estimate, but it was thought to be adequate
for sampling purposes[3]. The average number of people per
household was much more precisely known, and the value[4]

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(1) This paper does not deal with the question of bias in
     the NTS results due to non-response. This problem
     would be treated in the usual fashion - that is, to
     interview a relatively small sample of non-respondents,
     and to apply appropriate adjustments to the overall
     results.

(2) Australian Travel Research Conference, op. cit.

(3) In fact, the pilot survey for the NTS would suggest that
     the figure of 4.5 trips per person per annum was rather
     low. However, work on analysis of the results of the
     pilot survey has not yet been completed.

(4) From Australian Bureau of Statistics reports.

of 3.8 was used for this parameter. As a result, the value of h_i was set at 17.1 trips per household per annum.

Again, the anticipated response rate for the NTS was the subject of considerable speculation. On the basis of past BTE surveys, and taking into account experience with other surveys of a similar nature to the NTS, it was expected that the response rate would be unlikely to exceed 0.50. The pilot survey yielded an actual response rate of 0.32. However this figure did not reflect the full potential response to the NTS, since it included only limited experimentation with methods of improving the response. If the 'best' methods of improving the response suggested by the pilot were adopted, it would be reasonable to expect a response rate of 0.40. This value of v_i was used in planning the NTS.

Although both h_i and v_i have been annotated in this paper as if they varied from region to region, the crude methods by which values were attached to them clearly make any regional differentiation impossible. While it is well known that trip generation varies from region to region, it was not possible to come up with appropriate values for each region. Equally, response rates vary considerably, but the exact nature of this variation in specific circumstances could not be identified satisfactorily in advance of the actual survey.

The implications of these results were that each questionnaire distributed could, on average, be reasonably expected to result in a record of 6.84 trips if details were given for a full year. However, the questionnaire only asked details of trips ending in a particular month. Although the

average number of trips per month would vary considerably
through the year, insufficient information was available to
warrant any assumption other than that the trips would be
uniformly distributed over time. Accordingly, each
questionnaire distributed could be expected to provide
information on 0.57 trips ending in a particular month.

An important point to note in regard to selecting
the sample size is that the same sample size[1] is required
to estimate a monthly trip distribution as to estimate a
distribution for a full year (or for any other period, for
that matter), if comparable accuracy is required. Conversely,
aggregation of monthly estimates over a full year would give
an annual estimate considerably more accurate[2] than the
individual monthly ones. The NTS was originally intended to
provide 'acceptable' monthly estimates of trip distributions,
and 'very good' annual estimates[3].

A further point is that the regional sample size
does <u>not</u> depend in any way on the population of the region.
It depends solely on the trip distribution from the region
and on the parameters specified for limiting sampling errors.
Therefore, a region such as Sydney might not require any

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(1) This is actually an approximation. The population of
     trips for a given region is smaller on a monthly basis
     than it is on a yearly basis. Hence the finite population
     correction factor (f in Equation (6)) would change. This
     is a second-order effect and has been ignored here.

(2) From Equation (13), it can be seen that a square-root
     relationship holds in this case. Effectively, the sample
     for an annual estimate is 12 times greater than the
     individual samples for each month (assuming the monthly
     samples are equal). If everything else is equal the
     relative error (r) for the annual estimate would be $12^{-\frac{1}{2}}$
     or 0.29 times the monthly value of r. Similarly, quarterly
     estimates would have relative errors cf 0.58 times
     their component monthly estimates.

(3) 'Acceptable' would broadly mean r = 0.50 with Q = 0.950
     for important corridors; 'very good' would mean r = 0.10
     for the same corridors.

greater sample than, say, the ACT, although there is a
ratio of about 17 to 1 in their respective populations. The
fact is that so-called 'fractional' or 'percentage' samples
have absolutely no place in the NTS. A further implication
is that major corridors (e.g. Sydney-Melbourne) can be
assessed with quite high accuracy by samples relatively
much smaller than might be suggested by their contributions
to Australia's population. This further helps the trade-off
between coverage and accuracy.

It has already been noted that final sample sizes
for each NTS region have not yet been determined. However,
it is of some value to explore the process a little further.
In Table 2, the six State capital regions are shown, together
with the regions surrounding the other major centres described
in Appendix V (that is, the ACT, Newcastle, Wollongong and
Geelong). For each of these regions, Table 2 shows the major
corridor associated with the region, together with the sample
sizes required to give a relative error of 0.50 (with $Q = 0.950$)
to estimates of the proportion of travel between that region
and the region at the end of the corridor[1]. The entry for
each region also shows other destination regions which would
then have relative errors less than 0.50 for the given sample
size. Although they certainly could not be regarded as
definitive, the figures given would form a fairly concrete
basis for selecting monthly samples for the NTS. Since the
annual estimates of travel between an origin region and another
region have been shown to have relative errors of 0.29 times
the errors in the monthly estimates, each of the nominated
monthly sample sizes should lead to relative errors of about
0.15 if carried through for the whole year.

(1) These figures are, of course, based on the sampling
     procedures outlined previously, complete with the
     inherent assumptions relating to accuracy of the trip
     distribution model and so on.

Although the final sample sizes have not been
determined, it is possible to describe the processes involved
in drawing a suitable random sample for the NTS. Details
of these processes are given in the next section.

TABLE 2 - POSSIBLE MONTHLY SAMPLES FOR SELECTED REGIONS

Region	Corridor	Monthly Sample[a]	Questionnaires Distributed[b]	Other Region Covered[c]
ACT	ACT-Sydney	38	67	None[d]
Sydney	Sydney-Melbourne	322	565	ACT Bathurst Wollongong Newcastle Gosford
Wollongong	Wollongong-Sydney	11	19	None[d]
Newcastle	Newcastle-Sydney	12	21	None[d]
Melbourne	Melbourne-Sydney	295	518	Shepparton Bendigo Ballarat Moe Geelong
Geelong	Geelong-Melbourne	6	11	None[d]
Brisbane	Brisbane-Sydney	219	384	Gold Coast Lismore
Adelaide	Adelaide-Melbourne	160	281	Murray Bridg
Perth	Perth-Melbourne	420	737	Geraldton Albany Bunbury Northam
Hobart	Hobart-Sydney	236	414	Burnie Launceston Melbourne

(a) Expressed as the effective sample required (in trips) to
     obtain a relative error of 0.50 (Q = 0.950) for travel
     between the region and the destination region for the
     corridor on a monthly basis.

(b) Questionnaires distributed (one to a household) to obtain the
     required sample of trips on the basis of generation and re-
     sponse rates derived in the text. It should be noted that
     some of the smaller samples would be increased for other
     reasons.

(c) Other destination regions which would be covered with a
     relative error less than 0.50 (Q = 0.950) if the
     nominated sample size was used, listed in order of
     reducing relative error.

(d) No other destination regions would be covered with a
     relative error less than 0.50 (Q = 0.950).

SAMPLE SELECTION

The preceding sections of this paper have given
details of the processes by which sample size requirements
for the NTS were derived. However, the paper would not
be complete without at least some examination of the way
in which actual sample selection was to be performed.
Although determination of appropriate sample sizes for the
NTS was a relatively difficult task in itself, even greater
difficulty was experienced in choosing an appropriate source
from which particular households could be chosen. In
selecting such a source, the following attributes had to be
considered:

- The sample was to be selected on a
  household basis, and ideally the source
  of the sample would have been structured
  on this basis;

- Fully national coverage was required, so
  that the source of the sample had to be
  comprehensive in its geographical
  coverage;

- It would have been impractical to undertake
  normal[1] sampling processes, since the cost
  of carrying out these processes on a national
  scale would have been prohibitive.

(1)   Such as structured selection and 'blocking' of Census
      Collector Districts (CCD's).

The BTE investigated a variety of data sources from which to sample. Although no one source satisfied all these requirements the Federal electoral rolls were considered to be the most suitable source for the sample. The BTE therefore decided to use the electoral rolls and proceeded to develop techniques for selecting a sample from this source.

Fundamentally, the electoral rolls are not an ideal source of samples. Among other things, they suffer from the following deficiencies in this regard:

. Electoral rolls are based on names, not addresses - it is therefore necessary to perform considerable data manipulation to obtain a list of addresses;

. Only registered electors are recorded on the rolls, and such groups as unnaturalised migrants are excluded;

. The rolls are not completely up-to-date for the purposes of the survey at any particular time;

. Electoral divisions and subdivisions do not necessarily aggregate to appropriate NTS regions, so that sampling procedures become rather difficult.

Despite these objections, the electoral rolls were among the few possible sources of a national sample. The major statistical problem was that households other

than those containing registered voters were excluded.
Even this was not considered a great problem[1], and it
was estimated that the rolls would exclude only 3% or 4%
of addresses. In view of the lack of an acceptable
alternative, this error was not considered major. Equally,
the objections to the electoral rolls on the basis of
their not being up-to-date for the purposes of NTS were
reduced somewhat by enrolments resulting from the
announcement of the December 1975 elections. Accordingly,
the BTE judged that the electoral rolls were the most
appropriate sample source on the basis of coverage, accuracy
and convenience, despite minor reservations[2] about the
statistical validity of the source. However, use of the
rolls did involve a fairly considerable data manipulation
effort which is described below.

The first major precept of the BTE's philosophy
in using the electoral rolls was that they should be used
as a list of addresses, not names. The preliminary
processing of the rolls therefore involved generating[3] a
list of addresses from the list of names contained in the
rolls. Two major considerations dictated the general form
of the processing technique. The first of these was that
the only common point between the NTS regions and electoral

(1) At the 1972 House of Representatives election, 7,073,930
     electors were enrolled, out of a total of 7,884,724
     persons in Australia in the appropriate age group. Thus,
     89% of all people in the voting age group were enrolled.
     The error would have been considerably less on a household
     basis, since the presence of even one elector in a
     household would have caused that household's address to
     appear in the rolls.

(2) These reservations do not, of course, cast any doubt on
     the validity of Australian Electoral Office procedures.
     The electoral rolls are not designed as a sample source.

(3) At the time when this paper was prepared, the actual
     sample selection process had not been completed. However,
     the processing techniques had been tested and finalised,
     and the selection procedure is described as if it had
     been completed.

divisions was at the State level. Therefore, the processing technique had to involve aggregation of addresses to form full State lists, which could then be broken down on the basis of NTS regions. The second consideration was that the sampling fractions (or 'skip intervals') for each region could not be determined until the total number of addresses in the region had been found. This meant that options for great reductions in the data treated in the early stages of the process were rather severely curtailed. In the event, the sample was selected by a process broadly along the following lines:

. The personal records for an electoral division (ED) were sorted into address order[1];

. The sorted personal records were then examined to determine a list of addresses. This was done by progressively checking each record against the previous record to see if it had the same address[2];

. Personal records relating to each fifth[3] address were then accumulated into a state file, together with appropriate regional and other coding information;

(1)   Since the aim of this phase was to place records with the same address next to each other, no particular effort was made to come up with an otherwise meaningful list. Accordingly, the sorting process was applied to the entire address field, even though this resulted in a file which was organised in a very unusual manner.

(2)   Quite clearly, this process was subject to some error, since the check was on the entire address field, and even one character out of place would have resulted in failure. In the event, tests indicated an error rate of about 1%, which was considered acceptable. In particular, this rate would not lead to any significant probability of embarrassment through sending multiple forms to a household.

(3)   This was a reflection of the desire to reduce subsequent processing to a minimum, subject to the constraint that sufficient addresses had to be available after the first phase to meet predicted sample sizes. The one-in-five selection in the first phase was adopted as a compromise between these factors.

.   A file of information on the numbers of
      addresses encountered in each region was
      updated for use in subsequent processing;

.   The address counts for each region were
      related to regional sample sizes to determine
      appropriate skip intervals for final sample
      selection;

.   Each accumulated State file was processed and
      a new address file, based on the predetermined
      skip intervals for each region, was generated.

The final address file contained the sample, in
a more-or-less disorganised fashion. However, the sample
contained in the file was that for a whole year. This file
required subdivision into separate monthly files (set up on
a random basis). Similarly, postal charge schedules dictated
that the economics of distribution would be improved if the
addresses were ordered in a particular fashion. Although
this processing stage had not been reached at the time at
which this paper was written, no particular problems would
be expected in carrying out these tasks.

Broad details of the sample selection process are
shown in Figure 2.
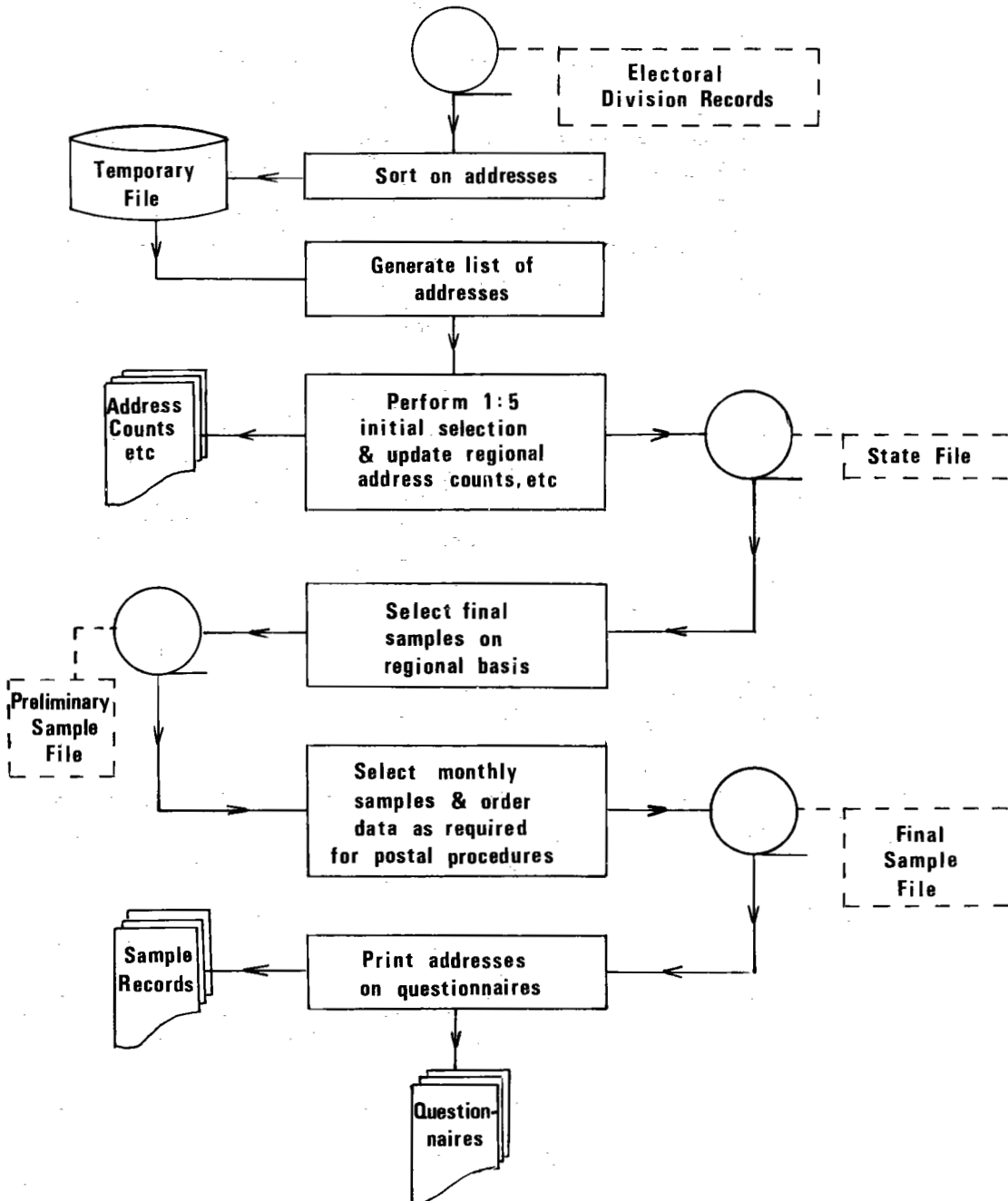
FIGURE 2. FLOW-CHART OF SAMPLE SELECTION PROCESS

CONCLUDING REMARKS

The accuracy and value of the results of any survey depend heavily on the care taken in determining and selecting samples for the survey. In the case of a survey like the NTS, the nature of the results desired is such that sample size determination is perhaps the most troublesome part of the overall survey design process. Equally, the requirement for full national coverage brings its own problems in determining suitable sources from which a sample might be selected. In view of these factors, the BTE considered that the processes used for determining and selecting samples for the NTS warranted fairly complete description, since they could have general application to other surveys of the same broad type.

In this paper, comprehensive details of these processes have been presented. Since the paper is mostly descriptive, it is not really possible to draw conclusions as such. However, the analysis presented does, in fact, show that it is possible to conduct a survey such as the NTS with relatively limited resources, but that considerable attention must be given to the interaction between parameters of the survey design process if this is to be achieved. It is difficult to over-emphasise this point. Although this paper has largely treated sample design in isolation from the other factors influencing the design of the NTS, it is quite clear that there is an extensive interface between these aspects.

Although the major aim of the paper was to outline the sample design process, it also proved to be a suitable vehicle for describing some of the peripheral work associated with this process. Included in this work were such 'sub-studies' as determination of the gravity model for domestic non-urban passenger travel and establishment of an appropriate system of regions. These aspects could well be of value outside the framework of NTS sample design, even though they were originally set up within that framework.

Finally, the processes described in this paper
were the end result of a considerable amount of research
and assessment. Many options were available when the BTE
originally set out on its work program for the NTS, and
reduction of the options clearly required a substantial
effort. While it would be unreasonable to state that the
approach ultimately adopted was the ideal one, it is regarded
as an acceptable and economical answer to a particularly
complex problem.

APPENDIX I

NATIONAL TRAVEL SURVEY REGIONS

This Appendix gives details of the NTS regions. There are 64 NTS regions, and they are described in broad terms in Table I.1. Each entry in Table I.1 describes one NTS region, and gives the following particulars for that region:

. The State or Territory in which the region is located;

. The name of the region, which is in most cases the name of the largest population centre within the region[1];

. An abbreviation of the region name;

. The region number, based on a State or Territory number together with a region number within that State or Territory;

. Population of the region[2];

. Co-ordinates of the approximate population centroid of the region[3], as estimated by the BTE.

The State or Territory coding system used in deriving region numbers was as follows:

State or Territory	Code
Australian Capital Territory	1
New South Wales	2
Victoria	3
Queensland	4
South Australia	5
Western Australia	6
Tasmania	7
Northern Territory	8

The locations and boundaries of the NTS regions are shown in Figures I.1 to I.7.

(1) The Australian Government Regions on which the NTS regions were based were usually described in terms of traditional area names such as 'Southern Hills'. However, this system was regarded as unsatisfactory for the present purposes, and the alternative of naming regions after the largest population centres in them was adopted for the NTS.

(2) Based on Australian Bureau of Statistics (ABS) figures for populations in Local Government Areas at 30 June, 1974, as given in various ABS State Office publications.

(3) The latitude and longitude of each regional centroid are given in degrees and decimal degrees.

TABLE I.1 - DETAILS OF NTS REGIONS

State or Territory	Region Name	Abbreviation	Region Number	Population	Co-ordinates of Centroid Latitude	Longitude
ACT	Australian Capital Territory	ACT	101	168,600	35.25°S	149.25°E
NSW	Lismore	LISMRE	201	99,130	28.67°S	153.08°E
	Armidale	ARMDLE	202	165,910	30.10°S	150.75°E
	Dubbo	DUBBO	203	98,010	30.75°S	148.00°E
	Broken Hill	BRKNHL	204	31,230	31.67°S	142.25°E
	Deniliquin	DENLQN	205	52,310	35.50°S	147.33°E
	Albury	ALBURY	206	35,730	35.00°S	144.00°E
	Wagga	WAGGA	207	131,550	34.67°S	147.42°E
	Bathurst	BATHST	208	151,930	33.50°S	149.33°E
	Goulburn	GOULBN	209	78,560	35.00°S	149.17°E
	Cooma	COOMA	210	42,060	36.33°S	149.50°E
	Newcastle	NEWCTL	211	414,030	32.67°S	150.90°E
	Gosford	GOSFRD	212	103,670	33.40°S	151.50°E
	Wollongong	WLNGNG	213	261,930	34.75°S	150.80°E
	Sydney	SYDNEY	214	2,940,670	33.75°S	151.00°E
	Grafton	GRAFTN	215	62,940	31.50°S	153.75°E
	Taree	TAREE	216	67,290	29.80°S	153.25°E
Victoria	Geelong	GEELNG	301	173,650	38.25°S	144.20°E
	Warrnambool	WRNMBL	302	93,870	38.25°S	142.50°E
	Ballarat	BALLRT	303	99,180	37.50°S	143.75°E
	Horsham	HORSHM	304	52,330	36.60°S	142.40°E
	Mildura	MILDRA	305	66,790	34.80°S	143.00°E
	Bendigo	BENDGO	306	124,030	36.60°S	144.50°E
	Shepparton	SHPRTN	307	118,440	36.50°S	145.60°E
	Wangaratta	WANGTA	308	68,290	36.40°S	146.70°E
	Sale	SALE	309	54,510	37.85°S	147.60°E
	Moe	MOE	310	112,980	38.30°S	146.30°E
	Melbourne	MELBRN	311	2,660,220	38.00°S	145.00°E
Queensland	Brisbane	BRSBNE	401	940,800	27.50°S	153.20°E
	Gold Coast	GOLDCT	402	131,050	27.80°S	153.00°E
	Nambour	NAMBOR	403	59,840	26.80°S	152.85°E
	Bundaberg	BUNDBG	404	140,370	25.25°S	152.58°E
	Rockhampton	RKHMTN	405	124,400	23.75°S	150.92°E
	Mackay	MACKAY	406	72,200	21.34°S	149.00°E
	Townsville	TWNSVL	407	138,400	19.50°S	146.80°E
	Cairns	CAIRNS	408	118,360	17.32°S	147.75°E
	Mount Isa	MT ISA	409	46,100	20.75°S	140.00°E
	Longreach	LNGRCH	410	14,040	23.92°S	145.00°E
	Roma	ROMA	411	29,490	27.42°S	148.25°E
	Toowoomba	TOWMBA	412	150,150	27.50°S	151.65°E

TABLE I.1 - DETAILS OF NTS REGIONS (Cont.)

State or Territory	Region Name	Abbreviation	Region Number	Population	Co-ordinates of Centroid Latitude	Longitude
South Australia	Adelaide	ADELDE	501	888,100	34.92°S	138.83°E
	Port Lincoln	PTLNCN	502	29,700	34.25°S	134.92°E
	Kadina	KADINA	503	21,200	34.17°S	137.92°E
	Whyalla	WHYLLA	504	81,800	32.58°S	137.83°E
	Gawler	GAWLER	505	35,750	34.25°S	138.67°E
	Victor Harbour	VCTHBR	506	32,400	35.42°S	138.42°E
	Murray Bridge	MRYBDG	507	56,200	35.00°S	139.42°E
	Mount Gambier	MTGMBR	508	56,000	35.55°S	139.42°E
	Woomera	WOOMRA	509	10,850	29.50°S	135.70°E
Western Australia	Albany	ALBANY	601	61,550	33.42°S	118.17°E
	Bunbury	BUNBRY	602	66,550	33.83°S	116.00°E
	Kalgoorlie	KALGLE	603	41,500	30.30°S	122.00°E
	Northam	NRTHAM	604	39,900	31.25°S	117.00°E
	Port Hedland	PTHDLD	605	36,250	20.50°S	117.00°E
	Derby	DERBY	606	15,450	15.75°S	125.00°E
	Geraldton	GRLDTN	607	41,450	29.50°S	115.50°E
	Perth	PERTH	608	771,100	32.17°S	115.92°E
	Carnarvon	CARNVN	609	16,150	24.00°S	117.58°E
Tasmania	Hobart	HOBART	701	189,410	42.75°S	147.25°E
	Burnie	BURNIE	702	89,720	41.17°S	146.00°E
	Launceston	LNCSTN	703	107,380	41.42°S	147.00°E
	Queenstown	QNSTWN	704	12,570	41.83°S	145.50°E
Northern Territory	Darwin	DARWIN	801	62,602	14.00°S	133.00°E
	Alice Springs	ALSPNG	802	24,298	23.40°S	133.50°E

N

100 0 100 200
scale km

——— Regional boundaries
——— Main roads
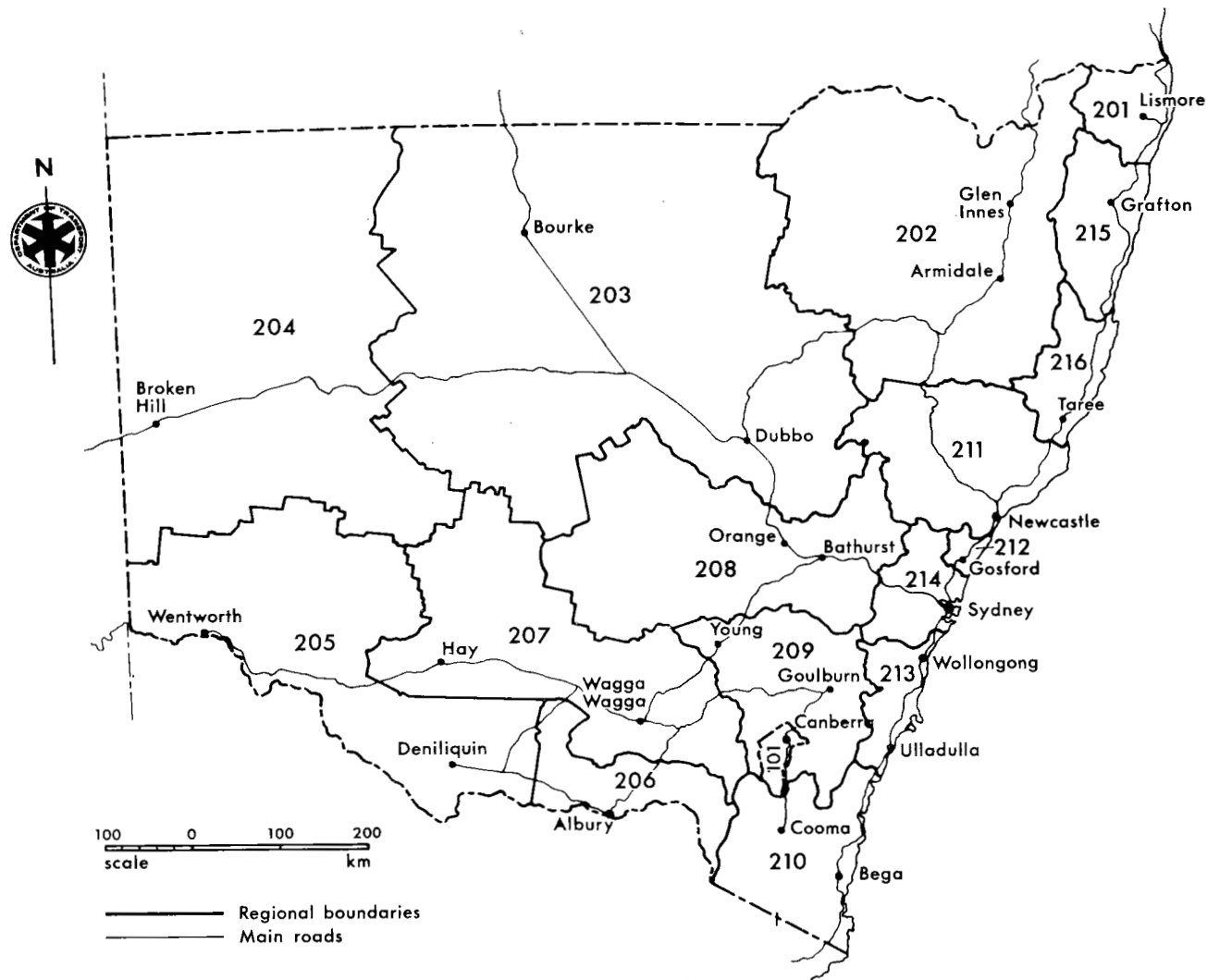
FIGURE I.1

