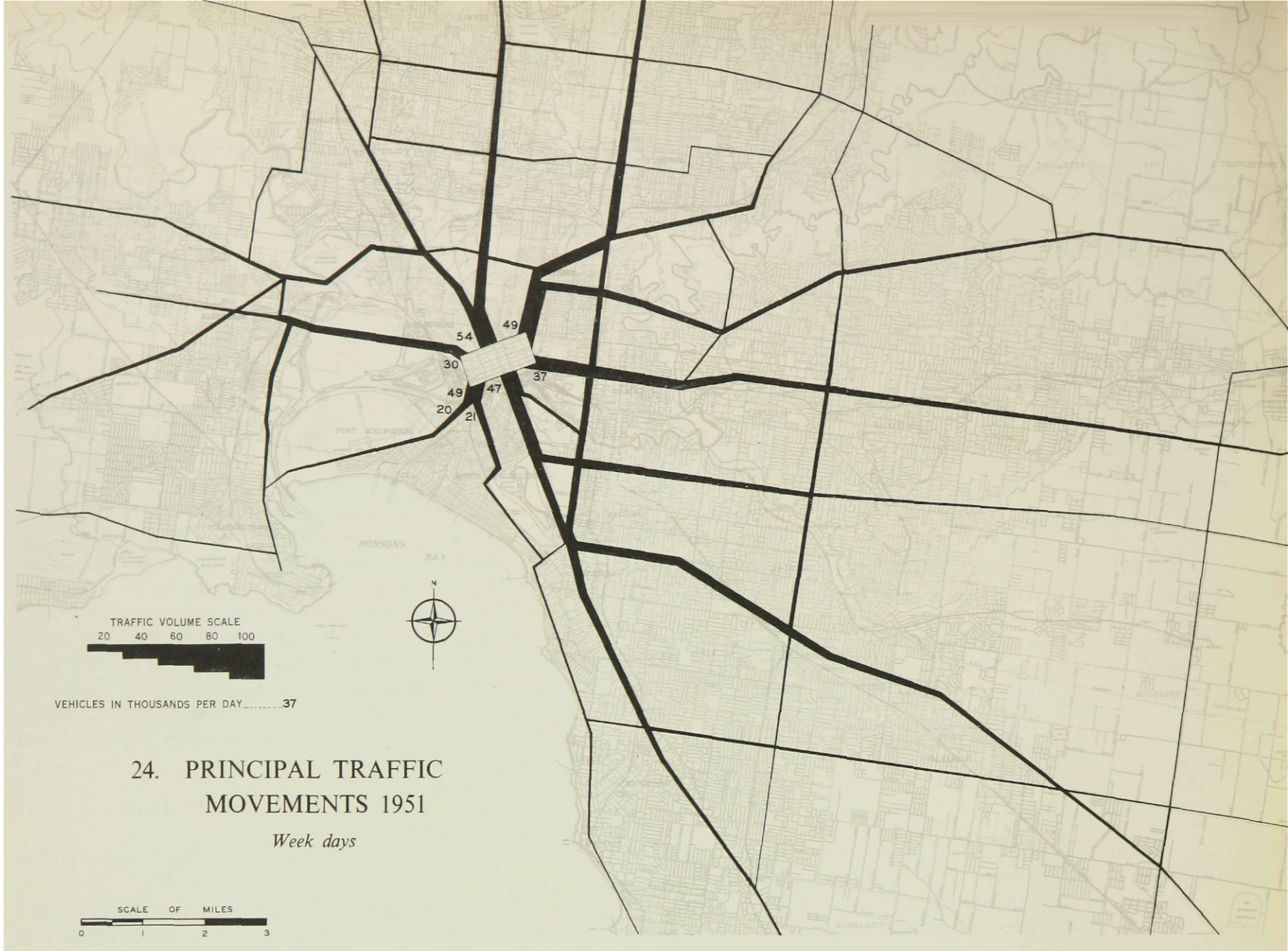


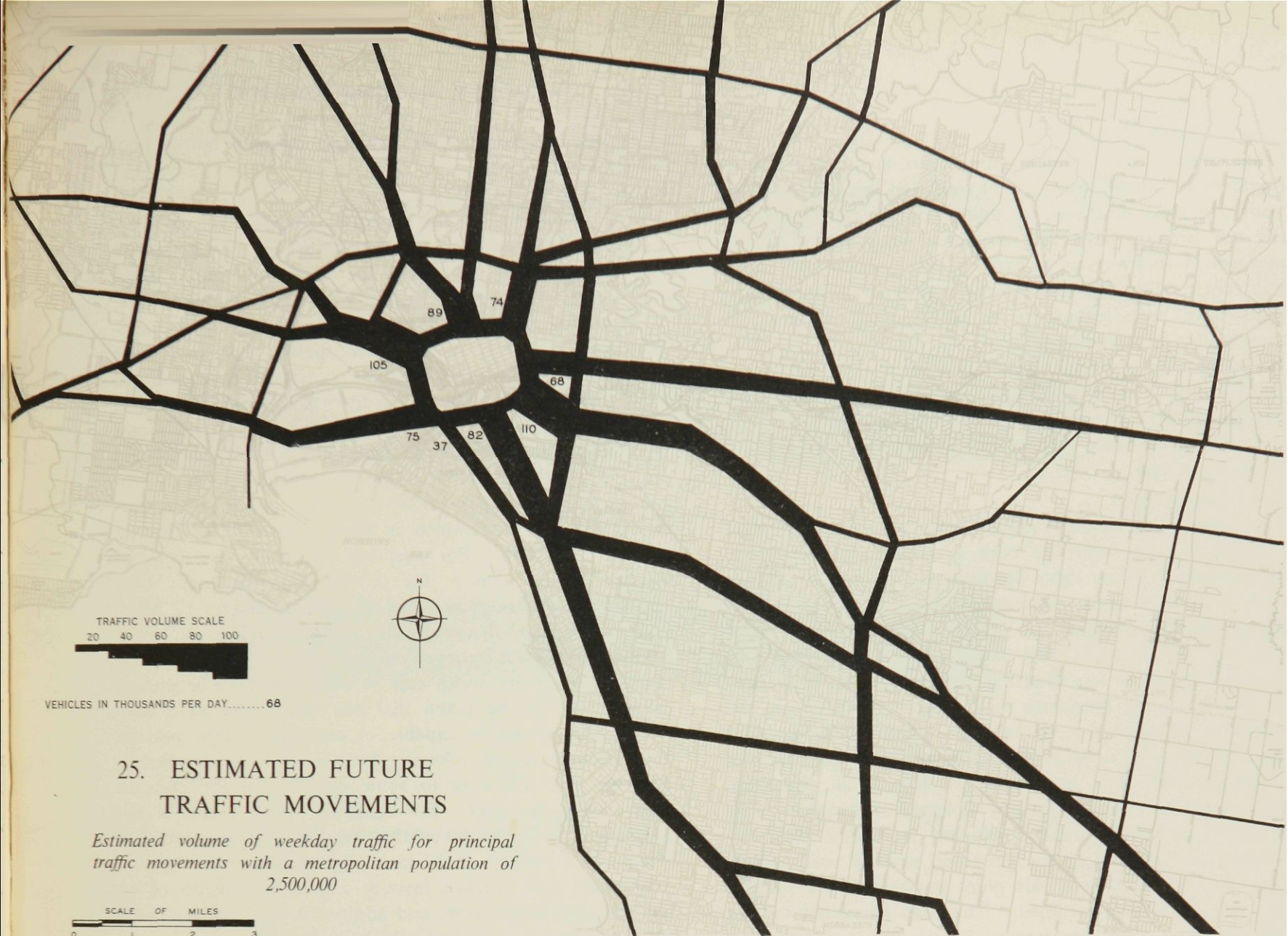


that it can be constructed in stages as the traffic grows. While this is a matter for the road construction authority, it must be kept in mind in planning the road communication system, and the planner's responsibility is to reserve sufficient area along the various road routes so that additional road capacity may be readily provided when it is needed.

It has been made a principle in this planning scheme that wherever reasonably practicable, the reservations for road purposes should be sufficiently wide for the roads which will be required when the population of the city reaches 2,500,000. In most instances the present cost will not be great, and will be expenditure well justified. Only where the reservation of the full width would be too costly at this stage and would unduly interfere with existing development, or where the opportunity has already been lost, has this principle been departed from. In these instances reservations or road widening sufficient for the needs for an intermediate period have been provided. Any additional land required for wider roads in years to come can then be acquired as easily as and at no greater cost than now.

In planning the road system the needs of industrial and commercial traffic must be specially considered, because this traffic accounts for the major portion of the cost of road transport. Not only is it continuous throughout the working day, but its volume is much greater than is often realised. Its broad movements may be classified as follow:

- (a) Between industrial areas.
- (b) Between industrial areas and shipping, rail and road transport terminals.
- (c) Between industrial areas and centres of wholesale and retail distribution.
- (d) Between shipping, rail and road transport terminals and places of storage.
- (e) Between shipping, rail and road transport terminals and places of wholesale distribution.