NTS REGIONS - NEW SOUTH WALES

FIGURE I.2

NTS REGIONS - VICTORIA

N

Weipa

408

Cairns

Townsville

409

Mt Isa

407

Mackay

406

Longreach

Rockhampton

Gladstone

410

405

Bundaberg

404

403

Charleville

Nambour

Roma

412

401

411

Toowoomba

Brisbane

Ipswich

Gold
Coast

402

| 100 | 0 | 100 | 200 | 300 |
scale   km

———— Regional boundaries
——— Main roads
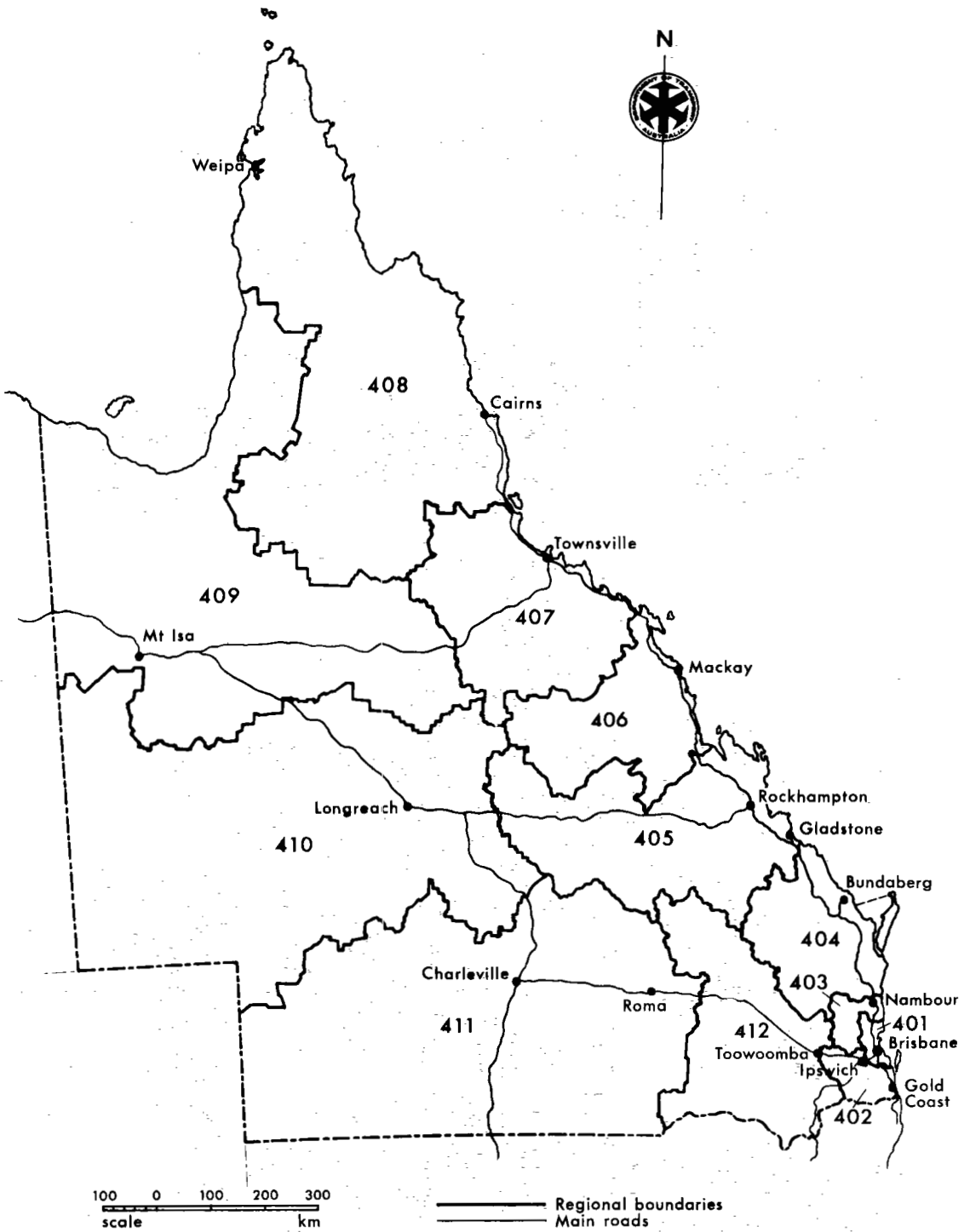
FIGURE I.3

NTS REGIONS - QUEENSLAND
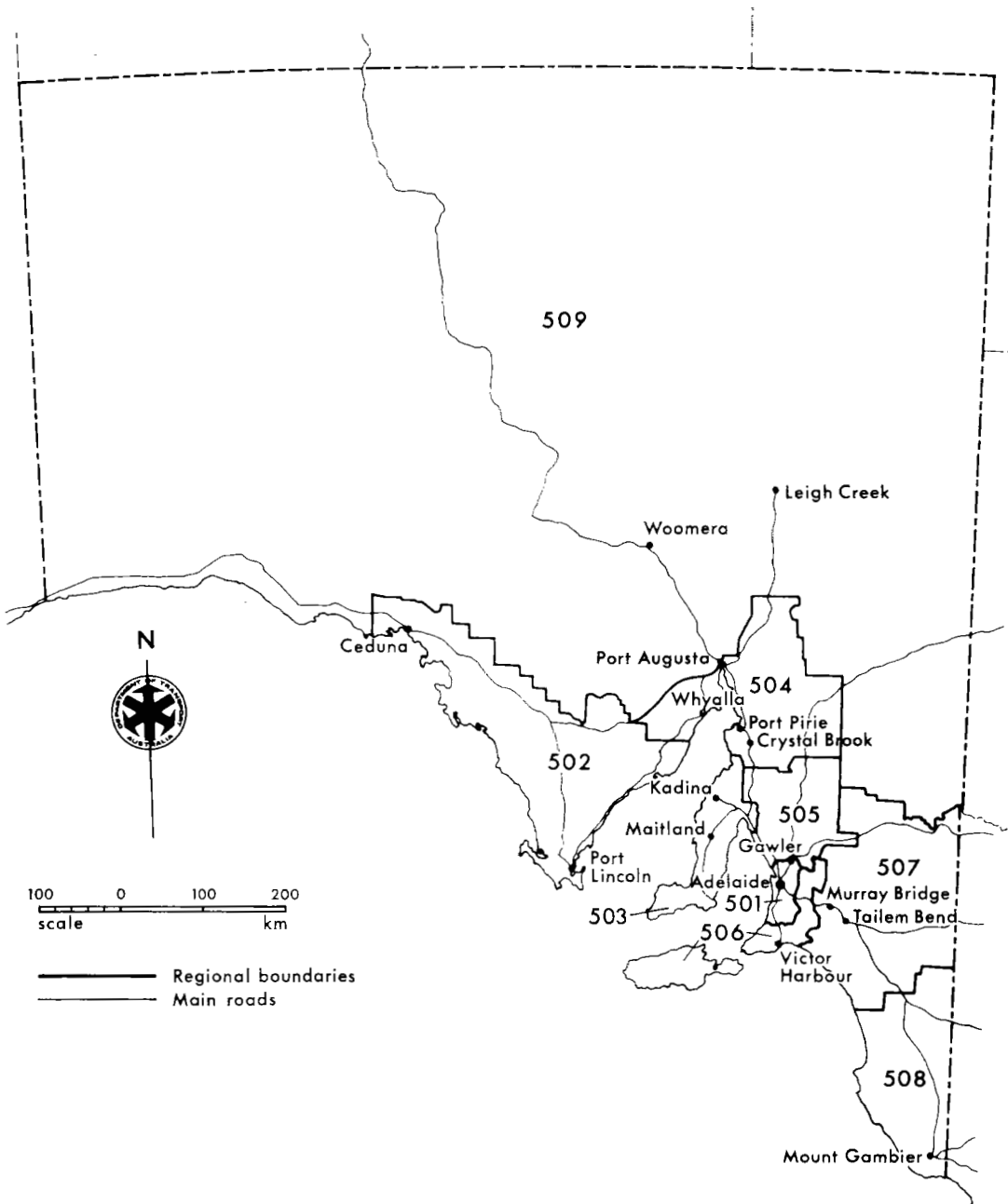
FIGURE I.4

NTS REGIONS – SOUTH AUSTRALIA
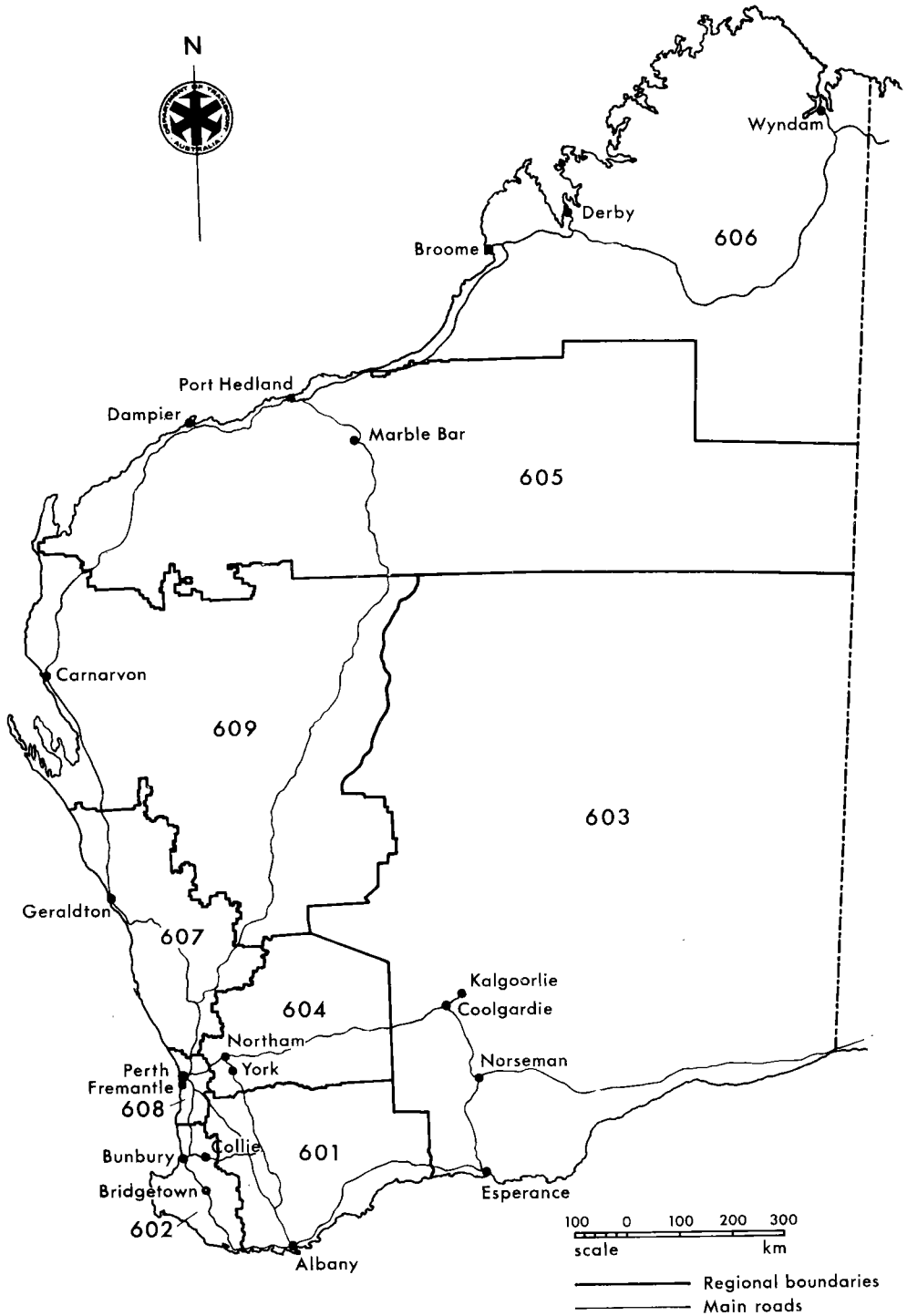
FIGURE I.5

NTS REGIONS – WESTERN AUSTRALIA
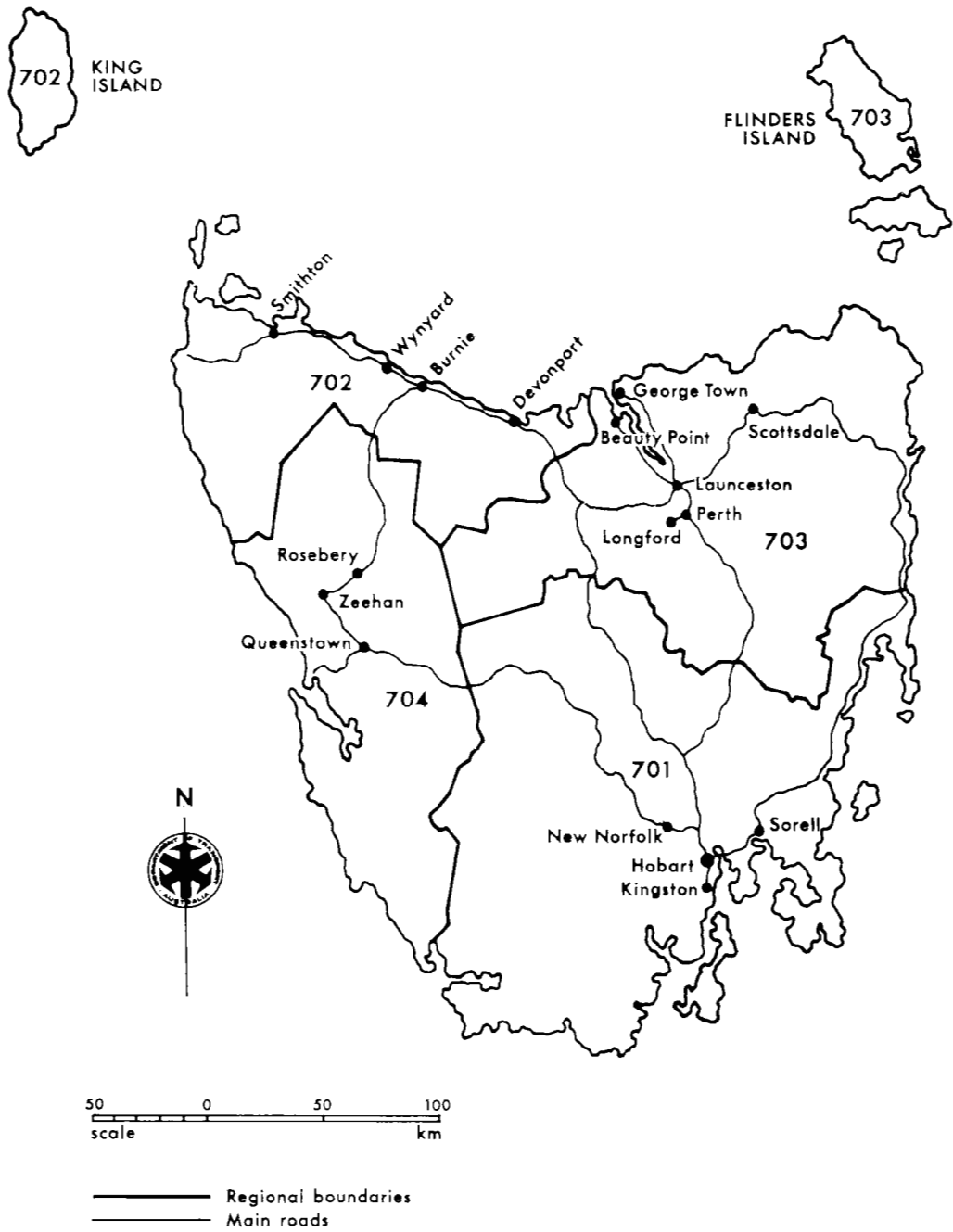
FIGURE I.6

NTS REGIONS - TASMANIA

Darwin
Batchelor
Katherine
801
Daly Waters
Newcastle Waters
Tennant Creek
Camooweal
Barrow Creek
802
N
Alice Springs
Ayers Rock
Kulgera

100	0	100	200
scale			km

—————— Regional boundaries
————————— Main roads
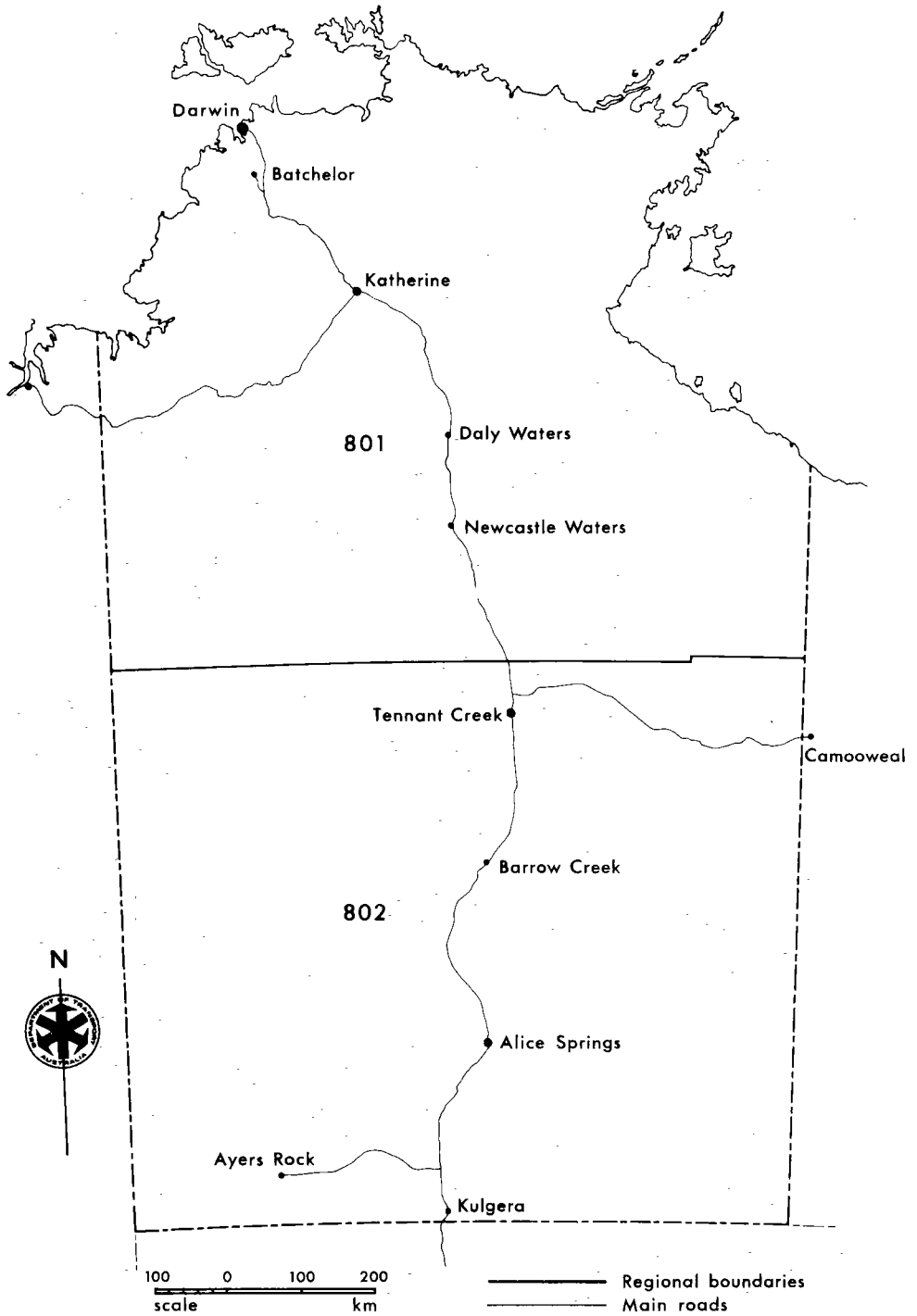
FIGURE I.7

NTS REGIONS – NORTHERN TERRITORY

APPENDIX II

DERIVED MODEL FOR REGIONAL TRIP DISTRIBUTIONS

The need for regional trip distribution information
for planning the NTS motivated the BTE to attempt to develop
a trip distribution model which could be used to obtain fairly
coarse relative estimates of travel patterns. It should be
emphasised that the aim of this exercise was to generate order-
of-magnitude estimates of relative travel proportions. It was
not intended that the results of the process would yield a
comprehensive predictive tool.

The trip distribution model was derived by suitable
manipulation of the results of the Survey of Australian Travel[1],
conducted by the Australian Travel Research Conference (ATRC)
in 1973/74. Certain methods used in conducting the ATRC survey
led to limitations[2] in its use for this purpose, but the data
obtained during the survey yielded the most substantial body
of information then available on domestic non-urban passenger
travel in Australia. Details of the way in which the ATRC
information was used are given later in this paper.

The distribution model developed from the ATRC
information was of the 'gravity' type, with separate exponents
for the distance, origin population and destination population
terms. Although there are significant notional objections to
gravity models, they do provide a traditional and reasonable
means of determining trip distributions. Also, the use of a
more sophisticated approach for the basic objective of assessing
sample size requirements would have been rather superfluous.

DETAILS OF ANALYTICAL PROCEDURES

One major difficulty encountered in analysing the
ATRC survey data was that different regional zoning and coding
systems were used for origins and destinations. The system

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(1)   Australian Travel Research Conference, op. cit.

(2)   This is in no way a reflection on the way in which the
      survey was conducted. However, the objectives of the
      ATRC were quite different to those of the BTE in using
      the survey data to obtain a trip distribution model, and
      this did create some difficulties.

used was clearly suited to the original aims of the ATRC survey, but it was unacceptable for the type of analysis envisaged by the BTE. Further, the generally smaller areas used as destination zones did not necessarily aggregate to equivalence with specific origin regions. Accordingly, the zoning system was altered to suit the BTE analysis. The alteration consisted of using origin regions in their original form, while destination zones were aggregated to form regions identical to the origin regions, as far as possible. This process usually produced satisfactory results, but it did involve rejecting some otherwise valid information in cases where destination zones could not be aggregated successfully to form equivalent origin regions without gross distortion. The regions eventually produced through this manipulation were renumbered and coded as shown in Table II.1[1]. The revised regions were then used as both origin and destination regions, for the purposes of further analysis. The area covered by each of these regions[2] is shown in Figure II.1.

Estimates of the populations of the regions were available from ATRC sources, but interregional distances were not readily available, and therefore had to be calculated. This was done by taking the co-ordinates of each region's population centroid. The resultant co-ordinates are shown in Table II.2, together with regional populations. Great-circle distances between regional centroids were then calculated by applying normal spherical trigonometry methods to the co-ordinates of pairs of regions. The results are shown in Table II.3.

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(1) The region symbols used in describing region centres are based on airport designations where applicable. Region centres without airport designations are described by a similar 3-letter code.

(2) It must be pointed out that these regions are in no way equivalent to the NTS regions. In most cases, their boundaries were quite different. The regions used in this particular case were isolated for their role in determining the appropriate trip distribution model.
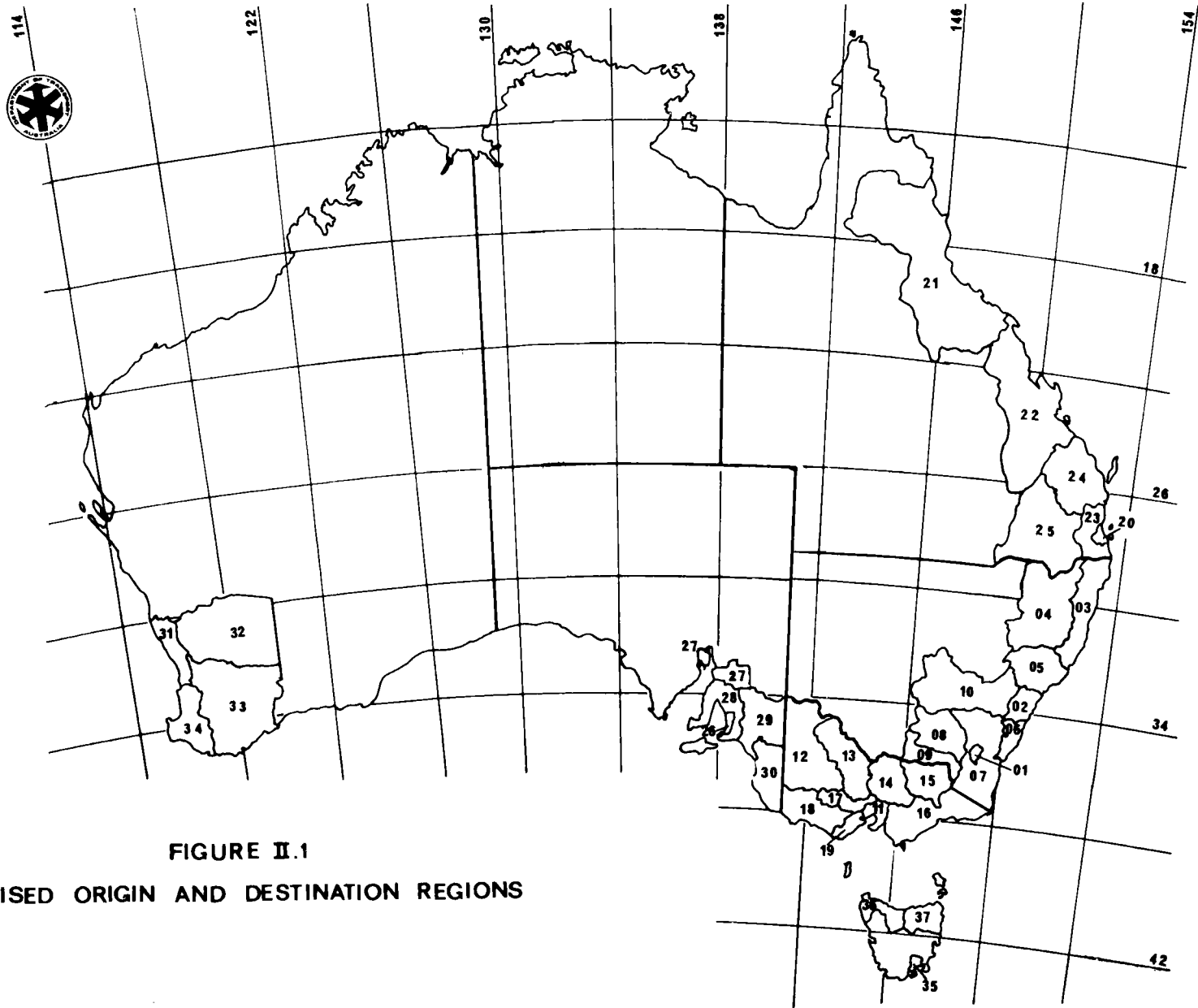
FIGURE II.1

REVISED ORIGIN AND DESTINATION REGIONS

TABLE II.1 - ORIGIN/DESTINATION REGIONAL CODING CORRESPONDENCE

Revised Region Number	State	Regional Centre[a]	Region Symbol	Equivalent ATRC Origin Region	Equivalent ATRC Destination Zones[b]
01	ACT	Canberra	CBR	10	062
02	NSW	Sydney	SYD	20	041, 042, 043
03	NSW	Grafton	GFT	21	046, 047, 048, 049, 050, 051, 052
04	NSW	Armidale	ARM	22	053
05	NSW	Newcastle	NTL	23	044
06	NSW	Wollongong	WNG	24	045
07	NSW	Queanbeyan	QBN	25	063, 064, 065
08	NSW	Wagga	WGA	26	058
09	NSW	Albury	ABX	27	061
10	NSW	Bathurst	BTH	28	056, 057
11	Vic	Melbourne	MEL	30	011, 012
12	Vic	Horsham	HOR	31	020, 022, 025
13	Vic	Bendigo	BEN	32	026, 027, 028
14	Vic	Shepparton	SHP	33	030, 033
15	Vic	Wangaratta	WAN	34	031, 032
16	Vic	Moe	MOE	35	013, 014, 015, 016
17	Vic	Ballarat	BAL	36	024
18	Vic	Portland	PTL	37	019, 021
19	Vic	Geelong	GLN	38	017, 018
20	Qld	Brisbane	BNE	40	071
21	Qld	Cairns	CNS	41	079
22	Qld	Rockhampton	ROK	42	077, 078
23	Qld	Gold Coast	GCT	43	072, 073, 074
24	Qld	Bundaberg	BUN	44	075, 076
25	Qld	Toowoomba	TWB	45	087
26	SA	Adelaide	ADL	50	091
27	SA	Port Pirie	PTP	51	103
28	SA	Tanunda	TAN	52	092, 093, 099, 100
29	SA	Renmark	REN	53	094, 095, 096
30	SA	Mt Gambier	MGM	54	097, 098
31	WA	Perth	PER	60	111, 112
32	WA	Northam	NOR	61	117
33	WA	Albany	ALB	62	115, 116
34	WA	Bunbury	BNB	63	113, 114
35	Tas	Hobart	HBA	70	139
36	Tas	Devonport	DPO	71	132
37	Tas	Launceston	LST	72	133

(a) The regional centres given in this table were largely assigned for identification purposes, and do not necessarily indicate functional centres for the regions concerned.

(b) These destination zones did not necessarily aggregate precisely to the nominated origin regions; however there was a reasonably good correspondence in most cases.

TABLE II.2 - REGIONAL COORDINATES AND POPULATIONS

Revised Region Number	State	Region Symbol	Coordinates[a]		Population[b]
			Latitude	Longitude	
01	ACT	CBR	$35^{\circ}18'S$	$149^{\circ}08'E$	175,400
02	NSW	SYD	$33^{\circ}35'S$	$150^{\circ}55'E$	3,028,400
03	NSW	GFT	$30^{\circ}15'S$	$152^{\circ}55'E$	255,900
04	NSW	ARM	$30^{\circ}15'S$	$151^{\circ}15'E$	154,100
05	NSW	NTL	$32^{\circ}10'S$	$151^{\circ}15'E$	467,700
06	NSW	WNG	$34^{\circ}45'S$	$150^{\circ}30'E$	285,300
07	NSW	QBN	$35^{\circ}25'S$	$149^{\circ}10'E$	136,500
08	NSW	WGA	$34^{\circ}50'S$	$147^{\circ}25'E$	105,400
09	NSW	ABX	$35^{\circ}40'S$	$147^{\circ}20'E$	57,200
10	NSW	BTH	$33^{\circ}20'S$	$148^{\circ}20'E$	173,300
11	Vic	MEL	$37^{\circ}45'S$	$145^{\circ}10'E$	2,604,900
12	Vic	HOR	$35^{\circ}30'S$	$142^{\circ}10'E$	99,500
13	Vic	BEN	$36^{\circ}15'S$	$143^{\circ}55'E$	158,400
14	Vic	SHP	$36^{\circ}45'S$	$145^{\circ}30'E$	116,700
15	Vic	WAN	$36^{\circ}35'S$	$147^{\circ}10'E$	67,900
16	Vic	MOE	$37^{\circ}45'S$	$147^{\circ}10'E$	195,600
17	Vic	BAL	$37^{\circ}35'S$	$143^{\circ}35'E$	107,000
18	Vic	PTL	$37^{\circ}50'S$	$142^{\circ}15'E$	97,800
19	Vic	GLN	$38^{\circ}20'S$	$143^{\circ}45'E$	168,000
20	Qld	BNE	$27^{\circ}20'S$	$153^{\circ}05'E$	926,000
21	Qld	CNS	$18^{\circ}35'S$	$145^{\circ}30'E$	273,900
22	Qld	ROK	$23^{\circ}25'S$	$149^{\circ}30'E$	210,500
23	Qld	GCT	$27^{\circ}15'S$	$152^{\circ}25'E$	199,800
24	Qld	BUN	$25^{\circ}40'S$	$152^{\circ}05'E$	160,000
25	Qld	TWB	$27^{\circ}25'S$	$150^{\circ}15'E$	176,300
26	SA	ADL	$34^{\circ}55'S$	$138^{\circ}40'E$	876,700
27	SA	PTP	$33^{\circ}15'S$	$138^{\circ}30'E$	88,800
28	SA	TAN	$34^{\circ}10'S$	$138^{\circ}25'E$	103,200
29	SA	REN	$34^{\circ}50'S$	$140^{\circ}05'E$	70,400
30	SA	MGM	$36^{\circ}40'S$	$140^{\circ}35'E$	71,800
31	WA	PER	$31^{\circ}55'S$	$115^{\circ}40'E$	759,400
32	WA	NOR	$30^{\circ}45'S$	$117^{\circ}50'E$	86,600
33	WA	ALB	$33^{\circ}30'S$	$117^{\circ}45'E$	115,200
34	WA	BNB	$33^{\circ}50'S$	$115^{\circ}45'E$	123,200
35	Tas	HBA	$42^{\circ}40'S$	$147^{\circ}20'E$	159,100
36	Tas	DPO	$41^{\circ}10'S$	$145^{\circ}55'E$	114,100
37	Tas	LST	$41^{\circ}20'S$	$147^{\circ}40'E$	125,900

(a) These coordinates were assigned by fairly arbitrary estimation of the geographic centroid of each region.

(b) Derived from ATRC sources.

TABLE II.3 - INTERREGIONAL[a] GREAT-CIRCLE DISTANCES[b] (KM)

Origin Region	Destination Region CBR	SYD	GFT	ARM	NTL	WNG	QBN	WGA	ABX	BTH
CBR	–	251	663	595	399	138	13	164	167	230
SYD	251	–	415	371	160	135	259	350	401	241
GFT	663	415	–	160	265	549	672	724	795	552
ARM	595	371	160	–	213	505	606	623	704	439
NTL	399	160	265	213	–	295	409	462	531	302
WNG	138	135	549	505	295	–	142	281	305	254
QBN	13	259	672	606	409	142	–	171	168	243
WGA	164	350	724	623	462	281	171	–	92	186
ABX	167	401	795	704	531	305	168	92	–	275
BTH	230	241	552	439	302	254	243	186	275	–
MEL	446	695	1097	1004	831	582	441	381	301	568
HOR	631	828	1160	1028	916	762	633	482	467	614
BEN	482	703	1069	953	812	618	482	353	314	517
SHP	364	605	996	897	732	502	361	274	203	459
WAN	227	477	883	799	617	363	221	195	102	376
MOE	224	573	987	914	723	447	314	325	232	502
BAL	557	798	1184	1078	922	695	554	460	396	638
PTL	675	913	1293	1181	1033	814	672	570	512	743
GLN	585	833	1230	1131	965	722	580	508	434	692
BNE	961	725	324	370	565	860	972	992	1074	807
CNS	1892	1752	1497	1421	1616	1864	1906	1816	1908	1664
ROK	1321	1138	831	779	988	1263	1334	1285	1378	1108
GCT	947	718	337	352	558	853	958	968	1052	781
BUN	1107	887	516	516	727	1021	1119	1113	1200	926
TWB	882	688	408	329	536	815	895	867	957	683
ADL	952	1134	1430	1286	1204	1079	955	798	790	906
PTP	1002	1152	1402	1249	1198	1118	1008	839	852	913
TAN	986	1155	1430	1282	1214	1109	990	827	829	921
REN	824	1005	1305	1163	1076	950	828	669	664	777
MGM	783	999	1346	1218	1098	919	783	649	615	796
PER	3107	3285	3534	3378	3338	3235	3109	2953	2943	3050
NOR	2949	3116	3347	3190	3160	3073	2952	2791	2787	2878
ALB	2874	3060	3324	3170	3119	3004	2876	2723	2708	2828
BNB	3046	3236	3506	3353	3299	3178	3048	2897	2880	3006
HBA	851	1074	1484	1441	1234	939	839	889	796	1059
DPO	710	951	1367	1305	1107	818	699	716	623	896
LST	682	908	1319	1273	1067	772	670	723	630	891

(a)   Based on the centroids of the revised regions.

(b)   Although the distance matrix is symmetrical, it has
      been reproduced in full for convenience.

TABLE II.3 - INTERREGIONAL [a] GREAT-CIRCLE DISTANCES [b] (KM)(Cont)

Origin Region	MEL	HOR	BEN	SHP	WAN	MOE	BAL	PTL	GLN	BNE
CBR	446	631	482	364	227	324	557	675	585	961
SYD	695	828	703	605	477	573	798	913	833	725
GFT	1097	1160	1069	996	883	987	1184	1293	1230	324
ARM	1004	1028	953	897	799	914	1078	1181	1131	370
NTL	831	916	812	732	617	723	922	1033	965	565
WNG	582	762	618	502	363	447	695	814	722	860
QBN	441	633	482	361	221	314	554	672	580	972
WGA	381	482	353	274	195	325	460	570	508	992
ABX	301	467	314	203	102	232	396	512	434	1074
BTH	568	614	517	459	376	502	638	743	692	807
MEL	–	366	200	115	219	175	140	256	139	1374
HOR	366	–	178	330	465	511	263	259	345	1375
BEN	200	178	–	152	293	333	151	229	232	1315
SHP	115	330	152	–	149	184	193	311	234	1266
WAN	219	465	293	149	–	129	336	456	358	1169
MOE	175	511	333	184	129	–	315	432	306	1283
BAL	140	263	151	193	336	315	–	120	84	1445
PTL	256	259	229	311	456	432	120	–	142	1544
GLN	139	345	232	234	358	306	84	142	–	1500
BNE	1374	1375	1315	1266	1169	1283	1445	1544	1500	–
CNS	2131	1909	1970	2020	2008	2137	2120	2163	2202	1244
ROK	1646	1518	1524	1531	1481	1609	1673	1745	1746	564
GCT	1349	1335	1282	1240	1149	1266	1415	1512	1473	66
BUN	1493	1446	1409	1381	1300	1421	1548	1639	1611	210
TWB	1243	1180	1149	1129	1059	1184	1290	1378	1356	279
ADL	661	324	497	648	788	823	531	456	591	1608
PTP	783	419	596	746	872	929	666	612	737	1545
TAN	726	372	550	702	837	882	600	533	665	1591
REN	559	203	380	532	668	712	438	385	508	1490
MGM	423	192	301	438	587	595	284	196	335	1567
PER	2757	2475	2636	2779	2927	2932	2616	2503	2640	3634
NOR	2619	2320	2486	2633	2779	2793	2478	2368	2508	3433
ALB	2513	2242	2399	2540	2689	2689	2373	2258	2393	3439
BNB	2677	2415	2569	2708	2857	2853	2537	2421	2555	3625
HBA	594	928	788	694	695	565	664	703	584	1800
DPO	385	709	573	492	520	394	446	486	365	1671
LST	452	806	651	542	529	400	544	605	472	1633

(a) Based on the centroids of the revised regions.

(b) Although the distance matrix is symmetrical, it has been reproduced in full for convenience.

TABLE II.3—INTERREGIONAL^(a) GREAT-CIRCLE DISTANCES^(b) (KM) (Cont)

TABLE II.3—INTERREGIONAL[a] GREAT-CIRCLE DISTANCES[b] (KM) (Cont)

Origin Region	Destination Region CNS	ROK	GCT	BUN	TWB	ADL	PTP	TAN	REN	MGM
CBR	1892	1321	947	1107	882	952	1002	986	824	783
SYD	1752	1138	718	887	688	1134	1152	1155	1005	999
GFT	1492	831	337	516	408	1430	1402	1430	1305	1346
ARM	1421	779	352	516	329	1286	1249	1282	1163	1218
NTL	1616	988	558	727	536	1204	1198	1214	1076	1098
WNG	1864	1263	853	1021	815	1079	1118	1109	950	919
QBN	1906	1334	958	1119	895	955	1008	990	828	783
WGA	1816	1285	968	1113	867	798	839	827	669	649
ABX	1908	1378	1052	1200	957	790	852	829	664	615
BTH	1664	1108	781	926	683	906	913	921	777	796
MEL	2131	1646	1349	1493	1243	661	783	726	559	423
HOR	1909	1518	1335	1446	1180	324	419	372	203	192
BEN	1970	1524	1282	1409	1149	497	596	550	380	301
SHP	2020	1531	1240	1381	1129	648	746	702	532	438
WAN	2008	1481	1149	1300	1059	788	872	837	668	587
MOE	2137	1609	1266	1421	1184	823	929	882	712	595
BAL	2120	1673	1415	1548	1290	531	666	600	438	284
PTL	2163	1745	1512	1639	1378	456	612	533	385	196
GLN	2202	1746	1473	1611	1356	591	737	665	508	335
BNE	1244	564	66	210	279	1608	1545	1591	1490	1567
CNS	–	679	1195	1038	1095	1937	1773	1869	1884	2067
ROK	679	–	517	361	451	1653	1532	1608	1562	1703
GCT	1195	517	–	179	214	1560	1492	1541	1444	1528
BUN	1038	361	179	–	266	1645	1560	1618	1536	1638
TWB	1095	451	214	266	–	1380	1299	1355	1270	1372
ADL	1937	1653	1560	1645	1380	–	185	86	129	260
PTP	1773	1532	1492	1560	1299	185	–	102	228	424
TAN	1869	1608	1541	1618	1355	86	102	–	169	340
REN	1884	1562	1444	1536	1270	129	228	169	–	208
MGM	2067	1703	1528	1638	1372	260	424	340	208	–
PER	3330	3447	3574	3598	3364	2155	2140	2130	2284	2341
NOR	3093	3227	3372	3390	3160	1996	1965	1964	2124	2198
ALB	3214	3284	3381	3415	3174	1926	1923	1907	2055	2102
BNB	3399	3473	3567	3603	3360	2102	2105	2085	2231	2270
HBA	2701	2168	1792	1957	1734	1155	1315	1235	1087	895
DPO	2511	2001	1657	1814	1579	940	1097	1019	869	680
LST	2538	1999	1624	1788	1565	1061	1209	1137	980	801

(a) Based on the centroids of the revised regions.

(b) Although the distance matrix is symmetrical, it has been reproduced in full for convenience.

TABLE II.3-INTERREGIONAL$^{(a)}$ GREAT-CIRCLE DISTANCES$^{(b)}$(KM)(Cont)

Origin Region	Destination Region PER	NOR	ALB	BNB	HBA	DPO	LST
CBR	3107	2949	2874	3046	851	710	682
SYD	3285	3116	3060	3236	1074	951	908
GFT	3534	3347	3324	3506	1484	1367	1319
ARM	3378	3190	3170	3353	1441	1305	1273
NTL	3338	3160	3119	3299	1234	1107	1067
WNG	3235	3073	3004	3178	939	818	772
QBN	3109	2952	2876	3048	839	699	670
WGA	2953	2791	2723	2897	889	716	723
ABX	2943	2787	2708	2880	796	623	630
BTH	3050	2878	2828	3006	1059	896	891
MEL	2757	2619	2513	2677	594	385	452
HOR	2475	2320	2242	2415	928	709	806
BEN	2636	2486	2399	2569	788	573	651
SHP	2779	2633	2540	2708	694	492	542
WAN	2927	2779	2689	2857	695	520	529
MOE	2932	2793	2689	2853	565	394	400
BAL	2616	2478	2373	2537	664	446	544
PTL	2503	2368	2258	2421	703	486	605
GLN	2640	2508	2393	2555	584	365	472
BNE	3634	3433	3439	3625	1800	1671	1633
CNS	3330	3093	3214	3399	2701	2511	2538
ROK	3447	3227	3284	3473	2168	2001	1999
GCT	3574	3372	3381	3567	1792	1657	1624
BUN	3598	3390	3415	3603	1957	1814	1788
TWB	3364	3160	3174	3360	1734	1579	1565
ADL	2155	1996	1926	2102	1155	940	1061
PTP	2140	1965	1923	2105	1315	1097	1209
TAN	2130	1964	1907	2085	1235	1019	1137
REN	2284	2124	2055	2231	1087	869	980
MGM	2341	2198	2102	2270	895	680	801
PER	–	243	262	213	3027	2873	3020
NOR	243	–	305	394	2929	2764	2910
ALB	262	305	–	188	2768	2618	2765
BNB	213	394	188	–	2910	2767	2914
HBA	3027	2929	2768	2910	–	219	169
DPO	2873	2764	2618	2767	219	–	147
LST	3020	2910	2765	2914	169	147	–

(a) Based on the centroids of the revised regions.

(b) Although the distance matrix is symmetrical, it has
     been reproduced in full for convenience.

It should be noted that the interregional distances given in Table II.3 are roughly equivalent to airline distances, and do not take into account the indirectness[1] prevalent with other modes (or, indeed, with some air routes).

The ATRC survey records were then scanned to determine such factors as the origin and destination of each trip, the number of people making the trip, and so on. Destinations were allocated on the basis of the ATRC 'main destination' definition[2]. At this stage, records with invalid coding, or those which did not fit into the revised regional zoning system, were rejected. The trip numbers were multiplied by appropriate regional expansion factors[3], and were aggregated into an origin/destination matrix, which is reproduced in Table II.4. Of the 6975 original ATRC records (each describing a trip by one or more persons), 663 were discarded during this process.

Each origin/destination pair (except those corresponding to diagonal elements of the matrix, which reflected intraregional travel) represented one observation which could be used for fitting the gravity model. However, all origin/destination pairs for which no trips were recorded were rejected. Of the 1332 non-diagonal elements of the matrix, only 463 actually contained records of trips. The numbers recorded in these 463 elements were used in deriving the gravity model.

RESULTS

The ultimate objective of the processes described above was to derive a gravity model of the form:

$$t_{ij} = k \ P_i^a \ P_j^b \ d_{ij}^c \qquad (II.1)$$

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(1) As an example, the great circle distance between Sydney and Melbourne is 695 km. However, the airline distance is 743 km, and the road, rail and sea distances are 893 km, 959 km and 1078 km, respectively.

(2) That is, if a respondent indicated that a trip had several destinations, the destination nominated as the 'main destination' was used for this analysis.

(3) From ATRC sources.

where t_{ij} is the number of trips per annum with origin
i and destination j,

k is a constant relating to trip generation,

P_i is the population of the origin region,

P_j is the population of the destination region,

d_{ij} is the distance(km) between the centroids
of regions i and j,

and a, b and c are fitted exponents.

Values for the constant, k, and exponents a, b and
c may be derived by applying normal multiple linear regression
techniques to a logarithmic transformation of the basic model:

$$\ln t_{ij} = \ln k + a \ln P_i + b \ln P_j + c \ln d_{ij} \qquad (II.2)$$

The 463 valid observations were subjected to this
transformation process, and were analysed by means of a standard
multiple linear regression package[1]. Values obtained for the
exponents a, b and c are shown in Table II.5, together with the
corresponding standard errors. The coefficient of determination
(R^2) for the regression was 0.62. The value of the constant, k,
is not of great significance, since it is related to trip
generation propensity rather than to trip distribution. It was
found to have a value of 2.185. These values were all based
on a model predicting trips on an annual basis.

TABLE II.5 - REGRESSION RESULTS

Exponent	Fitted Value	Standard Error	Relative Standard Error (%)
a	0.823	0.043	5.2
b	0.467	0.043	9.2
c	-1.221	0.055	4.5

(1) The IBM stepwise regression package 'GRAPPA'.

TABLE II.4 - INTERREGIONAL TRIP ESTIMATES[a] 1973/74 ('000 TRIPS)

Origin Region	Destination Region[b]								
	CBR	SYD	GFT	ARM	NTL	WNG	QBN	WGA	ABX
CBR	4	165	18	7	6	86	141	21	0
SYD	287	1456	392	98	434	910	392	28	70
GFT	0	151	282	42	12	0	0	16	0
ARM	0	36	48	30	10	0	1	0	0
NTL	0	592	124	0	339	8	20	0	0
WNG	0	86	15	0	30	28	68	0	0
QBN	47	116	6	0	14	41	40	7	0
WGA	18	96	2	11	1	4	64	33	12
ABX	3	14	6	1	2	1	6	9	16
BTH	4	93	14	0	12	0	6	5	0
MEL	19	198	0	10	0	68	78	29	145
HOR	0	0	0	0	0	0	0	0	0
BEN	0	9	3	0	0	0	0	0	3
SHP	0	0	0	0	0	0	1	6	18
WAN	1	2	0	2	3	3	8	7	7
MOE	2	14	0	0	0	0	0	6	12
BAL	0	3	0	0	0	0	0	0	0
PTL	1	4	2	0	0	0	0	0	2
GLN	0	1	6	0	0	0	10	2	2
BNE	10	107	95	16	12	4	9	2	0
CNS	0	0	5	0	5	0	0	0	0
ROK	0	0	2	0	6	0	0	0	0
GCT	0	33	44	16	4	0	0	0	0
BUN	0	5	3	0	0	3	4	0	0
TWB	0	19	11	0	0	0	0	0	0
ADL	0	64	11	0	2	0	0	0	0
PTP	0	0	0	0	4	0	0	0	0
TAN	0	0	0	0	0	0	0	0	0
REN	2	1	0	0	0	0	0	0	0
MGM	1	4	0	0	0	0	0	0	0
PER	0	11	0	0	0	1	0	0	0
NOR	1	6	0	0	0	0	0	0	1
ALB	0	7	0	0	0	0	0	0	0
BNB	0	4	0	0	0	0	0	0	0
HBA	1	11	0	0	0	0	0	0	0
DPO	1	0	0	0	0	0	0	0	0
LST	0	4	0	0	4	0	0	0	0

(a) Based directly on ATRC survey results, with appropriate adjustments for the different regional zoning system.

(b) Trips with the same origin and destination regions (reflecting intraregional travel) are included, but were not used in estimating the trip distribution model. Similarly, origin/destination region pairs for which no trips were recorded were not used in estimating the model.

TABLE II.4-INTERREGIONAL TRIP ESTIMATES$^{(a)}$ 9173/74('000 TRIPS)(Cont)

Origin	Destination Region$^{(b)}$								
Region	BTH	MEL	HOR	BEN	SHP	WAN	MOE	BAL	PTL
CBR	26	47	0	1	2	0	6	2	1
SYD	161	238	14	0	0	0	0	0	0
GFT	0	5	0	0	0	0	8	2	0
ARM	0	1	0	0	0	0	0	0	0
NTL	24	4	0	0	0	0	0	0	0
WNG	15	5	0	0	0	0	0	0	0
QBN	15	20	0	0	0	0	0	0	0
WGA	8	24	0	2	2	4	0	0	0
ABX	3	42	4	5	4	8	2	0	1
BTH	22	4	0	0	0	0	0	0	0
MEL	24	523	247	397	320	160	832	39	58
HOR	0	61	90	27	11	0	0	13	27
BEN	0	146	12	50	24	16	11	12	11
SHP	2	147	18	35	47	42	8	0	0
WAN	0	64	5	12	5	52	5	0	1
MOE	4	196	14	17	7	4	209	26	2
BAL	1	68	26	70	14	4	14	12	25
PTL	0	135	40	12	0	4	4	34	90
GLN	0	90	16	6	11	8	24	1	93
BNE	0	26	5	4	0	0	0	4	0
CNS	0	0	0	0	0	0	0	0	0
ROK	0	0	0	0	0	0	0	0	0
GCT	0	4	0	0	0	0	0	0	0
BUN	0	0	0	0	0	0	0	0	0
TWB	0	2	0	0	0	0	0	0	3
ADL	0	81	33	2	0	2	3	3	0
PTP	0	10	0	0	0	0	0	0	3
TAN	0	0	0	0	0	0	0	0	0
REN	0	12	6	2	0	0	0	0	11
MGM	0	2	5	0	0	0	0	0	6
PER	0	17	10	0	0	0	0	0	0
NOR	0	0	0	0	0	0	0	0	0
ALB	0	5	0	0	0	0	0	0	0
BNB	0	0	0	0	0	0	0	0	0
HBA	0	11	0	0	0	0	0	0	0
DPO	0	8	0	0	0	0	0	0	0
LST	0	12	0	0	0	0	0	0	0

(a) Based directly on ATRC survey results, with appropriate adjustments for the different regional zoning system.

(b) Trips with the same origin and destination region (reflecting intraregional travel) are included, but were not used in estimating the trip distribution model. Similarly, origin/destination region pairs for which no trips were recorded were not used in estimating the model.

TABLE II.4—INTERREGIONAL TRIP ESTIMATES[a] 1973/74('000 TRIPS)(Cont)

Origin Region	Destination Region[b]								
	GLN	BNE	CNS	ROK	GCT	BUN	TWB	ADL	PTP
CBR	1	13	3	0	9	0	0	12	0
SYD	0	28	28	7	168	35	0	105	0
GFT	0	60	0	0	12	0	8	0	0
ARM	0	8	0	0	5	5	0	0	0
NTL	0	4	0	0	16	0	8	0	0
WNG	0	10	0	0	0	49	0	0	0
QBN	0	0	3	0	0	0	0	6	0
WGA	0	0	0	1	2	1	0	7	0
ABX	2	2	0	0	2	0	0	1	0
BTH	0	0	1	0	1	0	0	8	0
MEL	358	82	5	0	63	0	0	126	0
HOR	7	0	0	0	6	0	0	24	0
BEN	10	6	0	0	3	0	0	6	0
SHP	20	0	0	0	11	2	0	3	0
WAN	0	1	0	0	1	0	0	1	0
MOE	2	0	0	0	3	0	6	4	0
BAL	44	0	0	2	0	0	0	2	0
PTL	26	0	0	0	2	0	0	7	2
GLN	26	0	10	0	0	0	0	22	1
BNE	0	134	30	60	1086	296	199	19	0
CNS	0	51	218	54	5	0	20	0	0
ROK	0	18	42	88	16	40	4	0	0
GCT	0	80	0	0	240	54	67	0	0
BUN	0	144	7	29	65	118	44	1	0
TWB	0	143	3	0	104	10	96	0	0
ADL	11	2	0	0	2	6	3	76	142
PTP	4	0	0	0	0	6	0	153	9
TAN	0	0	0	0	0	0	1	117	8
REN	2	0	0	0	0	0	0	84	4
MGM	6	0	0	0	0	0	0	62	4
PER	0	1	2	0	0	0	0	8	0
NOR	0	0	0	0	0	0	0	0	0
ALB	0	0	0	0	1	0	0	0	0
BNB	0	0	0	0	0	0	0	0	0
HBA	0	0	0	0	2	0	0	1	0
DPO	0	0	0	0	3	0	0	0	0
LST	0	0	0	0	0	0	0	0	0

(a) Based directly on ATRC survey results, with appropriate adjustments for the different regional zoning system.

(b) Trips with the same origin and destination regions (reflecting intraregional travel) are included, but were not used in estimating the trip distribution model. Similarly, origin/ destination region pairs for which no trips were recorded were not used in estimating the model.

TABLE II.4-INTERREGIONAL TRIP ESTIMATES 1973/74 ('000 TRIPS)(Cont)

Origin Region	Destination Region									
	TAN	REN	MGM	PER	NOR	ALB	BNB	HBA	DPO	LST
CBR	0	0	1	4	0	0	0	1	1	0
SYD	0	0	0	35	0	0	0	7	0	0
GFT	0	0	0	0	0	0	0	0	0	0
ARM	0	0	0	0	0	0	0	0	0	0
NTL	0	0	0	8	0	0	0	0	0	0
WNG	0	0	0	0	0	0	0	5	0	0
QBN	0	0	0	0	0	0	0	0	5	0
WGA	0	0	0	0	0	0	0	0	0	0
ABX	0	0	0	0	0	0	0	0	0	1
BTH	0	0	0	0	0	0	0	0	2	0
MEL	78	24	48	0	0	0	0	10	0	39
HOR	9	1	5	2	0	0	0	0	0	0
BEN	0	0	0	0	0	0	0	3	0	0
SHP	0	0	0	0	0	0	0	0	0	0
WAN	0	0	0	1	0	0	0	0	0	0
MOE	6	0	2	0	0	0	0	0	0	0
BAL	0	0	6	1	0	0	0	1	0	7
PTL	3	3	11	0	0	0	0	2	0	0
GLN	0	6	23	2	0	0	0	3	2	0
BNE	0	0	0	7	0	0	0	9	0	0
CNS	0	0	0	0	0	0	0	0	0	0
ROK	0	0	0	0	0	0	0	0	0	0
GCT	0	0	0	0	0	0	0	0	0	0
BUN	0	0	0	0	0	0	0	0	0	0
TWB	0	0	0	0	0	0	0	0	0	0
ADL	582	245	90	11	0	2	0	5	2	0
PTP	18	1	1	0	0	1	0	1	0	0
TAN	24	24	17	0	0	0	0	0	0	0
REN	34	9	4	0	0	0	0	0	0	2
MGM	8	4	22	0	0	0	0	0	0	0
PER	4	0	0	268	57	141	216	2	0	0
NOR	0	0	0	310	44	16	21	0	0	0
ALB	0	0	0	217	11	212	30	0	0	0
BNB	0	0	0	193	0	28	89	0	0	0
HBA	0	0	0	1	0	0	0	10	50	82
DPO	0	0	0	0	0	0	0	48	44	98
LST	0	0	0	0	0	0	0	80	77	131

(a) Based directly on ATRC survey results, with appropriate adjustments for the different regional zoning system.

(b) Trips with the same origin and destination regions (reflecting intraregional travel) are included, but were not used in estimating the trip distribution model. Similarly, origin/destination region pairs for which no trips were recorded were not used in estimating the model.

As a rudimentary check on the practical value of the model obtained by this process, values predicted by the model were compared with the ATRC survey results for some of the more significant origin/destination region pairs. The results are shown in Table II.6.

COMMENTS ON RESULTS

The gravity model described by the exponents in Table II.5 was regarded as credible on the basis of known characteristics of non-urban passenger travel, although the magnitude of the distance exponent was a little lower than might have been expected. On the other hand, the table (Table II.6) of comparisons between the ATRC survey results and the corresponding predicted values was not particularly encouraging. There are two possible causes for the apparent lack of agreement:

. The results used in deriving the model were themselves subject to normal sampling errors, so that they could be expected to be spread fairly widely[1] around actual values;

. The gravity model fitted was fairly basic, and did not categorise trips by mode; nor did it take any account of other factors which might influence trip generation and attraction patterns.

Nevertheless, the model was regarded as sufficiently valid to be used to provide trip distribution estimates for the NTS. Its use as a general predictive tool is considered rather more limited.

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(1) Especially in view of the relatively low sample sizes for particular regions.

TABLE II.6 – COMPARISON OF SURVEY RESULTS AND PREDICTED VALUES

Origin	Destination	Survey Result	Predicted Value	Relative Error (%)
Canberra	Sydney	165,200	56,680	- 65.7
	Melbourne	46,800	26,184	- 44.1
	Brisbane	12,800	6,326	- 50.6
	Adelaide	12,400	6,237	- 44.1
	Perth	3,600	1,376	- 61.8
	Hobart	1,200	3,223	+168.6
Sydney	Canberra	287,200	156,241	- 45.6
	Melbourne	238,000	158,901	- 33.2
	Brisbane	28,000	93,087	+232.5
	Adelaide	105,200	52,551	- 50.0
	Perth	35,200	13,411	- 61.9
	Hobart	7,200	25,303	+251.4
Melbourne	Canberra	19,200	68,410	+256.3
	Sydney	198,400	150,606	- 24.1
	Brisbane	82,400	37,674	- 54.3
	Adelaide	126,000	89,732	- 28.8
	Perth	0	14,673	na
	Hobart	9,600	46,066	+379.9
Brisbane	Canberra	10,400	11,438	+ 10.0
	Sydney	107,200	61,055	- 43.0
	Melbourne	26,400	26,071	- 1.2
	Adelaide	19,200	12,937	- 32.6
	Perth	7,200	4,470	- 37.9
	Hobart	8,800	5,079	- 42.3
Adelaide	Canberra	0	11,061	na
	Sydney	64,000	33,803	- 47.2
	Melbourne	81,200	60,899	- 25.0
	Brisbane	1,600	12,688	+693.0
	Perth	10,800	8,089	- 25.1
	Hobart	4,800	8,346	+ 73.9
Perth	Canberra	0	2,319	na
	Sydney	11,200	8,196	- 26.8
	Melbourne	17,200	9,462	- 45.0
	Brisbane	1,200	4,166	+247.2
	Adelaide	7,600	7,686	+ 1.1
	Hobart	2,400	2,287	- 4.7
Hobart	Canberra	800	2,718	+239.8
	Sydney	10,800	8,866	- 17.9
	Melbourne	10,800	17,030	+ 57.7
	Brisbane	1,200	2,715	+126.3
	Adelaide	800	4,547	+468.4
	Perth	800	1,311	+ 63.9

APPENDIX III
INTERREGIONAL DISTANCE MATRIX

This Appendix presents a matrix of interregional distances used in deriving estimated trip distribution information for the NTS sampling process. The following points should be noted:

.   The distances are those between the
    approximate population centroids of
    the NTS regions (as described in
    Appendix I);

.   The distances were calculated on a
    great-circle basis, and therefore are
    approximately equivalent to 'airline'
    distances;

.   The matrix of interregional distances
    is symmetrical, but the full matrix
    has been reproduced for ease of reference;

.   The distances are expressed in km.

Origin Region			Destination Region									
State	No.	Name	ACT	LISMRE	ARMDLE	DUBBO	BRKNHL	DENLQN	ALBURY	WAGGA	BATHST	GOULBN	COOMA
ACT	101	ACT	–	815	589	513	761	176	473	178	194	28	122
NSW	201	LISMRE	815	–	276	542	1092	932	1108	855	644	794	915
	202	ARMDLE	589	276	–	273	829	680	834	596	401	564	702
	203	DUBBO	513	542	273	–	556	531	602	439	330	485	635
	204	BRKNHL	761	1092	829	556	–	634	404	585	693	741	845
	205	DENLQN	176	932	680	513	634	–	307	92	288	176	216
	206	ALBURY	478	1108	834	602	404	307	–	314	517	470	518
	207	WAGGA	178	855	596	439	585	92	314	–	218	163	263
	208	BATHST	194	644	401	330	693	288	517	218	–	167	315
	209	GOULBN	28	794	564	485	741	176	470	163	167	–	150
	210	COOMA	122	915	702	635	845	216	518	263	315	150	–
	211	NEWCTL	324	491	286	347	821	455	687	391	172	304	426
	212	GOSFRD	291	547	373	442	887	447	712	401	201	278	373
	213	WLNGNG	151	709	517	516	865	326	620	309	193	151	211
	214	SYDNEY	231	598	406	436	850	388	657	344	157	217	317
	215	GRAFTN	590	321	326	553	1088	742	986	686	470	576	664
	216	TAREE	712	126	243	515	1071	841	1042	770	553	693	805
VIC	301	GEELNG	559	1345	1087	903	752	413	361	491	701	571	515
	302	WRNMBL	687	1446	1180	973	732	527	385	593	810	696	654
	303	BALLRT	552	1309	1045	846	662	389	278	455	672	559	527
	304	HORSHM	634	1331	1059	831	548	459	229	501	718	635	635
	305	MILDRA	571	1170	895	648	354	401	93	404	600	563	611
	306	BENDGO	453	1191	926	726	585	282	183	340	558	457	448
	307	SHPRTN	356	1116	857	676	619	191	220	261	476	362	349
	308	WANGTA	263	1046	795	639	666	114	289	203	401	271	250
	309	SALE	324	1140	909	790	842	262	451	353	508	346	238
	310	MOE	428	1240	999	853	824	324	420	415	599	447	357
	311	MELBRN	487	1279	1025	851	747	346	345	429	634	500	439
QLD	401	BRSBNE	939	130	374	620	1155	1048	1207	968	763	917	1041
	402	GOLDCT	901	97	336	585	1122	1010	1169	929	724	879	1003
	403	NAMBOR	1000	209	420	645	1161	1100	1241	1016	818	976	1105
	404	BUNDBG	1156	383	568	758	1235	1245	1361	1158	969	1132	1266

Origin Region State No. Name	ACT	LISMRE	ARMDLE	DUBBO	BRKNHL	DENLQN	ALBURY	WAGGA	BATHST	GOULBN	COOMA
405 RKHMTN	1288	587	706	830	1225	1351	1418	1260	1095	1262	1405
406 MACKAY	1546	912	989	1051	1329	1582	1595	1490	1352	1519	1667
407 TWNSVL	1767	1201	1243	1256	1427	1779	1745	1687	1576	1739	1889
408 CAIRNS	1999	1374	1453	1493	1689	2021	2000	1929	1806	1970	2120
409 MT ISA	1848	1586	1497	1369	1234	1789	1632	1710	1689	1820	1962
410 LNGRCH	1324	962	892	815	903	1307	1235	1218	1145	1296	1445
411 ROMA	875	493	384	371	748	902	934	810	683	847	997
412 TOWMBA	891	191	302	506	1019	979	1105	892	703	866	1002
SA 501 ADELDE	948	1513	1238	973	481	774	471	784	977	941	976
502 PTLNCN	1312	1827	1557	1285	741	1139	834	1146	1331	1305	1342
503 KADINA	1041	1560	1287	1017	489	870	563	871	1055	1032	1077
504 WHYLLA	1094	1520	1256	983	428	933	630	917	1076	1081	1147
505 GAWLER	972	1499	1225	957	440	801	494	803	987	963	1009
506 VCTHBR	982	1569	1294	1031	547	806	509	823	1022	977	1002
507 MRYBDG	894	1467	1192	929	454	720	417	730	925	887	922
508 MTGMBR	891	1494	1218	960	504	715	420	734	935	886	911
509 WOOMRA	1422	1689	1452	1190	671	1277	990	1243	1365	1404	1493
WA 601 ALBANY	2849	3351	3089	2816	2260	2673	2375	2689	2879	2844	2863
602 BUNBRY	3035	3551	3288	3015	2459	2859	2563	2877	3071	3031	3045
603 KALGLE	2597	3004	2755	2485	1933	2427	2120	2426	2596	2588	2631
604 NRTHAM	3018	3472	3217	2945	2390	2844	2540	2852	3034	3011	3041
605 PTHDLD	3546	3744	3541	3296	2801	3392	3092	3367	3494	3530	3607
606 DERBY	3242	3215	3070	2870	2486	3120	2856	3069	3138	3219	3331
607 GRLDTN	3217	3636	3388	3117	2565	3044	2739	3048	3223	3209	3245
608 PERTH	3087	3566	3308	3035	2479	2912	2611	2924	3111	3081	3105
609 CARNVN	3288	3562	3341	3085	2564	3127	2822	3111	3255	3275	3340
TAS 701 HOBART	851	1650	1440	1335	1308	806	906	898	1044	877	739
702 BURNIE	716	1531	1303	1172	1108	641	707	733	902	739	617
703 LNCSTN	713	1520	1303	1189	1163	658	760	751	904	738	605
704 QNSTWN	800	1615	1386	1252	1165	721	770	813	985	823	702
NT 801 DARWIN	2868	2635	2552	2412	2178	2786	2582	2716	2723	2842	2976
802 ALSPNG	2011	2039	1865	1649	1259	1894	1641	1840	1908	1989	2103

Origin Region			Destination Region										
State	No.	Name	NEWCTL	GOSFRD	WLNGNG	SYDNEY	GRAFTN	TAREE	GEELNG	WRNMBL	BALLRT	HORSHM	MILDRA
ACT	101	ACT	324	291	151	231	590	712	559	687	552	634	571
NSW	201	LISMRE	491	547	709	598	321	126	1345	1446	1309	1331	1170
	202	ARMDLE	286	373	517	406	326	243	1087	1180	1045	1059	895
	203	DUBBO	347	442	516	436	553	515	903	973	846	831	648
	204	BRKNHL	821	887	865	850	1088	1071	752	732	662	548	354
	205	DENLQN	455	447	326	388	742	841	413	527	389	459	401
	206	ALBURY	637	712	620	657	986	1042	361	385	278	229	93
	207	WAGGA	391	401	309	344	686	770	491	593	455	501	404
	208	BATHST	172	201	193	157	470	553	701	810	672	718	600
	209	GOULBN	304	278	151	217	576	693	571	696	559	635	563
	210	COOMA	426	373	211	317	664	805	515	654	527	635	611
	211	NEWCTL	–	98	231	120	298	389	867	980	843	891	767
	212	GOSFRD	98	–	163	60	298	433	850	973	836	901	797
	213	WLNGNG	231	163	–	112	453	596	706	837	702	785	712
	214	SYDNEY	120	60	112	–	359	487	789	913	776	843	744
	215	GRAFTN	298	298	453	359	–	194	1148	1269	1132	1188	1065
	216	TAREE	389	433	596	487	194	–	1254	1363	1225	1259	1111
VIC	301	GEELNG	867	850	706	789	1148	1254	–	148	92	242	398
	302	WRNMBL	980	973	837	913	1269	1363	148	–	137	183	386
	303	BALLRT	843	836	702	776	1132	1225	92	137	–	156	307
	304	HORSHM	891	901	785	843	1188	1259	242	183	156	–	207
	305	MILDRA	767	797	712	744	1065	1111	398	386	307	207	–
	306	BENDGO	730	729	604	670	1022	1110	185	254	120	187	241
	307	SHPRTN	645	638	508	578	934	1029	230	335	198	286	301
	308	WANGTA	565	550	413	489	847	953	301	424	289	384	378
	309	SALE	649	607	448	549	902	1035	300	448	341	480	533
	310	MOE	751	718	563	659	1015	1140	183	331	240	392	488
	311	MELBRN	798	778	632	717	1076	1186	75	220	123	277	398
QLD	401	BRSBNE	615	675	837	726	447	255	1459	1555	1420	1433	1264
	402	GOLDCT	577	638	800	688	417	223	1420	1517	1381	1395	1227
	403	NAMBOR	679	745	905	792	529	335	1507	1598	1464	1469	1293
	404	BUNDBG	841	912	1070	957	704	510	1646	1728	1597	1590	1404

Origin Region			Destination Region									
State	No.	Name	NEWCTL	GOSFRD	WLNGNG	SYDNEY	GRAFTN	TAREE	GEELNG	WRNMBL	BALLRT	HORSHM	MILDRA
	405	RKHMTN	991	1074	1223	1111	905	711	1733	1798	1674	1645	1447
	406	MACKAY	1273	1363	1501	1393	1224	1032	1935	1980	1866	1812	1607
	407	TWNSVL	1520	1614	1740	1638	1504	1317	2099	2125	2023	1949	1741
	408	CAIRNS	1735	1826	1961	1855	1688	1495	2352	2382	2277	2207	1999
	409	MT ISA	1709	1806	1881	1806	1817	1667	1987	1960	1897	1777	1589
	410	LNGRCH	1130	1229	1328	1238	1204	1046	1595	1610	1514	1431	1225
	411	ROMA	636	734	850	751	699	555	1261	1317	1197	1159	960
	412	TOWMBA	579	656	810	697	488	299	1381	1467	1334	1334	1155
SA	501	ADELDE	1142	1177	1091	1124	1437	1467	605	494	526	372	380
	502	PTLNCN	1491	1532	1454	1481	1782	1794	942	811	873	726	742
	503	KADINA	1214	1256	1180	1205	1505	1522	722	611	641	486	469
	504	WHYLLA	1223	1277	1223	1231	1503	1497	854	759	767	612	538
	505	GAWLER	1147	1188	1112	1137	1439	1459	665	561	583	427	401
	506	VCTHBR	1188	1219	1128	1165	1485	1520	602	480	529	381	422
	507	MRYBDG	1090	1124	1037	1071	1386	1419	558	453	477	322	327
	508	MTGMBR	1103	1132	1037	1077	1400	1441	520	406	443	292	335
	509	WOOMRA	1488	1558	1535	1521	1741	1694	1248	1157	1160	1005	904
WA	601	ALBANY	3039	3080	2995	3028	3328	3330	2398	2250	2353	2228	2285
	602	BUNBRY	3232	3271	3182	3218	3523	3528	2572	2424	2530	2410	2474
	603	KALGLE	2744	2798	2735	2751	3021	2998	2215	2074	2154	2013	2026
	604	NRTHAM	3188	3235	3161	3186	3472	3460	2593	2446	2541	2410	2448
	605	PTHDLD	3612	3686	3663	3651	3850	3775	3271	3143	3196	3042	2999
	606	DERBY	3215	3304	3327	3283	3395	3277	3128	3031	3040	2885	2776
	607	GRLDTN	3373	3425	3357	3377	3652	3631	2808	2663	2753	2618	2646
	608	PERTH	3268	3312	3232	3261	3555	3550	2645	2497	2597	2471	2520
	609	CARNVN	3384	3451	3414	3412	3638	3580	2971	2837	2901	2751	2728
TAS	701	HOBART	1165	1103	941	1052	1376	1536	562	641	655	799	957
	702	BURNIE	1040	991	828	935	1278	1423	359	441	451	595	755
	703	LNCSTN	1032	975	812	922	1256	1409	425	521	517	667	814
	704	QNSTWN	1124	1075	912	1019	1362	1507	413	472	504	639	811
NT	801	DARWIN	2756	2853	2917	2848	2872	2720	2913	2854	2821	2681	2521
	802	ALSPNG	1990	2077	2096	2055	2187	2085	1938	1859	1847	1697	1566

Origin Region			Destination Region									
State	No.	Name	BENDGO	SHPRTN	WANGTA	SALE	MOE	MELBRN	BRSBNE	GOLDCT	NAMBOR	BUNDBG	RKHMTN
ACT	101	ACT	453	356	263	324	420	487	939	901	1000	1156	1288
NSW	201	LISMRE	1191	1116	1046	1140	1240	1279	130	97	209	383	587
	202	ARMDLE	926	857	795	909	999	1025	374	336	420	568	706
	203	DUBBO	726	676	639	790	853	851	620	585	645	758	830
	204	BRKNHL	585	619	666	842	824	747	1155	1122	1161	1235	1225
	205	DENLQN	282	191	114	262	324	346	1048	1010	1100	1245	1351
	206	ALBURY	183	220	289	451	420	345	1207	1169	1241	1361	1418
	207	WAGGA	340	261	203	353	415	429	968	929	1016	1158	1260
	208	BATHST	558	476	401	508	599	634	763	724	818	969	1095
	209	GOULBN	457	362	271	346	447	500	917	879	976	1132	1262
	210	COOMA	448	349	250	238	357	439	1041	1003	1105	1266	1405
	211	NEWCTL	730	645	565	649	751	798	615	577	679	841	991
	212	GOSFRD	729	638	550	607	718	778	675	638	745	912	1074
	213	WLNGNG	604	508	413	448	563	632	337	800	905	1070	1223
	214	SYDNEY	670	578	489	549	659	717	726	638	792	957	1111
	215	GRAFTN	1022	934	847	902	1015	1076	447	417	529	704	905
	216	TAREE	1110	1029	953	1035	1140	1186	255	223	335	510	711
VIC	301	GEELNG	185	230	301	300	183	75	1459	1420	1507	1646	1733
	302	WRNMBL	254	335	424	448	331	220	1555	1517	1598	1728	1798
	303	BALLRT	120	198	289	341	240	123	1420	1381	1464	1597	1674
	304	HORSHM	187	286	384	480	392	277	1433	1395	1469	1590	1645
	305	MILDRA	241	301	378	533	488	398	1264	1227	1293	1404	1447
	306	BENDGO	–	98	197	307	246	161	1301	1262	1344	1477	1555
	307	SHPRTN	98	–	98	232	209	175	1229	1191	1277	1416	1506
	308	WANGTA	197	98	–	179	214	233	1163	1124	1215	1360	1463
	309	SALE	307	232	179	–	124	228	1263	1225	1323	1477	1599
	310	MOE	246	209	214	124	–	118	1361	1323	1417	1566	1676
	311	MELBRN	161	175	233	228	118	–	1395	1356	1445	1587	1681
QLD	401	BRSBNE	1301	1229	1163	1263	1361	1395	–	38	85	257	475
	402	GOLDCT	1262	1191	1124	1225	1323	1356	38	–	112	286	496
	403	NAMBOR	1344	1277	1215	1323	1417	1445	85	112	–	174	390
	404	BUNDBG	1477	1416	1360	1477	1566	1587	257	286	174	–	236

Origin Region		Destination Region										
State	No. Name	BENDGO	SHPRTN	WANGTA	SALE	MOE	MELBRN	BRSBNE	GOLDCT	NAMBOR	BUNDBG	RKHMTN
	405 RKHMTN	1555	1506	1463	1599	1676	1681	475	496	390	236	–
	406 MACKAY	1751	1717	1689	1840	1903	1891	806	824	721	567	332
	407 TWNSVL	1914	1893	1879	2041	2091	2064	1102	1117	1020	872	636
	408 CAIRNS	2167	2143	2124	2282	2337	2315	1262	1283	1177	1013	787
	409 MT ISA	1815	1833	1857	2037	2043	1977	1533	1531	1469	1380	1171
	410 LNGRCH	1410	1400	1397	1568	1603	1565	912	909	851	780	602
	411 ROMA	1079	1039	1009	1161	1223	1214	488	469	460	494	488
	412 TOWMBA	1214	1151	1093	1211	1299	1321	152	137	141	266	423
SA	501 ADELDE	544	635	729	849	765	649	1593	1558	1611	1701	1704
	502 PTLNCN	906	999	1094	1206	1114	996	1895	1862	1902	1972	1941
	503 KADINA	653	742	833	960	879	764	1633	1599	1645	1724	1711
	504 WHYLLA	756	834	916	1062	995	886	1581	1550	1584	1648	1613
	505 GAWLER	589	676	766	896	818	704	1574	1540	1588	1671	1665
	506 VCTHBR	562	657	753	862	770	652	1652	1617	1672	1764	1770
	507 MRYBDG	491	581	675	797	714	599	1550	1515	1570	1663	1672
	508 MTGMBR	471	565	661	772	683	566	1580	1544	1603	1701	1716
	509 WOOMRA	1137	1206	1279	1438	1381	1276	1722	1697	1706	1730	1640
WA	601 ALBANY	2416	2514	2612	2693	2581	2466	3404	3375	3399	3439	3357
	602 BUNBRY	2597	2696	2795	2869	2755	2641	3606	3576	3602	3644	3562
	603 KALGLE	2195	2289	2384	2493	2393	2275	3043	3016	3028	3050	2946
	604 NRTHAM	2596	2693	2791	2882	2775	2658	3516	3488	3505	3532	3433
	605 PTHDLD	3208	3292	3377	3516	3435	3319	3744	3727	3705	3672	3504
	606 DERBY	3013	3076	3141	3308	3259	3155	3183	3175	3126	3052	2849
	607 GRLDTN	2803	2899	2996	3094	2989	2872	3674	3648	3658	3676	3564
	608 PERTH	2658	2756	2854	2938	2828	2712	3615	3586	3606	3638	3545
	609 CARNVN	2925	3013	3102	3230	3142	3024	3576	3555	3545	3530	3382
TAS	701 HOBART	723	709	707	545	501	561	1778	1741	1844	2005	2139
	702 BURNIE	524	520	533	393	320	362	1656	1617	1716	1871	1990
	703 LNCSTN	577	560	558	400	352	416	1647	1609	1711	1870	1998
	704 QNSTWN	587	592	612	477	398	427	1740	1701	1800	1955	2072
NT	801 DARWIN	2760	2798	2839	3018	3002	2919	2574	2575	2505	2397	2171
	802 ALSPNG	1807	1862	1921	2092	2054	1957	2027	2013	1982	1942	1774

Origin Region			Destination Region									
State	No.	Name	MACKAY	TWNSVL	CAIRNS	MT ISA	LNGRCH	ROMA	TOWMBA	ADELDE	PTLNCN	KADINA	WHYLLA
ACT	101	ACT	1546	1767	1999	1848	1324	875	891	948	1312	1041	1094
NSW	201	LISMRE	912	1201	1374	1586	962	493	191	1513	1827	1560	1520
	202	ARMDLE	989	1243	1453	1497	892	384	302	1238	1557	1287	1256
	203	DUBBO	1051	1256	1493	1369	815	371	506	973	1285	1017	983
	204	BRKNHL	1329	1427	1689	1234	903	748	1019	481	741	489	428
	205	DENLQN	1582	1779	2021	1789	1307	902	979	774	1139	870	933
	206	ALBURY	1595	1745	2000	1632	1235	934	1105	471	834	563	630
	207	WAGGA	1490	1687	1929	1710	1218	810	892	784	1146	871	917
	208	BATHST	1352	1576	1806	1689	1145	683	703	977	1331	1055	1076
	209	GOULBN	1519	1739	1970	1820	1296	847	866	941	1305	1032	1081
	210	COOMA	1667	1889	2120	1962	1445	997	1002	976	1342	1077	1147
	211	NEWCTL	1273	1520	1735	1709	1130	636	579	1142	1491	1214	1223
	212	GOSFRD	1363	1614	1826	1806	1229	734	656	1177	1532	1256	1277
	213	WLNGNG	1501	1740	1961	1881	1328	850	810	1091	1454	1180	1223
	214	SYDNEY	1393	1638	1855	1806	1238	751	697	1124	1481	1205	1231
	215	GRAFTN	1224	1504	1688	1817	1204	699	488	1437	1782	1505	1503
	216	TAREE	1032	1317	1495	1667	1046	555	299	1467	1794	1522	1497
VIC	301	GEELNG	1935	2099	2352	1987	1595	1261	1381	605	942	722	854
	302	WRNMBL	1980	2125	2382	1960	1610	1317	1467	494	811	611	759
	303	BALLRT	1866	2023	2277	1897	1514	1197	1334	526	873	641	767
	304	HORSHM	1812	1949	2207	1777	1431	1159	1334	372	726	486	612
	305	MILDRA	1607	1741	1999	1589	1225	960	1155	380	742	469	538
	306	BENDGO	1751	1914	2167	1815	1410	1079	1214	544	906	653	756
	307	SHPRTN	1717	1893	2143	1833	1400	1039	1151	635	999	742	834
	308	WANGTA	1689	1879	2124	1857	1397	1009	1093	729	1094	833	916
	309	SALE	1840	2041	2282	2037	1568	1161	1211	849	1206	960	1062
	310	MOE	1903	2091	2337	2043	1603	1223	1299	765	1114	879	995
	311	MELBRN	1891	2064	2315	1977	1565	1214	1321	649	996	764	886
QLD	401	BRSBNE	806	1102	1262	1533	912	488	152	1593	1895	1633	1581
	402	GOLDCT	824	1117	1283	1531	909	469	137	1558	1862	1599	1550
	403	NAMBOR	721	1020	1177	1469	851	460	141	1611	1902	1645	1584
	404	BUNDBG	567	872	1013	1380	780	494	266	1701	1972	1724	1648

Origin Region		Destination Region										
State	No.	Name	MACKAY	TWNSVL	CAIRNS	MT ISA	LNGRCH	ROMA	TOWMBA	ADELDE	PTLNCN	KADINA	WHYLLA
	405	RKHMTN	332	636	787	1171	602	488	423	1704	1941	1711	1613
	406	MACKAY	–	307	465	936	500	680	735	1807	1990	1792	1667
	407	TWNSVL	307	–	262	723	525	892	1017	1885	2015	1851	1706
	408	CAIRNS	465	262	–	899	787	1124	1200	2147	2274	2113	1967
	409	MT ISA	936	723	899	–	623	1118	1399	1579	1581	1506	1332
	410	LNGRCH	500	525	787	623	–	507	775	1360	1507	1329	1191
	411	ROMA	680	892	1124	1118	507	–	335	1223	1480	1237	1154
	412	TOWMBA	735	1017	1200	1399	775	335	–	1470	1761	1503	1443
SA	501	ADELDE	1807	1885	2147	1579	1360	1223	1470	–	365	117	276
	502	PTLNCN	1990	2015	2274	1581	1507	1480	1761	365	–	276	327
	503	KADINA	1792	1851	2113	1506	1329	1237	1503	117	276	–	177
	504	WHYLLA	1667	1706	1967	1332	1191	1154	1443	276	327	177	–
	505	GAWLER	1756	1825	2088	1506	1302	1187	1446	75	344	68	201
	506	VCTHBR	1873	1951	2213	1638	1427	1287	1530	66	344	145	320
	507	MRYBDG	1783	1869	2132	1585	1344	1188	1428	54	420	164	306
	508	MTGMBR	1834	1925	2187	1646	1400	1231	1462	88	435	204	361
	509	WOOMRA	1612	1578	1826	1064	1112	1247	1573	670	533	560	398
WA	601	ALBANY	3310	3227	3449	2570	2812	2949	3261	1904	1548	1825	1833
	602	BUNBRY	3516	3431	3652	2770	3018	3153	3463	2094	1741	2018	2031
	603	KALGLE	2871	2765	2979	2090	2379	2570	2894	1655	1290	1556	1521
	604	NRTHAM	3360	3252	3463	3570	2868	3048	3369	2069	1706	1981	1968
	605	PTHDLD	3319	3111	3249	2391	2902	3257	3592	2670	2331	2556	2461
	606	DERBY	2602	2345	2429	1677	2277	2724	3039	2538	2283	2422	2274
	607	GRLDTN	3471	3343	3543	2644	2986	3199	3525	2270	1904	2176	2150
	608	PERTH	3481	3380	3593	2703	2986	3152	3469	2140	1780	2056	2054
	609	CARNVN	3230	3053	3218	2330	2781	3088	3423	2381	2028	2271	2195
TAS	701	HOBART	2386	2585	2828	2538	2103	1707	1741	1134	1427	1250	1400
	702	BURNIE	2222	2410	2657	2340	1920	1542	1605	935	1240	1052	1198
	703	LNCSTN	2240	2437	2680	2390	1954	1560	1604	1015	1324	1132	1274
	704	QNSTWN	2301	2486	2733	2400	1992	1621	1688	962	1250	1078	1231
NT	801	DARWIN	1879	1590	1621	1055	1674	2173	2446	2398	2259	2297	2123
	802	ALSPNG	1609	1442	1630	731	1172	1546	1876	1380	1214	1272	1105

Origin Region			Destination Region									
State	No.	Name	GAWLER	VCTHBR	MRYBDG	MTGMBR	WOOMRA	ALBANY	BUNBRY	KALGLE	NRTHAM	PTHDLD	DERBY
ACT	101	ACT	972	982	894	891	1422	2849	3035	2597	3018	3546	3242
NSW	201	LISMRE	1499	1569	1467	1494	1689	3351	3551	3004	3472	3744	3215
	202	ARMDLE	1225	1294	1192	1218	1452	3089	3288	2755	3217	3541	3070
	203	DUBBO	957	1031	929	960	1190	2816	3015	2485	2945	3z96	2870
	204	BRKNHL	440	547	454	504	671	2260	2459	1933	2390	2801	2486
	205	DENLQN	801	806	720	715	1277	2673	2859	2427	2844	3392	3120
	206	ALBURY	494	509	417	420	990	2375	2563	2120	2540	3092	2856
	207	WAGGA	803	823	730	734	1243	2689	2877	2426	2852	3367	3069
	208	BATHST	987	1022	925	935	1365	2879	3071	2596	3034	3494	3138
	209	GOULBN	963	977	887	886	1404	2844	3031	2588	3011	3530	3219
	210	COOMA	1009	1002	922	911	1493	2863	3045	2631	3041	3607	3331
	211	NEWCTL	1147	1188	1090	1103	1488	3039	3232	2744	3188	3612	3215
	212	GOSFRD	1188	1219	1124	1132	1558	3080	3271	2798	3235	3686	3304
	213	WLNGNG	1112	1128	1037	1037	1535	2995	3182	2735	3161	3663	3327
	214	SYDNEY	1137	1165	1071	1077	1521	3028	3218	2751	3186	3651	3283
	215	GRAFTN	1439	1485	1386	1400	1741	3328	3523	3021	3472	3850	3395
	216	TAREE	1459	1520	1419	1441	1694	3330	3528	2998	3460	3775	3277
VIC	301	GEELNG	665	602	558	520	1248	2398	2572	2215	2593	3271	3128
	302	WRNMBL	561	480	453	406	1157	2250	2424	2074	2446	3143	3031
	303	BALLRT	583	529	477	443	1160	2353	2530	2154	2541	3196	3040
	304	HORSHM	427	381	322	292	1005	2228	2410	2013	2410	3042	2885
	305	MILDRA	401	422	327	335	904	2285	2474	2026	2448	2999	2776
	306	BENDGO	589	562	491	471	1137	2416	2597	2195	2596	3208	3013
	307	SHPRTN	676	657	581	565	1206	2514	2696	2289	2693	3292	3076
	308	WANGTA	766	753	675	661	1279	2612	2795	2384	2791	3377	3141
	309	SALE	896	862	797	772	1438	2693	2869	2493	2882	3516	3308
	310	MOE	818	770	714	683	1381	2581	2755	2393	2775	3435	3259
	311	MELBRN	704	652	599	566	1276	2466	2641	2275	2658	3319	3155
QLD	401	BRSBNE	1574	1652	1550	1580	1722	3404	3606	3043	3516	3744	3183
	402	GOLDCT	1540	1617	1515	1544	1697	3375	3576	3016	3488	3727	3175
	403	NAMBOR	1588	1672	1570	1603	1706	3399	3602	3028	3505	3705	3126
	404	BUNDBG	1671	1764	1663	1701	1730	3439	3644	3050	3532	3672	3052

Origin Region			Destination Region										
State	No.	Name	GAWLER	VCTHBR	MRYBDG	MTGMBE	WOOMRA	ALBANY	BUNBRY	KALGLE	NRTHAM	PTHDLD	DERBY
	405	RKHMTN	1665	1770	1672	1716	1640	3357	3562	2946	3433	3504	2849
	406	MACKAY	1756	1873	1783	1834	1612	3310	3516	2871	3360	3319	2602
	407	TWNSVL	1825	1951	1869	1925	1578	3227	3431	2765	3252	3111	2345
	408	CAIRNS	2088	2213	2132	2187	1826	3449	3652	2979	3463	3249	2429
	409	MT ISA	1506	1638	1585	1646	1064	2570	2770	2090	2570	2391	1677
	410	LNGRCH	1302	1427	1344	1400	1112	2812	3018	2379	2868	2902	2277
	411	ROMA	1187	1287	1188	1231	1247	2949	3153	2570	3048	3257	2724
	412	TOWMBA	1446	1530	1428	1462	1573	3261	3463	2894	3369	3592	3039
SA	501	ADELDE	75	66	54	88	670	1904	2094	1655	2069	2670	2538
	502	PTLNCN	344	344	420	435	533	1548	1741	1290	1706	2331	2283
	503	KADINA	68	145	164	204	560	1825	2018	1556	1981	2556	2422
	504	WHYLLA	201	320	306	361	398	1833	2031	1521	1968	2461	2274
	505	GAWLER	–	132	107	159	597	1892	2085	1625	2049	2620	2469
	506	VCTHBR	132	–	102	91	705	1867	2054	1633	2038	2668	2561
	507	MRYBDG	107	102	–	61	704	1958	2147	1709	2124	2721	2577
	508	MTGMBR	159	91	61	–	757	1958	2144	1724	2130	2752	2626
	509	WOOMRA	597	705	704	757	–	1716	1922	1322	1802	2129	1879
WA	601	ALBANY	1892	1867	1958	1958	1716	–	206	501	265	1441	2081
	602	BUNBRY	2085	2054	2147	2144	1922	206	–	688	301	1485	2203
	603	KALGLE	1625	1633	1709	1724	1322	501	688	–	489	1199	1646
	604	NRTHAM	2049	2038	2124	2130	1802	265	301	489	–	1195	1905
	605	PTHDLD	2620	2668	2721	2752	2129	1441	1485	1199	1195	–	996
	606	DERBY	2469	2561	2577	2626	1879	2081	2203	1646	1905	996	–
	607	GRLDTN	2245	2242	2324	2334	1952	504	483	632	242	1012	1811
	608	PERTH	2124	2105	2194	2196	1908	252	184	614	144	1302	2043
	609	CARNVN	2337	2371	2433	2459	1897	1049	1103	825	808	393	1200
TAS	701	HOBART	1203	1114	1095	1046	1798	2731	2882	2631	2953	3748	3672
	702	BURNIE	1003	919	895	847	1596	2594	2753	2468	2809	3568	3472
	703	LNCSTN	1080	1000	972	927	1671	2682	2840	2556	2896	3654	3549
	704	QNSTWN	1032	940	925	874	1629	2568	2723	2458	2787	3571	3501
NT	801	DARWIN	2322	2442	2422	2480	1745	2627	2792	2134	2518	1844	881
	802	ALSPNG	1306	1418	1411	1466	712	1864	2059	1373	1845	1730	1230

Origin Region		Destination Region								
State	No.	Name	GRLDTN	PERTH	CARNVN	HOBART	BURNIE	LNCSTN	QNSTWN	DARWIN	ALSPNG
ACT	101	ACT	3217	3087	3288	851	716	713	800	2868	2011
NSW	201	LISMRE	3636	3566	3562	1650	1531	1520	1615	2635	2039
	202	ARMDLE	3388	3308	3341	1440	1303	1303	1386	2552	1865
	203	DUBBO	3117	3035	3085	1335	1172	1189	1252	2412	1649
	204	BRKNHL	2565	2479	2564	1308	1108	1163	1165	2178	1259
	205	DENLQN	3044	2912	3127	806	641	658	721	2786	1894
	206	ALBURY	2739	2611	2822	906	707	760	770	2582	1641
	207	WAGGA	3048	2924	3111	898	733	751	813	2716	1840
	208	BATHST	3223	3111	3255	1044	902	904	985	2723	1908
	209	GOULBN	3209	3081	3275	877	739	738	823	2842	1989
	210	COOMA	3245	3105	3340	739	617	605	702	2976	2103
	211	NEWCTL	3373	3268	3384	1165	1040	1032	1124	2756	1990
	212	GOSFRD	3425	3312	3451	1103	991	975	1075	2853	2077
	213	WLNGNG	3357	3232	3414	941	828	812	912	2917	2096
	214	SYDNEY	3377	3261	3412	1052	935	922	1019	2848	2055
	215	GRAFTN	3652	3555	3638	1376	1278	1256	1362	2872	2187
	216	TAREE	3631	3550	3580	1536	1423	1409	1507	2720	2085
VIC	301	GEELNG	2808	2645	2971	562	259	425	413	2913	1938
	302	WRNMBL	2663	2497	2837	641	441	521	472	2854	1859
	303	BALLRT	2753	2597	2901	655	451	517	504	2821	1847
	304	HORSHM	2618	2471	2751	799	595	667	639	2681	1697
	305	MILDRA	2646	2520	2728	957	755	814	811	2521	1566
	306	BENDGO	2803	2658	2925	723	523	577	587	2760	1807
	307	SHPRTN	2899	2756	3013	709	520	560	592	2798	1862
	308	WANGTA	2996	2854	3102	707	533	558	612	2839	1921
	309	SALE	3094	2938	3230	545	393	400	477	3018	2092
	310	MOE	2989	2828	3142	501	320	352	398	3002	2054
	311	MELBRN	2872	2712	3024	561	362	416	427	2919	1957
QLD	401	BRSBNE	3674	3615	3576	1778	1656	1647	1740	2574	2027
	402	GOLDCT	3648	3586	3555	1741	1617	1609	1701	2575	2013
	403	NAMBOR	3658	3606	3545	1844	1716	1711	1800	2505	1982
	404	BUNDBG	3676	3638	3530	2005	1871	1870	1955	2397	1942

Origin Region			Destination Region								
State	No.	Name	GRLDTN	PERTH	CARNVN	HOBART	BURNIE	LNCSTN	QNSTWN	DARWIN	ALSPNG
	405	RKHMTN	3564	3545	3382	2139	1990	1998	2072	2171	1774
	406	MACKAY	3471	3481	3230	2386	2222	2240	2301	1879	1609
	407	TWNSVL	3343	3380	3053	2585	2410	2437	2486	1590	1442
	408	CAIRNS	3543	3593	3218	2828	2657	2680	2733	1621	1630
	409	MT ISA	2644	2703	2330	2530	2340	2390	2400	1055	731
	410	LNGRCH	2986	2986	2781	2103	1920	1954	1992	1674	1172
	411	ROMA	3199	3152	3088	1707	1542	1560	1621	2173	1546
	412	TOWMBA	3525	3469	3423	1741	1605	1604	1688	2446	1876
SA	501	ADELDE	2270	2140	2381	1134	935	1015	962	2398	1380
	502	PTLNCN	1904	1780	2028	1427	1240	1324	1250	2259	1214
	503	KADINA	2176	2056	2271	1250	1052	1132	1078	2297	1272
	504	WHYLLA	2150	2054	2195	1400	1198	1274	1231	2123	1105
	505	GAWLER	2245	2124	2337	1203	1003	1080	1032	2322	1306
	506	VCTHBR	2242	2105	2371	1114	919	1000	940	2442	1418
	507	MRYBDG	2324	2194	2433	1095	895	972	925	2422	1411
	508	MTGMBR	2334	2196	2459	1046	847	927	874	2480	1466
	509	WOOMRA	1952	1908	1897	1798	1596	1671	1629	1745	712
WA	601	ALBANY	504	252	1049	2731	2594	2682	2568	2627	1864
	602	BUNBRY	483	184	1103	2882	2753	2840	2723	2792	2059
	603	KALGLE	632	614	825	2631	2468	2556	2458	2134	1373
	604	NRTHAM	242	144	808	2953	2809	2896	2787	2518	1845
	605	PTHDLD	1012	1302	393	3748	3568	3654	3571	1844	1730
	606	DERBY	1811	2043	1200	3672	3472	3549	3501	881	1230
	607	GRLDTN	-	299	645	3183	3034	3122	3015	2490	1913
	608	PERTH	299	-	922	2983	2845	2933	2820	2662	1981
	609	CARNVN	645	922	-	3424	3251	3338	3249	1963	1621
TAS	701	HOBART	3183	2983	3424	-	203	149	176	3476	2496
	702	BURNIE	3034	2845	3251	203	-	88	84	3272	2293
	703	LNCSTN	3122	2933	3338	149	88	-	132	3335	2364
	704	QNSTWN	3015	2820	3249	176	84	132	-	3320	2331
NT	801	DARWIN	2490	2662	1963	3476	3272	3335	3320	-	1046
	802	ALSPNG	1913	1981	1621	2496	2293	2364	2331	1046	-

APPENDIX IV

ESTIMATED TRIP PROPORTION MATRIX

This Appendix presents a matrix of estimated trip
proportions for trips between NTS origin and destination
region pairs. The matrix was used to derive estimated trip
distribution information for the NTS sampling process. The
following points should be noted:

- The trips are those between the approximate
  population centroids of the NTS regions
  (as described in Appendix I);

- The proportions were calculated using a
  gravity model for trip distribution (as
  discussed in Appendix II);

- The usual practice of dealing with fractional
  distributions of trips from a particular region
  (rather than actual numbers) has been followed
  here;

- Each row of the matrix has a total of 1.0000 -
  column totals are meaningless;

- The matrix is not symmetrical, since the
  gravity model used predicts different trip
  numbers in each direction for a given pair
  of regions;

- The form of model used will not predict
  intraregional travel, and hence diagonals
  of the matrix are undefined (and were ignored
  in calculating trip proportions).

ESTIMATED TRIP PROPORTION MATRIX

Origin Region			Destination Region										
State	No.	Name	ACT	LISMRE	ARMDLE	DUBBO	BRKNHL	DENLQN	ALBURY	WAGGA	BATHST	GOULBN	COOMA
ACT	101	ACT	–	0.0072	0.0160	0.0173	0.0095	0.0321	0.0103	0.0462	0.0327	0.2485	0.0529
NSW	201	LISMRE	0.0038	–	0.0315	0.0126	0.0048	0.0033	0.0029	0.0053	0.0059	0.0033	0.0035
	202	ARMDLE	0.0086	0.0324	–	0.0372	0.0085	0.0061	0.0052	0.0105	0.0134	0.0063	0.0062
	203	DUBBO	0.0066	0.0092	0.0263	–	0.0109	0.0065	0.0060	0.0119	0.0133	0.0059	0.0055
	204	BRKNHL	0.0016	0.0015	0.0026	0.0048	–	0.0031	0.0057	0.0049	0.0031	0.0021	0.0023
	205	DENLQN	0.0145	0.0028	0.0052	0.0077	0.0083	–	0.0102	0.0599	0.0117	0.0152	0.0152
	206	ALBURY	0.0031	0.0017	0.0029	0.0048	0.0105	0.0069	–	0.0112	0.0048	0.0038	0.0044
	207	WAGGA	0.0305	0.0067	0.0129	0.0207	0.0195	0.0878	0.0243	–	0.0252	0.0258	0.0184
	208	BATHST	0.0309	0.0107	0.0236	0.0331	0.0179	0.0245	0.0149	0.0362	–	0.0267	0.0158
	209	GOULBN	0.1910	0.0048	0.0090	0.0120	0.0096	0.0260	0.0097	0.0300	0.0217	–	0.0288
	210	COOMA	0.0189	0.0024	0.0041	0.0052	0.0049	0.0121	0.0052	0.0100	0.0060	0.0134	–
	211	NEWCTL	0.0377	0.0340	0.0814	0.0710	0.0332	0.0320	0.0240	0.0405	0.0823	0.0371	0.0394
	212	GOSFRD	0.0138	0.0095	0.0188	0.0169	0.0097	0.0105	0.0074	0.0125	0.0218	0.0133	0.0148
	213	WLNGNG	0.0658	0.0149	0.0271	0.0300	0.0214	0.0330	0.0187	0.0370	0.0490	0.0599	0.0638
	214	SYDNEY	0.2865	0.1343	0.2664	0.2697	0.1597	0.1953	0.1275	0.2375	0.4618	0.2815	0.2841
	215	GRAFTN	0.0039	0.0121	0.0147	0.0085	0.0050	0.0037	0.0033	0.0043	0.0051	0.0036	0.0049
	216	TAREE	0.0032	0.0401	0.0223	0.0098	0.0054	0.0034	0.0032	0.0040	0.0044	0.0030	0.0041
VIC	301	GEELNG	0.0095	0.0049	0.0078	0.0108	0.0181	0.0176	0.0258	0.0150	0.0072	0.0084	0.0153
	302	WRNMBL	0.0044	0.0027	0.0043	0.0059	0.0113	0.0079	0.0144	0.0072	0.0037	0.0040	0.0069
	303	BALLRT	0.0061	0.0032	0.0052	0.0074	0.0133	0.0120	0.0224	0.0104	0.0048	0.0054	0.0094
	304	HORSHM	0.0030	0.0018	0.0030	0.0045	0.0099	0.0058	0.0168	0.0054	0.0026	0.0028	0.0044
	305	MILDRA	0.0042	0.0026	0.0045	0.0074	0.0206	0.0083	0.0615	0.0087	0.0040	0.0039	0.0057
	306	BENDGO	0.0093	0.0043	0.0072	0.0107	0.0186	0.0213	0.0448	0.0178	0.0073	0.0084	0.0138
	307	SHPRTN	0.0120	0.0045	0.0076	0.0112	0.0167	0.0330	0.0345	0.0237	0.0085	0.0107	0.0180
	308	WANGTA	0.0110	0.0031	0.0053	0.0076	0.0097	0.0394	0.0157	0.0204	0.0066	0.0097	0.0172
	309	SALE	0.0071	0.0023	0.0037	0.0049	0.0061	0.0118	0.0076	0.0086	0.0041	0.0060	0.0151
	310	MOE	0.0092	0.0038	0.0061	0.0081	0.0113	0.0166	0.0151	0.0129	0.0062	0.0080	0.0168
	311	MELBRN	0.1061	0.0489	0.0792	0.1098	0.1721	0.2069	0.2577	0.1670	0.0774	0.0936	0.1758
QLD	401	BRSBNE	0.0202	0.3387	0.1153	0.0687	0.0430	0.0227	0.0237	0.0263	0.0262	0.0190	0.0260
	402	GOLDCT	0.0042	0.0956	0.0259	0.0146	0.0088	0.0047	0.0049	0.0055	0.0055	0.0039	0.0054
	403	NAMBOR	0.0019	0.0196	0.0104	0.0068	0.0044	0.0022	0.0024	0.0026	0.0025	0.0018	0.0025
	404	BUNDBG	0.0033	0.0189	0.0145	0.0112	0.0083	0.0038	0.0043	0.0044	0.0041	0.0031	0.0043

			ACT	LISMRE	ARMDLE	DUBBO	BRKNHL	DENLQN	ALBURY	WAGGA	BATHST	GOULBN	COOMA
Origin Region			Destination Region										
State	No.	Name											
	405	RKHMTN	0.0026	0.0102	0.0100	0.0091	0.0076	0.0032	0.0037	0.0036	0.0032	0.0024	0.0034
	406	MACKAY	0.0013	0.0038	0.0043	0.0044	0.0044	0.0017	0.0020	0.0019	0.0016	0.0012	0.0018
	407	TWNSVL	0.0019	0.0046	0.0055	0.0060	0.0069	0.0025	0.0031	0.0028	0.0022	0.0018	0.0026
	408	CAIRNS	0.0015	0.0034	0.0040	0.0043	0.0049	0.0019	0.0023	0.0021	0.0017	0.0014	0.0020
	409	MT ISA	0.0007	0.0013	0.0018	0.0022	0.0033	0.0010	0.0014	0.0011	0.0008	0.0007	0.0010
	410	LNGRCH	0.0004	0.0009	0.0013	0.0015	0.0018	0.0005	0.0007	0.0006	0.0005	0.0004	0.0005
	411	ROMA	0.0013	0.0038	0.0065	0.0074	0.0042	0.0016	0.0019	0.0019	0.0017	0.0012	0.0016
	412	TOWMBA	0.0048	0.0468	0.0330	0.0194	0.0111	0.0055	0.0058	0.0064	0.0064	0.0045	0.0060
SA	501	ADELDE	0.0191	0.0161	0.0255	0.0378	0.1194	0.0314	0.0714	0.0324	0.0185	0.0175	0.0269
	502	PTLNCN	0.0008	0.0008	0.0012	0.0016	0.0043	0.0012	0.0022	0.0012	0.0008	0.0007	0.0011
	503	KADINA	0.0008	0.0007	0.0011	0.0017	0.0054	0.0013	0.0027	0.0013	0.0008	0.0007	0.0011
	504	WHYLLA	0.0022	0.0023	0.0035	0.0052	0.0193	0.0035	0.0070	0.0038	0.0023	0.0021	0.0031
	505	GAWLER	0.0013	0.0012	0.0018	0.0027	0.0095	0.0021	0.0048	0.0022	0.0013	0.0012	0.0018
	506	VCTHBR	0.0012	0.0010	0.0016	0.0023	0.0067	0.0020	0.0043	0.0020	0.0011	0.0011	0.0017
	507	MRYBDG	0.0021	0.0017	0.0028	0.0041	0.0132	0.0035	0.0085	0.0036	0.0020	0.0019	0.0030
	508	MTGMBR	0.0021	0.0017	0.0027	0.0039	0.0116	0.0036	0.0084	0.0036	0.0020	0.0019	0.0030
	509	WOOMRA	0.0003	0.0004	0.0006	0.0008	0.0021	0.0005	0.0008	0.0005	0.0003	0.0003	0.0004
WA	601	ALBANY	0.0006	0.0007	0.0009	0.0011	0.0020	0.0008	0.0011	0.0008	0.0005	0.0005	0.0008
	602	BUNBRY	0.0005	0.0007	0.0009	0.0011	0.0019	0.0008	0.0011	0.0008	0.0005	0.0005	0.0008
	603	KALGLE	0.0004	0.0006	0.0008	0.0010	0.0018	0.0006	0.0009	0.0007	0.0005	0.0004	0.0006
	604	NRTHAM	0.0004	0.0005	0.0006	0.0008	0.0013	0.0005	0.0007	0.0005	0.0004	0.0003	0.0005
	605	PTHDLD	0.0003	0.0004	0.0005	0.0006	0.0010	0.0004	0.0005	0.0004	0.0003	0.0003	0.0004
	606	DERBY	0.0002	0.0002	0.0003	0.0004	0.0006	0.0002	0.0003	0.0002	0.0002	0.0001	0.0002
	607	GRLDTN	0.0003	0.0004	0.0006	0.0007	0.0012	0.0005	0.0007	0.0005	0.0003	0.0003	0.0005
	608	PERTH	0.0040	0.0050	0.0068	0.0084	0.0144	0.0055	0.0079	0.0058	0.0040	0.0037	0.0058
	609	CARNVN	0.0002	0.0002	0.0003	0.0003	0.0006	0.0002	0.0003	0.0002	0.0002	0.0001	0.0002
TAS	701	HOBART	0.0061	0.0041	0.0059	0.0072	0.0099	0.0084	0.0090	0.0077	0.0048	0.0054	0.0106
	702	BURNIE	0.0041	0.0024	0.0036	0.0046	0.0065	0.0060	0.0066	0.0053	0.0031	0.0036	0.0071
	703	LNCSTN	0.0047	0.0028	0.0042	0.0052	0.0071	0.0067	0.0070	0.0060	0.0036	0.0041	0.0085
	704	QNSTWN	0.0007	0.0004	0.0007	0.0008	0.0012	0.0010	0.0012	0.0009	0.0006	0.0006	0.0012
NT	801	DARWIN	0.0006	0.0009	0.0012	0.0014	0.0021	0.0007	0.0010	0.0008	0.0006	0.0005	0.0008
	802	ALSPNG	0.0004	0.0006	0.0008	0.0010	0.0019	0.0005	0.0008	0.0006	0.0004	0.0004	0.0005

Origin Region			Destination Region									
State	No.	Name	NEWCTL	GOSFRD	WLNGNG	SYDNEY	GRAFTN	TAREE	GEELNG	WRNMBL	BALLRT	HORSHM	MILDRA
ACT	101	ACT	0.0216	0.0088	0.0435	0.0518	0.0172	0.0117	0.0064	0.0093	0.0076	0.0091	0.0131
NSW	201	LISMRE	0.0101	0.0032	0.0051	0.0127	0.0283	0.0759	0.0017	0.0029	0.0021	0.0029	0.0043
	202	ARMDLE	0.0249	0.0064	0.0096	0.0258	0.0353	0.0433	0.0028	0.0047	0.0034	0.0049	0.0075
	203	DUBBO	0.0154	0.0041	0.0075	0.0185	0.0145	0.0135	0.0028	0.0047	0.0035	0.0051	0.0087
	204	BRKNHL	0.0032	0.0010	0.0024	0.0048	0.0037	0.0032	0.0020	0.0039	0.0028	0.0050	0.0107
	205	DENLQN	0.0082	0.0030	0.0098	0.0159	0.0075	0.0055	0.0053	0.0074	0.0067	0.0079	0.0117
	206	ALBURY	0.0042	0.0014	0.0038	0.0070	0.0045	0.0036	0.0053	0.0091	0.0085	0.0154	0.0582
	207	WAGGA	0.0153	0.0053	0.0162	0.0284	0.0128	0.0095	0.0067	0.0099	0.0085	0.0109	0.0178
	208	BATHST	0.0445	0.0131	0.0307	0.0791	0.0217	0.0152	0.0046	0.0072	0.0057	0.0075	0.0117
	209	GOULBN	0.0163	0.0065	0.0305	0.0392	0.0124	0.0085	0.0044	0.0064	0.0052	0.0064	0.0093
	210	COOMA	0.0081	0.0034	0.0151	0.0184	0.0078	0.0053	0.0037	0.0051	0.0042	0.0048	0.0063
	211	NEWCTL	-	0.0503	0.0394	0.1754	0.0604	0.0374	0.0057	0.0091	0.0069	0.0092	0.0139
	212	GOSFRD	0.0452	-	0.0316	0.2141	0.0316	0.0172	0.0030	0.0048	0.0036	0.0047	0.0069
	213	WLNGNG	0.0340	0.0303	-	0.1541	0.0292	0.0179	0.0059	0.0089	0.0069	0.0087	0.0123
	214	SYDNEY	0.5536	0.7524	0.5638	-	0.1202	0.0710	0.0159	0.0249	0.0190	0.0246	0.0361
	215	GRAFTN	0.0077	0.0045	0.0043	0.0049	-	0.0362	0.0017	0.0028	0.0020	0.0027	0.0039
	216	TAREE	0.0059	0.0030	0.0033	0.0035	0.0447	-	0.0015	0.0026	0.0019	0.0026	0.0038
VIC	301	GEELNG	0.0048	0.0029	0.0058	0.0043	0.0111	0.0084	-	0.0612	0.0684	0.0301	0.0206
	302	WRNMBL	0.0025	0.0015	0.0028	0.0022	0.0059	0.0045	0.0197	-	0.0316	0.0317	0.0161
	303	BALLRT	0.0031	0.0019	0.0037	0.0028	0.0071	0.0054	0.0369	0.0528	-	0.0395	0.0218
	304	HORSHM	0.0017	0.0010	0.0019	0.0015	0.0040	0.0031	0.0067	0.0219	0.0163	-	0.0262
	305	MILDRA	0.0026	0.0014	0.0026	0.0021	0.0056	0.0044	0.0045	0.0108	0.0087	0.0254	-
	306	BENDGO	0.0045	0.0026	0.0053	0.0040	0.0097	0.0074	0.0189	0.0299	0.0458	0.0478	0.0406
	307	SHPRTN	0.0051	0.0030	0.0063	0.0046	0.0104	0.0078	0.0140	0.0205	0.0239	0.0274	0.0298
	308	WANGTA	0.0038	0.0023	0.0052	0.0036	0.0075	0.0054	0.0064	0.0098	0.0096	0.0122	0.0143
	309	SALE	0.0026	0.0017	0.0039	0.0026	0.0058	0.0041	0.0053	0.0076	0.0065	0.0077	0.0078
	310	MOE	0.0040	0.0025	0.0054	0.0037	0.0091	0.0066	0.0177	0.0200	0.0182	0.0179	0.0159
	311	MELBRN	0.0504	0.0303	0.0628	0.0455	0.1138	0.0846	0.7101	0.4437	0.5537	0.3692	0.2741
QLD	401	BRSBNE	0.0295	0.0153	0.0189	0.0191	0.1414	0.2348	0.0081	0.0173	0.0119	0.0211	0.0284
	402	GOLDCT	0.0063	0.0032	0.0039	0.0040	0.0304	0.0546	0.0016	0.0035	0.0024	0.0043	0.0058
	403	NAMBOR	0.0027	0.0014	0.0018	0.0018	0.0119	0.0174	0.0008	0.0017	0.0012	0.0021	0.0029
	404	BUNDBG	0.0042	0.0022	0.0029	0.0028	0.0170	0.0210	0.0015	0.0032	0.0021	0.0039	0.0052

Origin Region			Destination Region										
State	No.	Name	NEWCTL	GOSFRD	WLNGNG	SYDNEY	GRAFTN	TAREE	GEELNG	WRNMBL	BALLRT	HORSHM	MILDRA
	405	RKHMTN	0.0031	0.0016	0.0023	0.0021	0.0113	0.0127	0.0012	0.0027	0.0018	0.0034	0.0046
	406	MACKAY	0.0015	0.0008	0.0011	0.0010	0.0050	0.0051	0.0007	0.0016	0.0010	0.0019	0.0026
	407	TWNSVL	0.0020	0.0011	0.0016	0.0015	0.0066	0.0065	0.0011	0.0024	0.0016	0.0030	0.0040
	408	CAIRNS	0.0015	0.0008	0.0012	0.0011	0.0051	0.0049	0.0008	0.0019	0.0012	0.0023	0.0029
	409	MT ISA	0.0007	0.0004	0.0006	0.0005	0.0021	0.0020	0.0005	0.0011	0.0007	0.0014	0.0018
	410	LNGRCH	0.0004	0.0002	0.0003	0.0003	0.0013	0.0013	0.0002	0.0005	0.0003	0.0007	0.0009
	411	ROMA	0.0016	0.0008	0.0011	0.0011	0.0047	0.0053	0.0006	0.0012	0.0008	0.0016	0.0023
	412	TOWMBA	0.0070	0.0035	0.0044	0.0044	0.0280	0.0427	0.0019	0.0041	0.0028	0.0051	0.0070
SA	501	ADELDE	0.0132	0.0074	0.0131	0.0107	0.0324	0.0264	0.0225	0.0670	0.0381	0.1044	0.1176
	502	PTLNCN	0.0006	0.0003	0.0006	0.0005	0.0015	0.0013	0.0008	0.0022	0.0013	0.0028	0.0032
	503	KADINA	0.0006	0.0003	0.0005	0.0005	0.0014	0.0012	0.0008	0.0024	0.0014	0.0035	0.0042
	504	WHYLLA	0.0017	0.0009	0.0016	0.0013	0.0043	0.0036	0.0021	0.0056	0.0034	0.0080	0.0108
	505	GAWLER	0.0009	0.0005	0.0009	0.0007	0.0023	0.0019	0.0014	0.0041	0.0024	0.0063	0.0078
	506	VCTHBR	0.0008	0.0005	0.0008	0.0007	0.0020	0.0017	0.0015	0.0045	0.0025	0.0066	0.0068
	507	MRYBDG	0.0014	0.0008	0.0014	0.0012	0.0035	0.0028	0.0026	0.0077	0.0044	0.0128	0.0146
	508	MTGMBR	0.0014	0.0008	0.0014	0.0012	0.0034	0.0028	0.0028	0.0088	0.0048	0.0144	0.0141
	509	WOOMRA	0.0003	0.0001	0.0002	0.0002	0.0007	0.0006	0.0002	0.0006	0.0004	0.0008	0.0011
WA	601	ALBANY	0.0004	0.0003	0.0004	0.0004	0.0013	0.0011	0.0005	0.0012	0.0007	0.0013	0.0015
	602	BUNBRY	0.0004	0.0003	0.0004	0.0003	0.0013	0.0011	0.0005	0.0011	0.0007	0.0013	0.0014
	603	KALGLE	0.0004	0.0002	0.0003	0.0003	0.0011	0.0009	0.0004	0.0009	0.0005	0.0011	0.0012
	604	NRTHAM	0.0003	0.0002	0.0003	0.0002	0.0009	0.0007	0.0003	0.0007	0.0004	0.0008	0.0009
	605	PTHDLD	0.0002	0.0001	0.0002	0.0002	0.0007	0.0006	0.0002	0.0005	0.0003	0.0006	0.0007
	606	DERBY	0.0001	0.0001	0.0001	0.0001	0.0004	0.0004	0.0001	0.0003	0.0002	0.0003	0.0004
	607	GRLDTN	0.0003	0.0002	0.0003	0.0002	0.0008	0.0007	0.0003	0.0007	0.0004	0.0008	0.0009
	608	PERTH	0.0033	0.0019	0.0031	0.0026	0.0095	0.0080	0.0033	0.0082	0.0048	0.0092	0.0104
	609	CARNVN	0.0001	0.0001	0.0001	0.0001	0.0004	0.0003	0.0001	0.0003	0.0002	0.0003	0.0004
TAS	701	HOBART	0.0036	0.0023	0.0044	0.0032	0.0096	0.0070	0.0069	0.0137	0.0082	0.0115	0.0107
	702	BURNIE	0.0022	0.0014	0.0028	0.0020	0.0057	0.0042	0.0064	0.0117	0.0070	0.0089	0.0077
	703	LNCSTN	0.0026	0.0016	0.0033	0.0024	0.0067	0.0049	0.0061	0.0110	0.0068	0.0090	0.0082
	704	QNSTWN	0.0004	0.0002	0.0005	0.0004	0.0010	0.0008	0.0011	0.0021	0.0012	0.0016	0.0014
NT	801	DARWIN	0.0005	0.0003	0.0004	0.0004	0.0016	0.0014	0.0004	0.0009	0.0006	0.0011	0.0013
	802	ALSPNG	0.0003	0.0002	0.0003	0.0003	0.0010	0.0009	0.0003	0.0007	0.0004	0.0008	0.0011

Origin Region			Destination Region										
State	No.	Name	BENDGO	SHPRTN	WANGTA	SALE	MOE	MELBRN	BRSBNE	GOLDCT	NAMBOR	BUNDBG	RKHMTN
ACT	101	ACT	0.0120	0.0165	0.0242	0.0197	0.0112	0.0208	0.0125	0.0055	0.0073	0.0123	0.0138
NSW	201	LISMRE	0.0029	0.0032	0.0035	0.0033	0.0024	0.0050	0.1094	0.0653	0.0387	0.0369	0.0281
	202	ARMDLE	0.0050	0.0056	0.0062	0.0055	0.0039	0.0083	0.0383	0.0182	0.0210	0.0290	0.0286
	203	DUBBO	0.0052	0.0058	0.0064	0.0051	0.0037	0.0082	0.0162	0.0072	0.0097	0.0159	0.0183
	204	BRKNHL	0.0040	0.0038	0.0035	0.0028	0.0023	0.0056	0.0044	0.0019	0.0028	0.0051	0.0067
	205	DENLQN	0.0124	0.0204	0.0389	0.0148	0.0091	0.0183	0.0064	0.0028	0.0038	0.0065	0.0075
	206	ALBURY	0.0176	0.0144	0.0105	0.0064	0.0055	0.0153	0.0045	0.0019	0.0027	0.0049	0.0059
	207	WAGGA	0.0152	0.0215	0.0296	0.0158	0.0103	0.0216	0.0108	0.0047	0.0064	0.0109	0.0126
	208	BATHST	0.0089	0.0110	0.0138	0.0108	0.0071	0.0144	0.0154	0.0068	0.0089	0.0145	0.0160
	209	GOULBN	0.0083	0.0113	0.0163	0.0127	0.0074	0.0141	0.0090	0.0040	0.0053	0.0088	0.0099
	210	COOMA	0.0064	0.0088	0.0135	0.0150	0.0073	0.0123	0.0058	0.0025	0.0034	0.0057	0.0065
	211	NEWCTL	0.0102	0.0121	0.0145	0.0128	0.0086	0.0173	0.0320	0.0144	0.0179	0.0275	0.0289
	212	GOSFRD	0.0053	0.0064	0.0078	0.0073	0.0047	0.0094	0.0150	0.0067	0.0084	0.0131	0.0137
	213	WLNGNG	0.0104	0.0131	0.0171	0.0163	0.0098	0.0186	0.0177	0.0078	0.0102	0.0166	0.0181
	214	SYDNEY	0.0283	0.0347	0.0432	0.0393	0.0251	0.0493	0.0653	0.0291	0.0370	0.0587	0.0629
	215	GRAFTN	0.0028	0.0032	0.0037	0.0036	0.0025	0.0050	0.0196	0.0089	0.0101	0.0142	0.0134
	216	TAREE	0.0026	0.0029	0.0033	0.0031	0.0022	0.0046	0.0401	0.0197	0.0181	0.0217	0.0186
VIC	301	GEELNG	0.0363	0.0285	0.0208	0.0219	0.0319	0.2070	0.0074	0.0032	0.0045	0.0081	0.0097
	302	WRNMBL	0.0185	0.0135	0.0103	0.0101	0.0116	0.0417	0.0052	0.0022	0.0031	0.0057	0.0070
	303	BALLRT	0.0474	0.0263	0.0168	0.0144	0.0177	0.0871	0.0059	0.0025	0.0036	0.0065	0.0078
	304	HORSHM	0.0205	0.0125	0.0088	0.0070	0.0072	0.0240	0.0043	0.0019	0.0027	0.0048	0.0059
	305	MILDRA	0.0168	0.0131	0.0101	0.0070	0.0062	0.0173	0.0057	0.0024	0.0035	0.0063	0.0078
	306	BENDGO	–	0.0690	0.0298	0.0182	0.0190	0.0696	0.0073	0.0032	0.0044	0.0079	0.0095
	307	SHPRTN	0.0649	–	0.0685	0.0251	0.0227	0.0615	0.0077	0.0033	0.0046	0.0081	0.0097
	308	WANGTA	0.0176	0.0429	–	0.0266	0.0171	0.0335	0.0063	0.0028	0.0038	0.0066	0.0077
	309	SALE	0.0085	0.0125	0.0211	–	0.0299	0.0310	0.0052	0.0022	0.0031	0.0054	0.0063
	310	MOE	0.0203	0.0258	0.0309	0.0683	–	0.0974	0.0066	0.0029	0.0040	0.0070	0.0083
	311	MELBRN	0.4583	0.4310	0.3750	0.4375	0.6013	–	0.0281	0.0121	0.0170	0.0302	0.0362
QLD	401	BRSBNE	0.0152	0.0170	0.0224	0.0230	0.0129	0.0089	–	0.5862	0.3317	0.1718	0.1042
	402	GOLDCT	0.0031	0.0035	0.0046	0.0047	0.0026	0.0018	0.2775	–	0.0943	0.0600	0.0394
	403	NAMBOR	0.0015	0.0017	0.0022	0.0023	0.0013	0.0009	0.0545	0.0327	–	0.0763	0.0366
	404	BUNDBG	0.0027	0.0030	0.0039	0.0040	0.0023	0.0016	0.0285	0.0210	0.0770	–	0.1007

Origin Region			Destination Region										
State	No.	Name	BENDGO	SHPRTN	WANGTA	SALE	MOE	MELBRN	BRSBNE	GOLDCT	NAMBOR	BUNDBG	RKHMTN
	405	RKHMTN	0.0023	0.0025	0.0032	0.0033	0.0019	0.0013	0.0122	0.0097	0.0260	0.0710	-
	406	MACKAY	0.0013	0.0014	0.0017	0.0018	0.0010	0.0007	0.0041	0.0033	0.0079	0.0155	0.0401
	407	TWNSVL	0.0020	0.0021	0.0026	0.0026	0.0016	0.0011	0.0048	0.0039	0.0088	0.0157	0.0310
	408	CAIRNS	0.0015	0.0016	0.0019	0.0020	0.0012	0.0009	0.0035	0.0029	0.0065	0.0115	0.0210
	409	MT ISA	0.0008	0.0009	0.0011	0.0011	0.0007	0.0005	0.0013	0.0011	0.0023	0.0036	0.0059
	410	LNGRCH	0.0004	0.0005	0.0006	0.0006	0.0003	0.0002	0.0009	0.0008	0.0017	0.0027	0.0050
	411	ROMA	0.0011	0.0012	0.0015	0.0015	0.0009	0.0006	0.0036	0.0032	0.0065	0.0088	0.0120
	412	TOWMBA	0.0037	0.0041	0.0053	0.0053	0.0030	0.0021	0.0571	0.0545	0.1053	0.0716	0.0545
SA	501	ADELDE	0.0420	0.0362	0.0378	0.0356	0.0249	0.0215	0.0140	0.0121	0.0232	0.0321	0.0429
	502	PTLNCN	0.0014	0.0013	0.0014	0.0014	0.0010	0.0008	0.0007	0.0006	0.0012	0.0016	0.0022
	503	KADINA	0.0016	0.0014	0.0015	0.0014	0.0010	0.0008	0.0006	0.0005	0.0010	0.0015	0.0020
	504	WHYLLA	0.0039	0.0036	0.0040	0.0038	0.0025	0.0021	0.0020	0.0017	0.0033	0.0047	0.0064
	505	GAWLER	0.0027	0.0024	0.0025	0.0024	0.0016	0.0014	0.0010	0.0009	0.0017	0.0023	0.0031
	506	VCTHBR	0.0026	0.0023	0.0024	0.0023	0.0016	0.0014	0.0009	0.0008	0.0015	0.0020	0.0027
	507	MRYBDG	0.0049	0.0042	0.0043	0.0040	0.0028	0.0024	0.0015	0.0013	0.0025	0.0034	0.0045
	508	MTGMBR	0.0052	0.0043	0.0044	0.0041	0.0029	0.0026	0.0015	0.0013	0.0024	0.0033	0.0044
	509	WOOMRA	0.0005	0.0004	0.0005	0.0005	0.0003	0.0003	0.0003	0.0003	0.0006	0.0008	0.0012
WA	601	ALBANY	0.0008	0.0008	0.0009	0.0010	0.0006	0.0005	0.0006	0.0005	0.0010	0.0015	0.0021
	602	BUNBRY	0.0007	0.0007	0.0009	0.0010	0.0006	0.0005	0.0006	0.0005	0.0010	0.0015	0.0021
	603	KALGLE	0.0006	0.0006	0.0007	0.0008	0.0005	0.0004	0.0005	0.0004	0.0009	0.0013	0.0018
	604	NRTHAM	0.0005	0.0005	0.0006	0.0006	0.0004	0.0003	0.0004	0.0004	0.0007	0.0010	0.0014
	605	PTHDLD	0.0003	0.0003	0.0004	0.0005	0.0003	0.0002	0.0004	0.0003	0.0006	0.0009	0.0013
	606	DERBY	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0004	0.0006	0.0008
	607	GRLDTN	0.0005	0.0005	0.0005	0.0006	0.0004	0.0003	0.0004	0.0003	0.0007	0.0010	0.0014
	608	PERTH	0.0054	0.0054	0.0064	0.0070	0.0045	0.0033	0.0046	0.0039	0.0077	0.0113	0.0156
	609	CARNVN	0.0002	0.0002	0.0002	0.0003	0.0002	0.0001	0.0002	0.0002	0.0003	0.0005	0.0007
TAS	701	HOBART	0.0083	0.0089	0.0110	0.0172	0.0117	0.0072	0.0034	0.0030	0.0055	0.0074	0.0091
	702	BURNIE	0.0067	0.0070	0.0084	0.0138	0.0109	0.0067	0.0020	0.0018	0.0033	0.0043	0.0054
	703	LNCSTN	0.0069	0.0074	0.0092	0.0157	0.0113	0.0065	0.0024	0.0020	0.0038	0.0050	0.0062
	704	QNSTWN	0.0012	0.0012	0.0014	0.0022	0.0017	0.0011	0.0004	0.0003	0.0006	0.0008	0.0010
NT	801	DARWIN	0.0007	0.0007	0.0008	0.0009	0.0005	0.0004	0.0009	0.0007	0.0015	0.0024	0.0036
	802	ALSPNG	0.0005	0.0005	0.0006	0.0006	0.0004	0.0003	0.0005	0.0005	0.0009	0.0014	0.0021

ESTIMATED TRIP PROPORTION MATRIX (CONT.)

Origin Region			Destination Region										
State	No.	Name	MACKAY	TWNSVL	CAIRNS	MT ISA	LNGRCH	ROMA	TOWMBA	ADELDE	PTLNCN	KADINA	WHYLLA
ACT	101	ACT	0.0128	0.0140	0.0138	0.0141	0.0126	0.0155	0.0114	0.0152	0.0122	0.0076	0.0137
NSW	201	LISMRE	0.0190	0.0175	0.0170	0.0133	0.0145	0.0243	0.0582	0.0067	0.0063	0.0036	0.0072
	202	ARMDLE	0.0219	0.0214	0.0202	0.0181	0.0203	0.0420	0.0423	0.0109	0.0098	0.0058	0.0115
	203	DUBBO	0.0159	0.0165	0.0153	0.0158	0.0177	0.0342	0.0176	0.0114	0.0097	0.0061	0.0122
	204	BRKNHL	0.0070	0.0083	0.0077	0.0105	0.0092	0.0085	0.0044	0.0158	0.0111	0.0087	0.0197
	205	DENLQN	0.0072	0.0080	0.0079	0.0085	0.0074	0.0086	0.0059	0.0113	0.0084	0.0055	0.0097
	206	ALBURY	0.0060	0.0069	0.0067	0.0080	0.0067	0.0069	0.0042	0.0173	0.0103	0.0078	0.0131
	207	WAGGA	0.0119	0.0132	0.0129	0.0138	0.0124	0.0151	0.0101	0.0171	0.0128	0.0084	0.0152
	208	BATHST	0.0144	0.0154	0.0149	0.0150	0.0143	0.0199	0.0145	0.0140	0.0114	0.0071	0.0134
	209	GOULBN	0.0092	0.0100	0.0098	0.0101	0.0091	0.0113	0.0082	0.0107	0.0086	0.0054	0.0098
	210	COOMA	0.0061	0.0068	0.0067	0.0069	0.0059	0.0069	0.0052	0.0077	0.0062	0.0038	0.0068
	211	NEWCTL	0.0247	0.0256	0.0250	0.0236	0.0233	0.0347	0.0293	0.0184	0.0158	0.0096	0.0183
	212	GOSFRD	0.0119	0.0125	0.0123	0.0116	0.0110	0.0153	0.0132	0.0093	0.0080	0.0048	0.0091
	213	WLNGNG	0.0163	0.0176	0.0174	0.0170	0.0154	0.0197	0.0157	0.0157	0.0132	0.0080	0.0147
	214	SYDNEY	0.0553	0.0585	0.0576	0.0552	0.0520	0.0709	0.0584	0.0470	0.0399	0.0242	0.0453
	215	GRAFTN	0.0107	0.0108	0.0107	0.0091	0.0089	0.0128	0.0150	0.0058	0.0053	0.0031	0.0059
	216	TAREE	0.0137	0.0131	0.0128	0.0104	0.0109	0.0176	0.0281	0.0058	0.0054	0.0031	0.0061
VIC	301	GEELNG	0.0099	0.0115	0.0115	0.0131	0.0102	0.0100	0.0068	0.0267	0.0185	0.0120	0.0189
	302	WRNMBL	0.0072	0.0085	0.0085	0.0100	0.0076	0.0071	0.0047	0.0256	0.0167	0.0111	0.0163
	303	BALLRT	0.0079	0.0093	0.0092	0.0107	0.0084	0.0082	0.0054	0.0244	0.0156	0.0107	0.0166
	304	HORSHM	0.0061	0.0072	0.0071	0.0086	0.0066	0.0064	0.0040	0.0276	0.0145	0.0111	0.0162
	305	MILDRA	0.0079	0.0093	0.0090	0.0110	0.0090	0.0090	0.0054	0.0301	0.0158	0.0130	0.0212
	306	BENDGO	0.0095	0.0110	0.0108	0.0125	0.0101	0.0104	0.0068	0.0260	0.0166	0.0116	0.0187
	307	SHPRTN	0.0096	0.0109	0.0108	0.0121	0.0100	0.0106	0.0071	0.0210	0.0144	0.0097	0.0162
	308	WANGTA	0.0075	0.0085	0.0084	0.0092	0.0077	0.0085	0.0058	0.0137	0.0100	0.0065	0.0112
	309	SALE	0.0061	0.0069	0.0069	0.0074	0.0061	0.0065	0.0046	0.0103	0.0080	0.0049	0.0084
	310	MOE	0.0082	0.0095	0.0095	0.0104	0.0083	0.0085	0.0060	0.0164	0.0123	0.0077	0.0128
	311	MELBRN	0.0363	0.0421	0.0419	0.0472	0.0373	0.0376	0.0255	0.0876	0.0618	0.0402	0.0645
QLD	401	BRSBNE	0.0633	0.0557	0.0541	0.0396	0.0444	0.0704	0.2200	0.0180	0.0173	0.0098	0.0196
	402	GOLDCT	0.0245	0.0218	0.0211	0.0158	0.0177	0.0294	0.0995	0.0074	0.0071	0.0040	0.0080
	403	NAMBOR	0.0200	0.0169	0.0163	0.0115	0.0133	0.0209	0.0666	0.0049	0.0048	0.0027	0.0054
	404	BUNDBG	0.0400	0.0305	0.0291	0.0185	0.0221	0.0285	0.0457	0.0068	0.0068	0.0038	0.0077

Origin Region			Destination Region										
State	No.	Name	MACKAY	TWNSVL	CAIRNS	MT ISA	LNGRCH	ROMA	TOWMBA	ADELDE	PTLNCN	KADINA	WHYLLA
	405	RKHMTN	0.0727	0.0424	0.0374	0.0214	0.0286	0.0274	0.0245	0.0064	0.0065	0.0036	0.0074
	406	MACKAY	–	0.0799	0.0552	0.0218	0.0279	0.0142	0.0097	0.0047	0.0049	0.0026	0.0055
	407	TWNSVL	0.1060	–	0.1506	0.0405	0.0356	0.0138	0.0088	0.0060	0.0066	0.0034	0.0073
	408	CAIRNS	0.0561	0.1156	–	0.0289	0.0202	0.0097	0.0067	0.0048	0.0053	0.0027	0.0057
	409	MT ISA	0.0110	0.0154	0.0143	–	0.0173	0.0063	0.0036	0.0044	0.0053	0.0026	0.0059
	410	LNGRCH	0.0089	0.0086	0.0063	0.0109	–	0.0094	0.0042	0.0031	0.0032	0.0018	0.0039
	411	ROMA	0.0112	0.0083	0.0075	0.0099	0.0235	–	0.0166	0.0049	0.0047	0.0027	0.0057
	412	TOWMBA	0.0390	0.0268	0.0266	0.0286	0.0534	0.0844	–	0.0084	0.0080	0.0046	0.0093
SA	501	ADELDE	0.0562	0.0546	0.0564	0.1066	0.1161	0.0750	0.0253	–	0.1261	0.2381	0.1605
	502	PTLNCN	0.0030	0.0031	0.0032	0.0065	0.0062	0.0036	0.0012	0.0065	–	0.0171	0.0267
	503	KADINA	0.0026	0.0026	0.0027	0.0052	0.0055	0.0034	0.0011	0.0196	0.0275	–	0.0482
	504	WHYLLA	0.0087	0.0087	0.0088	0.0184	0.0192	0.0113	0.0036	0.0209	0.0679	0.0762	–
	505	GAWLER	0.0041	0.0040	0.0041	0.0080	0.0087	0.0055	0.0018	0.0520	0.0323	0.1240	0.0393
	506	VCTHBR	0.0035	0.0034	0.0036	0.0067	0.0072	0.0046	0.0016	0.0560	0.0298	0.0454	0.0205
	507	MRYBDG	0.0059	0.0057	0.0059	0.0109	0.0121	0.0080	0.0027	0.1127	0.0367	0.0614	0.0341
	508	MTGMBR	0.0057	0.0055	0.0057	0.0104	0.0115	0.0077	0.0026	0.0619	0.0351	0.0469	0.0278
	509	WOOMRA	0.0017	0.0018	0.0018	0.0046	0.0040	0.0020	0.0006	0.0013	0.0071	0.0035	0.0064
WA	601	ALBANY	0.0030	0.0031	0.0035	0.0065	0.0053	0.0028	0.0011	0.0016	0.0018	0.0035	0.0041
	602	BUNBRY	0.0030	0.0031	0.0035	0.0064	0.0052	0.0028	0.0011	0.0015	0.0074	0.0033	0.0039
	603	KALGLE	0.0026	0.0027	0.0030	0.0061	0.0047	0.0024	0.0009	0.0013	0.0073	0.0031	0.0038
	604	NRTHAM	0.0020	0.0022	0.0024	0.0046	0.0036	0.0019	0.0007	0.0010	0.0050	0.0022	0.0027
	605	PTHDLD	0.0019	0.0021	0.0024	0.0046	0.0033	0.0016	0.0006	0.0007	0.0032	0.0015	0.0019
	606	DERBY	0.0013	0.0015	0.0017	0.0035	0.0022	0.0010	0.0004	0.0004	0.0016	0.0008	0.0010
	607	GRLDTN	0.0020	0.0022	0.0025	0.0046	0.0036	0.0019	0.0007	0.0009	0.0045	0.0020	0.0025
	608	PERTH	0.0225	0.0238	0.0268	0.0492	0.0396	0.0210	0.0079	0.0109	0.0544	0.0242	0.0288
	609	CARNVN	0.0010	0.0011	0.0013	0.0025	0.0018	0.0009	0.0003	0.0004	0.0019	0.0009	0.0011
TAS	701	HOBART	0.0112	0.0104	0.0113	0.0167	0.0191	0.0140	0.0058	0.0074	0.0224	0.0140	0.0145
	702	BURNIE	0.0066	0.0061	0.0066	0.0100	0.0115	0.0086	0.0034	0.0051	0.0144	0.0093	0.0095
	703	LNCSTN	0.0076	0.0070	0.0076	0.0113	0.0131	0.0098	0.0040	0.0053	0.0154	0.0099	0.0102
	704	QNSTWN	0.0013	0.0012	0.0013	0.0019	0.0022	0.0016	0.0006	0.0010	0.0028	0.0018	0.0018
NT	801	DARWIN	0.0060	0.0076	0.0090	0.0197	0.0102	0.0042	0.0015	0.0012	0.0051	0.0027	0.0035
	802	ALSPNG	0.0033	0.0039	0.0041	0.0141	0.0072	0.0029	0.0010	0.0011	0.0050	0.0025	0.0036

Origin Region			Destination Region										
State	No.	Name	GAWLER	VCTHBR	MRYBDG	MTGMBR	WOOMRA	ALBANY	BUNBRY	KALGLE	NRTHAM	PTHDLD	DERBY
ACT	101	ACT	0.0073	0.0067	0.0066	0.0084	0.0133	0.0054	0.0043	0.0094	0.0030	0.0110	0.0117
NSW	201	LISMRE	0.0034	0.0030	0.0028	0.0035	0.0084	0.0035	0.0027	0.0061	0.0020	0.0080	0.0092
	202	ARMDLE	0.0055	0.0048	0.0046	0.0057	0.0128	0.0049	0.0038	0.0087	0.0027	0.0109	0.0124
	203	DUBBO	0.0058	0.0049	0.0049	0.0059	0.0128	0.0043	0.0033	0.0077	0.0024	0.0093	0.0105
	204	BRKNHL	0.0087	0.0063	0.0069	0.0076	0.0151	0.0033	0.0025	0.0061	0.0018	0.0067	0.0074
	205	DENLQN	0.0054	0.0050	0.0050	0.0063	0.0088	0.0034	0.0027	0.0059	0.0018	0.0067	0.0071
	206	ALBURY	0.0081	0.0073	0.0081	0.0102	0.0100	0.0033	0.0025	0.0058	0.0018	0.0063	0.0066
	207	WAGGA	0.0082	0.0074	0.0075	0.0095	0.0139	0.0052	0.0040	0.0091	0.0028	0.0104	0.0111
	208	BATHST	0.0068	0.0061	0.0060	0.0075	0.0133	0.0051	0.0040	0.0089	0.0028	0.0107	0.0116
	209	GOULBN	0.0052	0.0047	0.0047	0.0059	0.0094	0.0038	0.0030	0.0066	0.0021	0.0077	0.0083
	210	COOMA	0.0036	0.0034	0.0033	0.0043	0.0065	0.0028	0.0022	0.0048	0.0015	0.0056	0.0059
	211	NEWCTL	0.0091	0.0081	0.0079	0.0098	0.0191	0.0076	0.0060	0.0133	0.0042	0.0163	0.0180
	212	GOSFRD	0.0046	0.0041	0.0040	0.0050	0.0095	0.0039	0.0031	0.0068	0.0022	0.0083	0.0091
	213	WLNGNG	0.0076	0.0070	0.0068	0.0086	0.0148	0.0063	0.0049	0.0108	0.0034	0.0130	0.0139
	214	SYDNEY	0.0229	0.0208	0.0201	0.0253	0.0465	0.0192	0.0151	0.0332	0.0106	0.0403	0.0438
	215	GRAFTN	0.0029	0.0026	0.0024	0.0030	0.0065	0.0028	0.0022	0.0049	0.0016	0.0063	0.0070
	216	TAREE	0.0029	0.0026	0.0024	0.0030	0.0070	0.0029	0.0023	0.0051	0.0016	0.0066	0.0075
VIC	301	GEELNG	0.0118	0.0124	0.0119	0.0164	0.0158	0.0068	0.0053	0.0115	0.0036	0.0123	0.0124
	302	WRNMBL	0.0109	0.0123	0.0115	0.0166	0.0130	0.0055	0.0043	0.0094	0.0029	0.0097	0.0097
	303	BALLRT	0.0106	0.0112	0.0111	0.0153	0.0133	0.0054	0.0042	0.0092	0.0029	0.0097	0.0099
	304	HORSHM	0.0115	0.0124	0.0133	0.0189	0.0117	0.0042	0.0033	0.0074	0.0023	0.0077	0.0078
	305	MILDRA	0.0140	0.0123	0.0146	0.0179	0.0150	0.0046	0.0035	0.0082	0.0025	0.0087	0.0092
	306	BENDGO	0.0117	0.0115	0.0119	0.0158	0.0151	0.0058	0.0045	0.0100	0.0031	0.0108	0.0111
	307	SHPRTN	0.0096	0.0093	0.0095	0.0124	0.0138	0.0054	0.0042	0.0093	0.0029	0.0102	0.0106
	308	WANGTA	0.0064	0.0061	0.0061	0.0079	0.0099	0.0040	0.0031	0.0068	0.0021	0.0076	0.0080
	309	SALE	0.0043	0.0047	0.0045	0.0059	0.0077	0.0034	0.0027	0.0058	0.0019	0.0065	0.0067
	310	MOE	0.0075	0.0075	0.0072	0.0096	0.0114	0.0051	0.0040	0.0086	0.0027	0.0095	0.0096
	311	MELBRN	0.0393	0.0403	0.0391	0.0529	0.0550	0.0235	0.0183	0.0400	0.0126	0.0432	0.0439
QLD	401	BRSBNE	0.0091	0.0080	0.0075	0.0093	0.0235	0.0098	0.0077	0.0172	0.0055	0.0229	0.0267
	402	GOLDCT	0.0037	0.0033	0.0031	0.0038	0.0095	0.0039	0.0031	0.0069	0.0022	0.0092	0.0107
	403	NAMBOR	0.0025	0.0022	0.0020	0.0025	0.0065	0.0027	0.0021	0.0048	0.0015	0.0064	0.0075
	404	BUNDBG	0.0035	0.0030	0.0028	0.0035	0.0096	0.0040	0.0031	0.0071	0.0023	0.0097	0.0116

			Destination Region										
State	No.	Name	GAWLER	VCTHBR	MRYBDG	MTGMBR	WOOMRA	ALBANY	BUNBRY	KALGLE	NRTHAM	PTHDLD	DERBY
	405	RKHMTN	0.0033	0.0028	0.0027	0.0033	0.0097	0.0039	0.0030	0.0070	0.0022	0.0097	0.0119
	406	MACKAY	0.0024	0.0021	0.0019	0.0023	0.0077	0.0030	0.0024	0.0056	0.0018	0.0080	0.0103
	407	TWNSVL	0.0031	0.0027	0.0024	0.0030	0.0107	0.0043	0.0033	0.0079	0.0025	0.0118	0.0158
	408	CAIRNS	0.0024	0.0021	0.0019	0.0024	0.0083	0.0036	0.0029	0.0067	0.0021	0.0104	0.0141
	409	MT ISA	0.0023	0.0020	0.0018	0.0022	0.0103	0.0034	0.0026	0.0067	0.0020	0.0097	0.0143
	410	LNGRCH	0.0016	0.0013	0.0013	0.0015	0.0056	0.0017	0.0013	0.0033	0.0010	0.0044	0.0056
	411	ROMA	0.0025	0.0021	0.0021	0.0025	0.0069	0.0023	0.0018	0.0042	0.0013	0.0054	0.0064
	412	TOWMBA	0.0043	0.0037	0.0035	0.0043	0.0111	0.0044	0.0034	0.0078	0.0025	0.0102	0.0120
SA	501	ADELDE	0.3624	0.3958	0.4420	0.3075	0.0723	0.0193	0.0146	0.0353	0.0102	0.0337	0.0343
	502	PTLNCN	0.0115	0.0108	0.0074	0.0089	0.0195	0.0051	0.0037	0.0098	0.0026	0.0081	0.0080
	503	KADINA	0.0713	0.0264	0.0199	0.0192	0.0157	0.0035	0.0027	0.0066	0.0019	0.0062	0.0063
	504	WHYLLA	0.0357	0.0189	0.0174	0.0180	0.0448	0.0066	0.0050	0.0128	0.0036	0.0122	0.0129
	505	GAWLER	–	0.0379	0.0428	0.0333	0.0186	0.0043	0.0033	0.0081	0.0023	0.0077	0.0079
	506	VCTHBR	0.0374	–	0.0433	0.0629	0.0145	0.0042	0.0032	0.0076	0.0022	0.0072	0.0072
	507	MRYBDG	0.0760	0.0779	–	0.1325	0.0187	0.0051	0.0039	0.0094	0.0027	0.0091	0.0093
	508	MTGMBR	0.0467	0.0893	0.1046	–	0.0171	0.0051	0.0039	0.0092	0.0027	0.0089	0.0090
	509	WOOMRA	0.0024	0.0019	0.0014	0.0016	–	0.0028	0.0021	0.0059	0.0015	0.0057	0.0063
WA	601	ALBANY	0.0025	0.0024	0.0016	0.0021	0.0122	–	0.0710	0.0436	0.0362	0.0206	0.0126
	602	BUNBRY	0.0023	0.0023	0.0016	0.0020	0.0113	0.0893	–	0.0307	0.0321	0.0206	0.0121
	603	KALGLE	0.0021	0.0021	0.0014	0.0017	0.0121	0.0205	0.0115	–	0.0142	0.0214	0.0139
	604	NRTHAM	0.0016	0.0015	0.0010	0.0013	0.0081	0.0431	0.0304	0.0362	–	0.0211	0.0114
	605	PTHDLD	0.0011	0.0010	0.0007	0.0009	0.0061	0.0050	0.0040	0.0112	0.0043	–	0.0241
	606	DERBY	0.0006	0.0005	0.0004	0.0005	0.0035	0.0016	0.0012	0.0038	0.0012	0.0125	–
	607	GRLDTN	0.0014	0.0014	0.0010	0.0012	0.0075	0.0203	0.0176	0.0273	0.0341	0.0276	0.0176
	608	PERTH	0.0171	0.0167	0.0114	0.0144	0.0860	0.5246	0.6351	0.3138	0.7121	0.2254	0.1683
	609	CARNVN	0.0006	0.0006	0.0004	0.0005	0.0036	0.0038	0.0030	0.0091	0.0036	0.0404	0.0134
TAS	701	HOBART	0.0108	0.0114	0.0084	0.0112	0.0291	0.0090	0.0070	0.0167	0.0056	0.0195	0.0259
	702	BURNIE	0.0073	0.0078	0.0058	0.0079	0.0182	0.0052	0.0040	0.0098	0.0032	0.0112	0.0150
	703	LNCSTN	0.0077	0.0082	0.0061	0.0082	0.0200	0.0058	0.0044	0.0109	0.0036	0.0126	0.0069
	704	QNSTWN	0.0014	0.0015	0.0011	0.0015	0.0035	0.0010	0.0008	0.0019	0.0006	0.0022	0.0029
NT	801	DARWIN	0.0019	0.0018	0.0013	0.0016	0.0121	0.0038	0.0029	0.0087	0.0027	0.0187	0.0595
	802	ALSPNG	0.0018	0.0016	0.0011	0.0014	0.0166	0.0026	0.0019	0.0068	0.0018	0.0093	0.0182

Origin Region			Destination Region								
State	No.	Name	GRLDTN	PERTH	CARNVN	HOBART	BURNIE	LNCSTN	QNSTWN	DARWIN	ALSPNG
ACT	101	ACT	0.0052	0.0083	0.0112	0.0208	0.0165	0.0176	0.0145	0.0156	0.0156
NSW	201	LISMRE	0.0035	0.0054	0.0079	0.0072	0.0051	0.0054	0.0048	0.0135	0.0120
	202	ARMDLE	0.0049	0.0076	0.0109	0.0109	0.0079	0.0084	0.0074	0.0178	0.0170
	203	DUBBO	0.0042	0.0066	0.0094	0.0093	0.0070	0.0073	0.0065	0.0149	0.0154
	204	BRKNHL	0.0031	0.0049	0.0069	0.0056	0.0044	0.0044	0.0042	0.0099	0.0126
	205	DENLQN	0.0032	0.0052	0.0069	0.0129	0.0109	0.0112	0.0096	0.0093	0.0097
	206	ALBURY	0.0031	0.0049	0.0065	0.0093	0.0081	0.0079	0.0074	0.0086	0.0097
	207	WAGGA	0.0050	0.0079	0.0107	0.0173	0.0143	0.0147	0.0127	0.0148	0.0155
	208	BATHST	0.0050	0.0078	0.0108	0.0154	0.0118	0.0125	0.0107	0.0158	0.0158
	209	GOULBN	0.0037	0.0058	0.0079	0.0140	0.0111	0.0118	0.0098	0.0110	0.0111
	210	COOMA	0.0027	0.0043	0.0057	0.0129	0.0103	0.0112	0.0089	0.0078	0.0077
	211	NEWCTL	0.0075	0.0118	0.0164	0.0216	0.0159	0.0170	0.0146	0.0249	0.0240
	212	GOSFRD	0.0038	0.0061	0.0084	0.0121	0.0088	0.0096	0.0081	0.0125	0.0119
	213	WLNGNG	0.0061	0.0096	0.0131	0.0226	0.0169	0.0184	0.0152	0.0187	0.0182
	214	SYDNEY	0.0187	0.0295	0.0407	0.0610	0.0452	0.0488	0.0411	0.0597	0.0577
	215	GRAFTN	0.0028	0.0044	0.0062	0.0073	0.0051	0.0056	0.0048	0.0098	0.0089
	216	TAREE	0.0029	0.0046	0.0066	0.0066	0.0046	0.0050	0.0044	0.0108	0.0097
VIC	301	GEELNG	0.0062	0.0102	0.0128	0.0350	0.0388	0.0335	0.0331	0.0155	0.0165
	302	WRNMBL	0.0050	0.0082	0.0102	0.0224	0.0226	0.0196	0.0211	0.0119	0.0130
	303	BALLRT	0.0049	0.0080	0.0102	0.0223	0.0226	0.0203	0.0200	0.0124	0.0135
	304	HORSHM	0.0039	0.0063	0.0081	0.0130	0.0120	0.0110	0.0111	0.0098	0.0111
	305	MILDRA	0.0043	0.0069	0.0091	0.0117	0.0100	0.0097	0.0093	0.0118	0.0137
	306	BENDGO	0.0053	0.0086	0.0112	0.0220	0.0209	0.0197	0.0184	0.0141	0.0154
	307	SHPRTN	0.0050	0.0081	0.0106	0.0220	0.0206	0.0200	0.0178	0.0136	0.0145
	308	WANGTA	0.0037	0.0060	0.0079	0.0171	0.0155	0.0155	0.0132	0.0103	0.0108
	309	SALE	0.0032	0.0053	0.0068	0.0211	0.0202	0.0210	0.0161	0.0086	0.0088
	310	MOE	0.0047	0.0077	0.0098	0.0329	0.0365	0.0345	0.0283	0.0122	0.0126
	311	MELBRN	0.0217	0.0353	0.0450	0.1255	0.1374	0.1232	0.1136	0.0553	0.0584
QLD	401	BRSBNE	0.0099	0.0153	0.0226	0.0189	0.0132	0.0141	0.0126	0.0397	0.0345
	402	GOLDCT	0.0040	0.0061	0.0090	0.0077	0.0054	0.0058	0.0051	0.0158	0.0138
	403	NAMBOR	0.0027	0.0042	0.0063	0.0050	0.0035	0.0037	0.0033	0.0113	0.0098
	404	BUNDBG	0.0041	0.0062	0.0094	0.0067	0.0047	0.0050	0.0045	0.0178	0.0149

Origin Region			Destination Region								
State	No.	Name	GRLDTN	PERTH	CARNVN	HOBART	BURNIE	LNCSTN	QNSTWN	DARWIN	ALSPNG
	405	RKHMTN	0.0040	0.0061	0.0094	0.0059	0.0041	0.0043	0.0039	0.0190	0.0158
	406	MACKAY	0.0032	0.0048	0.0077	0.0040	0.0028	0.0029	0.0027	0.0176	0.0138
	407	TWNSVL	0.0045	0.0068	0.0112	0.0049	0.0034	0.0036	0.0033	0.0292	0.0213
	408	CAIRNS	0.0039	0.0058	0.0097	0.0041	0.0028	0.0030	0.0028	0.0265	0.0171
	409	MT ISA	0.0036	0.0053	0.0093	0.0030	0.0021	0.0022	0.0021	0.0288	0.0293
	410	LNGRCH	0.0018	0.0027	0.0043	0.0022	0.0015	0.0016	0.0015	0.0094	0.0094
	411	ROMA	0.0023	0.0036	0.0054	0.0039	0.0029	0.0030	0.0027	0.0097	0.0095
	412	TOWMBA	0.0044	0.0068	0.0101	0.0082	0.0058	0.0062	0.0055	0.0179	0.0161
SA	501	ADELDE	0.0173	0.0282	0.0361	0.0318	0.0258	0.0248	0.0252	0.0421	0.0536
	502	PTLNCN	0.0044	0.0072	0.0090	0.0049	0.0037	0.0037	0.0037	0.0093	0.0128
	503	KADINA	0.0032	0.0052	0.0067	0.0049	0.0039	0.0038	0.0038	0.0078	0.0103
	504	WHYLLA	0.0061	0.0097	0.0131	0.0081	0.0063	0.0062	0.0061	0.0160	0.0231
	505	GAWLER	0.0039	0.0063	0.0082	0.0066	0.0053	0.0051	0.0052	0.0098	0.0128
	506	VCTHBR	0.0037	0.0061	0.0077	0.0069	0.0056	0.0054	0.0055	0.0088	0.0110
	507	MRYBDG	0.0046	0.0075	0.0097	0.0092	0.0075	0.0072	0.0073	0.0115	0.0144
	508	MTGMBR	0.0046	0.0075	0.0095	0.0097	0.0080	0.0076	0.0078	0.0111	0.0137
	509	WOOMRA	0.0027	0.0041	0.0061	0.0023	0.0017	0.0017	0.0017	0.0079	0.0154
WA	601	ALBANY	0.0313	0.1104	0.0282	0.0031	0.0021	0.0022	0.0022	0.0108	0.0107
	602	BUNBRY	0.0342	0.1682	0.0275	0.0030	0.0021	0.0021	0.0021	0.0104	0.0098
	603	KALGLE	0.0198	0.0310	0.0315	0.0027	0.0019	0.0019	0.0019	0.0116	0.0129
	604	NRTHAM	0.0626	0.1786	0.0317	0.0023	0.0016	0.0016	0.0016	0.0093	0.0088
	605	PTHDLD	0.0104	0.0116	0.0731	0.0017	0.0011	0.0012	0.0011	0.0130	0.0091
	606	DERBY	0.0034	0.0045	0.0126	0.0011	0.0008	0.0008	0.0008	0.0215	0.0093
	607	GRLDTN	–	0.0745	0.0425	0.0022	0.0015	0.0015	0.0015	0.0096	0.0086
	608	PERTH	0.5461	–	0.1076	0.0091	0.0062	0.0064	0.0064	0.0347	0.0323
	609	CARNVN	0.0089	0.0031	–	0.0013	0.0009	0.0009	0.0009	0.0083	0.0068
TAS	701	HOBART	0.0096	0.0055	0.0270	–	0.0810	0.1256	0.0975	0.0130	0.0126
	702	BURNIE	0.0055	0.0032	0.0156	0.0683	–	0.1684	0.1697	0.0099	0.0099
	703	LNCSTN	0.0061	0.0035	0.0175	0.1155	0.1839	–	0.1063	0.0105	0.0104
	704	QNSTWN	0.0011	0.0006	0.0031	0.0161	0.0333	0.0191	–	0.0039	0.0039
NT	801	DARWIN	0.0052	0.0026	0.0214	0.0016	0.0014	0.0014	0.0029	–	0.0218
	802	ALSPNG	0.0033	0.0017	0.0124	0.0011	0.0010	0.0010	0.0020	0.0154	–

APPENDIX V
SAMPLE REQUIREMENTS FOR SELECTED REGIONS

This Appendix presents the sample sizes (in trips) required to obtain specified accuracy levels for estimates of travel from selected origin regions. The following points should be noted:

- The accuracy levels treated were those corresponding to relative errors of 0.10, 0.20 and 0.50, with a probability (Q) of 0.950;

- The trip proportions are those described in Appendix IV, calculated between the approximate population centroids of the appropriate NTS regions;

- Due to the impracticality of reproducing a table for each of the 64 NTS regions, only those tables dealing with the six State capitals, the ACT, Newcastle, Wollongong and Geelong are presented here;

- The sample sizes given in this Appendix reflect numbers of trips, rather than number of households. Since the NTS sample was to be based on households, suitable conversion factors had to be calculated before the number of households in the regional samples could be determined;

- Only destination regions attracting more than 0.001 (0.1%) of trips from a particular origin region have been entered in the tables[1];

- Each table is laid out by decreasing order of trip proportions.

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(1) Although practical sample sizes would be aimed at proportions much higher than this. However, the list of proportions down to the 0.1% level has been reproduced as an indication of the growth in sample requirements with reducing trip proportions.

REGIONAL SAMPLE SIZE REQUIREMENTS (ACT)

Destination Region	Estimated Trip Proportion	Sample Size (a)		
		10%	20%	50%
SYDNEY	0.2865	956	239	38
GOULBN	0.1910	1626	406	65
MELBRN	0.1061	3236	809	129
WLNGNG	0.0658	5456	1364	218
NEWCTL	0.0377	9793	2448	391
BATHST	0.0309	12033	3008	481
WAGGA	0.0305	12202	3050	488
BRSBNE	0.0202	18604	4651	744
ADELDE	0.0191	19760	4940	790
COOMA	0.0189	19901	4975	796
DENLQN	0.0145	26134	6533	1045
GOSFRD	0.0138	27520	6880	1100
SHPRTN	0.0120	31603	7900	1264
WANGTA	0.0110	34390	8597	1375
GEELNG	0.0095	40116	10029	1604
BENDGO	0.0093	40945	10236	1637
MOE	0.0092	41256	10314	1650
ARMDLE	0.0086	44436	11109	1777
SALE	0.0071	53620	13405	2144
DUBBO	0.0066	58012	14503	2320
HOBART	0.0061	62604	15651	2504
BALLRT	0.0061	62856	15714	2514
TOOMBA	0.0048	80273	20068	3210
LNCSTN	0.0047	80583	20145	3223
ROMA	0.0044	86048	21512	3441
MILDRA	0.0042	90874	22718	3634
GOLDCT	0.0042	91069	22767	3642
BURNIE	0.0041	93971	23492	3758
PERTH	0.0040	95265	23816	3810
GRAFTN	0.0039	99352	24838	3974
LISMRE	0.0038	101425	25356	4057
BUNDBG	0.0033	116778	29194	4671
TAREE	0.0032	118365	29591	4734
ALBURY	0.0031	122535	30633	4901
HORSHM	0.0030	126377	31594	5055
RKHMTN	0.0026	147287	36821	5891
WHYLLA	0.0022	170455	42613	6818
MTGMBR	0.0021	181252	45313	7250
MRYBDG	0.0021	181464	45366	7258
NAMBOR	0.0019	197628	49407	7905
TWNSVL	0.0019	198610	49652	7944
BRKNHL	0.0016	241898	60474	9675
CAIRNS	0.0015	262744	65686	10509
MACKAY	0.0013	288413	72103	11536
GAWLER	0.0013	291876	72969	11675
ROMA	0.0013	300801	75200	12032
VCTHBR	0.0012	320515	80128	12820

(a) Sample size (in trips) required to give nominated relative errors to trip proportions for travel between the specified origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (SYDNEY)

Destination Region	Estimated Trip Proportion	Sample Size [a]		
		10%	20%	50%
GOSFRD	0.2141	1409	352	56
NEWCTL	0.1754	1805	451	72
WLNGNG	0.1541	2109	527	84
BATHST	0.0791	4472	1118	178
ACT	0.0518	7029	1757	281
MELBRN	0.0455	8058	2014	322
GOULBN	0.0392	9428	2357	377
WAGGA	0.0284	13153	3288	526
ARMDLE	0.0258	14486	3621	579
BRSBNE	0.0191	19782	4945	791
DUBBO	0.0185	20360	5090	814
COOMA	0.0184	20486	5121	819
DENLQN	0.0159	23739	5934	949
LISMRE	0.0127	29964	7491	1198
ADELDE	0.0107	35674	8918	1426
ALBURY	0.0070	54451	13612	2178
GRAFTN	0.0049	78679	19669	3147
BRKNHL	0.0048	79588	19897	3183
SHPRTN	0.0046	83662	20915	3346
TOWMBA	0.0044	86509	21627	3460
GEELNG	0.0043	89308	22327	3572
GOLDCT	0.0040	95276	23819	3811
BENDGO	0.0040	96522	24130	3860
MOE	0.0037	102165	25541	4086
WANGTA	0.0036	107432	26858	4297
TAREE	0.0035	108204	27051	4328
HOBART	0.0032	118260	29565	4730
BUNDBG	0.0028	134875	33718	5395
BALLRT	0.0028	138982	34745	5559
PERTH	0.0026	148316	37079	5932
SALE	0.0026	149108	37277	5964
LNCSTN	0.0024	160746	40186	6429
WRNMBL	0.0022	177460	44365	7098
RKHMTN	0.0021	178867	44716	7154
MILDRA	0.0021	182916	45729	7316
BURNIE	0.0020	189649	47412	7585
NAMBOR	0.0018	216183	54045	8647
HORSHM	0.0015	260604	65151	10424
TWNSVL	0.0015	263368	65842	10534
WHYLLA	0.0013	286499	71624	11459
MRYBDG	0.0012	329265	82316	13170
MTGMBR	0.0012	332497	83124	13299
CAIRNS	0.0011	348819	87204	13952
ROMA	0.0011	362990	90747	14519
MACKAY	0.0010	369348	92337	14773

(a)   Sample size (in trips) required to give nominated relative
      errors to trip proportions for travel between the specified
      origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (WOLLONGONG)

Destination Region	Estimated Trip Proportion	Sample Size [a]		
		10%	20%	50%
SYDNEY	0.5638	297	74	11
MELBRN	0.0628	5737	1434	229
ACT	0.0435	8441	2110	337
NEWCTL	0.0394	9363	2340	374
GOSFRD	0.0316	11775	2943	471
BATHST	0.0307	12117	3029	484
GOULBN	0.0305	12224	3056	488
BRSBNE	0.0189	19910	4977	796
WAGGA	0.0162	23371	5842	934
COOMA	0.0151	25015	6253	1000
ADELDE	0.0131	29027	7256	1161
DENLQN	0.0098	38633	9658	1545
ARMDLE	0.0096	39575	9893	1583
DUBBO	0.0075	50593	12648	2023
SHPRTN	0.0063	60341	15085	2413
GEELNG	0.0058	65855	16463	2634
MOE	0.0054	71188	17797	2847
BENDGO	0.0053	71837	17959	2873
WANGTA	0.0052	73818	18454	2952
LISMRE	0.0051	74357	18589	2974
HOBART	0.0044	87199	21799	3487
TOWMBA	0.0044	87916	21979	3516
GRAFTN	0.0043	88454	22113	3538
GOLDCT	0.0039	96893	24223	3875
SALE	0.0039	98271	24567	3930
ALBURY	0.0038	101818	25454	4072
BALLRT	0.0037	103925	25981	4157
LNCSTN	0.0033	116327	29081	4653
TAREE	0.0033	117157	29289	4686
PERTH	0.0031	124033	31008	4961
BUNDBG	0.0029	130731	32682	5229
WRNMBL	0.0028	134903	33725	5396
BURNIE	0.0028	138192	34548	5527
MILDRA	0.0026	146561	36640	5862
BRKNHL	0.0024	163054	40763	6522
RKHMTN	0.0023	170104	42526	6804
HORSHM	0.0019	201977	50494	8079
NAMBOR	0.0018	215202	53800	8608
TWNSVL	0.0016	239794	59948	9591
WHYLLA	0.0016	240358	60089	9614
MRYBDG	0.0014	267687	66921	10707
MTGMBR	0.0014	268475	67118	10739
CAIRNS	0.0012	315734	78933	12629
MACKAY	0.0011	342216	85554	13688
ROMA	0.0011	357152	89288	14286

(a) Sample size (in trips) required to give nominated relative errors to trip proportions for travel between the specified origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (NEWCASTLE)

Destination Region	Estimated Trip Proportion	Sample Size (a) 10%	20%	50%
SYDNEY	0.5536	309	77	12
MELBRN	0.0504	7233	1808	289
GOSFRD	0.0452	8121	2030	324
BATHST	0.0445	8253	2063	330
WLNGNG	0.0340	10915	2728	436
BRSBNE	0.0295	12654	3163	506
ARMDLE	0.0249	15039	3759	601
ACT	0.0216	17442	4360	697
GOULBN	0.0163	23177	5794	927
DUBBO	0.0154	24589	6147	983
WAGGA	0.0153	24797	6199	991
ADELDE	0.0132	28724	7181	1148
LISMRE	0.0101	37569	9392	1502
DENLQN	0.0082	46234	11558	1849
COOMA	0.0081	47246	11811	1889
GRAFTN	0.0077	49483	12370	1979
TOWMBA	0.0070	54471	13617	2178
GOLDCT	0.0063	60713	15178	2428
TAREE	0.0059	64964	16241	2598
SHPRTN	0.0051	75694	18923	3027
GEELNG	0.0048	79292	19823	3171
BENDGO	0.0045	84812	21203	3392
BUNDBG	0.0042	91078	22769	3643
ALBURY	0.0042	91741	22935	3669
MOE	0.0040	94855	23713	3794
WANGTA	0.0038	101446	25361	4057
HOBART	0.0036	106015	26503	4240
PERTH	0.0033	117658	29414	4706
BRKNHL	0.0032	121565	30391	4862
BALLRT	0.0031	121701	30425	4868
RKHMTN	0.0031	123052	30763	4922
NAMBOR	0.0027	141703	35425	5668
SALE	0.0026	144807	36201	5792
LNCSTN	0.0026	146013	36503	5840
MILDRA	0.0026	150241	37560	6009
WRNMBL	0.0025	153142	38285	6125
BURNIE	0.0022	170954	42738	6838
TWNSVL	0.0020	190224	47556	7608
HORSHM	0.0017	220709	55177	8828
WHYLLA	0.0017	224955	56238	8998
ROMA	0.0016	234477	58619	9379
CAIRNS	0.0015	254420	63605	10176
MACKAY	0.0015	261862	65465	10474
MRYBDG	0.0014	266281	66570	10651
MTGMBR	0.0014	270965	67741	10838

(a) Sample size (in trips) required to give nominated relative errors to trip proportions for travel between the specified origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (MELBOURNE)

Destination Region	Estimated Trip Proportion	Sample Size (a)		
		10%	20%	50%
GEELNG	0.2070	1471	367	58
MOE	0.0974	3560	890	142
BALLRT	0.0871	4026	1006	161
BENDGO	0.0696	5135	1283	205
SHPRTN	0.0615	5859	1464	234
SYDNEY	0.0493	7407	1851	296
WRNMBL	0.0417	8819	2204	352
WANGTA	0.0335	11070	2767	442
SALE	0.0310	12009	3002	480
HORSHM	0.0240	15637	3909	625
WAGGA	0.0216	17383	4345	695
ADELDE	0.0215	17452	4363	698
ACT	0.0208	18088	4522	723
WLNGNG	0.0186	20286	5071	811
DENLQN	0.0183	20639	5159	825
NEWCTL	0.0173	21804	5451	872
MILDRA	0.0173	21868	5467	874
ALBURY	0.0153	24649	6162	985
BATHST	0.0144	26378	6594	1055
GOULBN	0.0141	26870	6717	1074
COOMA	0.0123	30747	7686	1229
GOSFRD	0.0094	40693	10173	1627
BRSBNE	0.0089	42914	10728	1716
ARMDLE	0.0083	45791	11447	1831
DUBBO	0.0082	46665	11666	1866
HOBART	0.0072	52873	13218	2114
BURNIE	0.0067	57317	14329	2292
LNCSTN	0.0065	58593	14648	2343
BRKNHL	0.0056	68080	17020	2723
LISMRE	0.0050	76580	19145	3063
GRAFTN	0.0050	76671	19167	3066
TAREE	0.0046	83728	20932	3349
PERTH	0.0033	114453	28613	4578
MTGMBR	0.0026	146399	36599	5855
MRYBDG	0.0024	156453	39113	6258
TOWMBA	0.0021	183076	45769	7323
WHYLLA	0.0021	185331	46332	7413
GOLDCT	0.0018	211472	52868	8458
BUNDBG	0.0016	242219	60554	9688
VCTHBR	0.0014	273320	68330	10932
GAWLER	0.0014	276819	69204	11072
RKHMTN	0.0013	287080	71770	11483
TWNSVL	0.0011	337915	84478	13516
QNSTWN	0.0011	355495	88873	14219

(a)   Sample size (in trips) required to give nominated relative
      errors to trip proportions for travel between the specified
      origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (GEELONG)

Destination Region	Estimated Trip Proportion	Sample Size (a)		
		10%	20%	50%
MELBRN	0.7101	156	39	6
BALLRT	0.0369	10022	2505	400
ADELDE	0.0225	16693	4173	667
WRNMBL	0.0197	19073	4768	762
BENDGO	0.0189	19930	4982	797
MOE	0.0177	21263	5315	850
SYDNEY	0.0159	23748	5937	949
SHPRTN	0.0140	27142	6785	1085
BRSBNE	0.0081	47324	11831	1892
HOBART	0.0069	55291	13822	2211
HORSHM	0.0067	56988	14247	2279
WAGGA	0.0067	57350	14337	2z94
BURNIE	0.0064	59197	14799	2367
WANGTA	0.0064	59766	14941	2390
ACT	0.0064	59853	14963	2394
LNCSTN	0.0061	62766	15691	2510
WLNGNG	0.0059	64822	16205	2592
NEWCTL	0.0057	67275	16818	2691
DENLQN	0.0053	71526	17881	2861
SALE	0.0053	71733	17933	2869
ALBURY	0.0053	72523	18130	2900
BATHST	0.0046	82987	20746	3319
MILDRA	0.0045	85775	21443	3431
GOULBN	0.0044	87936	21984	3517
COOMA	0.0037	103866	25966	4154
PERTH	0.0033	115803	28950	4632
GOSFRD	0.0030	125727	31431	5029
ARMDLE	0.0028	136316	34079	5452
MTGMBR	0.0028	137675	34418	5507
DUBBO	0.0028	139002	34750	5560
MYRBDG	0.0026	149650	37412	5986
WHYLLA	0.0021	184832	46208	7393
BRKNHL	0.0020	189820	47455	7592
TOWMBA	0.0019	201654	50413	8066
LISMRE	0.0017	225136	56284	9005
GRAFTN	0.0017	229423	57355	9176
GOLDCT	0.0016	233411	58352	9336
TAREE	0.0015	247721	61930	9908
VCTHBR	0.0015	258623	64655	10344
BUNDBG	0.0015	264217	66054	10568
GAWLER	0.0014	269338	67334	10773
RKHMTN	0.0012	310843	77710	12433
QNSTWN	0.0011	356038	89009	14241
TWNSVL	0.0011	359827	89956	14393

(a) Sample size (in trips) required to give nominated relative errors to trip proportions for travel between the specified origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (BRISBANE)

Destination Region	Estimated Trip Proportion	Sample Size (a)		
		10%	20%	50%
GOLDCT	0.2775	1000	250	40
LISMRE	0.1094	3126	781	125
SYDNEY	0.0653	5499	1374	219
TOWMBA	0.0571	6340	1585	253
NAMBOR	0.0545	6668	1667	266
TAREE	0.0401	9192	2298	367
ARMDLE	0.0383	9643	2410	385
NEWCTL	0.0320	11622	2905	464
BUNDBG	0.0285	13113	3278	524
MELBRN	0.0281	13302	3325	532
GRAFTN	0.0196	19222	4805	768
WLNGNG	0.0177	21279	5319	851
DUBBO	0.0162	23385	5846	935
BATHST	0.0154	24569	6142	982
GOSFRD	0.0150	25302	6325	1012
ADELDE	0.0140	27042	6760	1081
ACT	0.0125	30241	7560	1209
RKHMTN	0.0122	31176	7794	1247
WAGGA	0.0108	35306	8826	1412
GOULBN	0.0090	42120	10530	1684
SHPRTN	0.0077	49784	12446	1991
GEELNG	0.0074	51349	12837	2053
BENDGO	0.0073	52249	13062	2089
MOE	0.0066	57706	14426	2308
DENLQN	0.0064	60115	15028	2404
WANGTA	0.0063	60272	15068	2410
BALLRT	0.0059	64634	16158	2585
COOMA	0.0058	66057	16514	2642
MILDRA	0.0057	67464	16866	2698
SALE	0.0052	74147	18536	2965
WRNMBL	0.0052	74150	18537	2966
TWNSVL	0.0048	80389	20097	3215
PERTH	0.0046	83407	20851	3336
ALBURY	0.0045	85514	21378	3420
BRKNHL	0.0044	86301	21575	3452
HORSHM	0.0043	88246	22061	3529
MACKAY	0.0041	93806	23451	3752
ROMA	0.0036	106277	26569	4251
CAIRNS	0.0035	108026	27006	4321
HOBART	0.0034	111500	27875	4460
LNCSTN	0.0024	162192	40548	6487
BURNIE	0.0020	189363	47340	7574
WHYLLA	0.0020	193095	48273	7723
MYRBDG	0.0015	256840	64210	10273
MTGMBR	0.0015	263705	65926	10548
MT ISA	0.0013	298345	74586	11933
GAWLER	0.0010	379947	94986	15197

(a) Sample size (in trips) required to give nominated relative errors to trip proportions for travel between the specified origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (ADELAIDE)

Destination Region	Estimated Trip Proportion	Sample Size (a)		
		10%	20%	50%
MRYBDG	0.1127	3025	756	121
MELBRN	0.0876	4001	1000	160
MTGMBR	0.0619	5824	1456	232
VCTHBR	0.0560	6471	1617	258
GAWLER	0.0520	7005	1751	280
SYDNEY	0.0470	7798	1949	311
MILDRA	0.0301	12371	3092	494
HORSHM	0.0276	13544	3386	541
GEELNG	0.0267	14018	3504	560
BENDGO	0.0260	14419	3604	576
ROMA	0.0256	14604	3651	584
BALLRT	0.0244	15387	3846	615
SHPRTN	0.0210	17885	4471	715
WHYLLA	0.0209	17966	4491	718
KADINA	0.0196	19170	4792	766
NEWCTL	0.0184	20463	5115	818
BRSBNE	0.0180	20947	5236	837
ALBURY	0.0173	21820	5455	872
WAGGA	0.0171	22117	5529	884
MOE	0.0164	23062	5765	922
BRKNHL	0.0158	23876	5969	955
WLNGNG	0.0157	24033	6008	961
ACT	0.0152	24884	6221	995
BATHST	0.0140	27138	6784	1085
WANGTA	0.0137	27583	6895	1103
DUBBO	0.0114	33223	8305	1328
DENLQN	0.0113	33695	8423	1347
ARMDLE	0.0109	34883	8720	1395
PERTH	0.0109	34912	8728	1396
GOULBN	0.0107	35391	8847	1415
SALE	0.0103	37042	9260	1481
GOSFRD	0.0093	40919	10229	1636
TOWMBA	0.0084	45188	11297	1807
COOMA	0.0077	49700	12425	1988
HOBART	0.0074	51237	12809	2049
GOLDCT	0.0074	51752	12938	2070
BUNDBG	0.0068	55819	13954	2232
LISMRE	0.0067	56925	14231	2277
PTLNCN	0.0065	59046	14761	2361
RKHMTN	0.0064	59209	14802	2368
TWNSVL	0.0060	63751	15937	2550
TAREE	0.0058	65755	16438	2630
GRAFTN	0.0058	66152	16538	2646
LNCSTN	0.0053	71547	17886	2861
BURNIE	0.0051	75057	18764	3002
WRNMBL	0.0049	77484	19371	3099
NAMBOR	0.0049	77943	19485	3117
CAIRNS	0.0048	80495	20123	3219
MACKAY	0.0047	82163	20540	3286

(a) Sample size (in trips) required to give nominated relative
     errors to trip proportions for travel between the specified
     origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (PERTH)

Destination Region	Estimated Trip Proportion	Sample Size (a)		
		10%	20%	50%
NRTHAM	0.1786	1766	441	70
BUNBRY	0.1682	1900	475	76
ALBANY	0.1104	3094	773	123
GRLDTN	0.0745	4771	1192	190
MELBRN	0.0353	10510	2627	420
KALGLE	0.0310	12020	3005	480
SYDNEY	0.0295	12636	3159	505
ADELDE	0.0282	13235	3108	529
BRSBNE	0.0153	24762	6190	990
NEWCTL	0.0118	32236	8059	1289
PTHDLD	0.0116	32699	8174	1307
GEELNG	0.0102	37427	9356	1497
WHYLLA	0.0097	39083	9770	1563
WLNGNG	0.0096	39473	9868	1578
BENDGO	0.0086	44129	11032	1765
ACT	0.0083	45912	11478	1836
ROMA	0.0082	46592	11648	1863
SHPRTN	0.0081	47154	11788	1886
BALLRT	0.0080	47649	11912	1905
WAGGA	0.0079	48270	12067	1930
BATHST	0.0078	48681	12170	1947
MOE	0.0077	49768	12442	1990
ARMDLE	0.0076	50370	12592	2014
MRYBDG	0.0075	50591	12647	2023
MTGMBR	0.0075	50733	12683	2029
PTLNCN	0.0072	52810	13202	2112
MILDRA	0.0069	55308	13827	2212
TOWMBA	0.0068	55969	13992	2238
TWNSVL	0.0068	56327	14081	2253
DUBBO	0.0066	58040	14510	2321
GAWLER	0.0063	60142	15035	2405
HORSHM	0.0063	60553	15138	2422
BUNDBG	0.0062	61248	15312	2449
GOLDCT	0.0061	62149	15537	2485
VCTHBR	0.0061	62297	15574	2491
RKHMTN	0.0061	62796	15699	2511
GOSFRD	0.0061	62932	15733	2517
WANGTA	0.0060	63779	15944	2551
CAIRNS	0.0058	65353	16338	2614
GOULBN	0.0058	65601	16400	2624
HOBART	0.0055	68924	17231	2756
LISMRE	0.0054	70375	17593	2815
MT ISA	0.0053	71757	17939	2870
SALE	0.0052	73473	18368	2938
KADINA	0.0052	73867	18466	2954
DENLQN	0.0052	74095	18523	2963
BRKNHL	0.0049	77477	19369	3099
ALBURY	0.0049	77512	19378	3100
MACKAY	0.0048	79287	19821	3171

(a) Sample size (in trips) required to give nominated relative errors to trip proportions for travel between the specified origin region and each of the stated destination regions.

REGIONAL SAMPLE SIZE REQUIREMENTS (HOBART)

Destination Region	Estimated Trip Proportion	Sample Size (a)		
		10%	20%	50%
MELBRN	0.1255	2677	669	107
LNCSTN	0.1155	2941	735	117
BURNIE	0.0683	5240	1310	209
SYDNEY	0.0610	5910	1477	236
GEELNG	0.0350	10594	2648	423
MOE	0.0329	11279	2819	451
ADELDE	0.0318	11685	2921	467
WLNGNG	0.0226	16617	4154	664
ROMA	0.0224	16798	4199	671
BALLRT	0.0223	16810	4202	672
SHPRTN	0.0220	17049	4262	681
BENDGO	0.0220	17090	4272	683
NEWCTL	0.0216	17432	4358	697
SALE	0.0211	17785	4446	711
ACT	0.0208	18089	4522	723
BRSBNE	0.0189	19961	4990	798
WAGGA	0.0173	21767	5441	870
WANGTA	0.0171	22086	5521	883
QNSTWN	0.0161	23435	5858	937
BATHST	0.0154	24508	6127	980
GOULBN	0.0140	26996	6749	1079
HORSHM	0.0130	29160	7290	1166
COOMA	0.0129	29360	7340	1174
DENLQN	0.0129	29482	7370	1179
GOSFRD	0.0121	31439	7859	1257
MILDRA	0.0117	32475	8118	1299
ARMDLE	0.0109	34993	8748	1399
MTGMBR	0.0097	39386	9846	1575
ALBURY	0.0093	40781	10195	1631
DUBBO	0.0093	40860	10215	1634
MRYBDG	0.0092	41603	10488	1664
PERTH	0.0091	41612	10403	1664
TOWMBA	0.0082	46349	11587	1853
WHYLLA	0.0081	47177	11794	1887
GOLDCT	0.0077	49416	12354	1976
GRAFTN	0.0073	52249	13062	2089
LISMRE	0.0072	52753	13188	2110
VCTHBR	0.0069	55075	13768	2203
BUNDBG	0.0067	56916	14229	2276
GAWLER	0.0066	57795	14448	2311
TAREE	0.0066	57965	14491	2318
RKHMTN	0.0059	65225	16306	2609
BRKNHL	0.0056	68254	17063	2730
NAMBOR	0.0050	76661	19165	3066
KADINA	0.0049	77438	19359	3097
PTLNCN	0.0049	77766	19441	3110
TWNSVL	0.0049	78276	19569	3131
CAIRNS	0.0041	94050	23512	3762
MACKAY	0.0040	96285	24071	3851

(a) Sample size (in trips) required to give nominated relative errors to trip proportions for travel between the specified origin region and each of the stated destination regions.