- (f) Between places of storage and places of wholesale and retail distribution.
- (g) Between centres of wholesale distribution and centres of retail distribution.
- (h) Between shopping centres.



- (i) Between centres of primary production and the markets.

Road communications between industrial areas, rail and road transport terminals, shipping terminals and centres of wholesale and retail distribution are obviously of great importance.

With 60% of all employment concentrated in the central district a great proportion of worker traffic today converges on this area, and because the times of starting and finishing work fall within limited periods heavy peak traffic results as the central business area is approached.

With the growth of the city and the increasing use of motor vehicles this worker traffic will become increasingly difficult to accommodate in addition to the commercial and industrial traffic which has its destination in the same area. This is one of the reasons why in the planning scheme one aim has been to bring about a better distribution of places of work and thus distribute worker traffic.

Much of the shopper traffic also gravitates to the central business area where it adds to the overall problem. However, its volume there is much less than that of worker

traffic, but in suburban shopping centres it assumes greater relative importance.

Generally, except for a few road routes where recreational traffic is heavy, the needs of the community will be met if the road system will carry the worker, industrial and commercial traffic.

LOCATION AND DESIGN OF THE ARTERIAL ROAD SYSTEM

The purpose of the arterial road system will be fulfilled only if it is built to ensure safe, uninterrupted and relatively rapid movement of traffic. To achieve this the roads must be carefully located, they must be of ample width to carry the anticipated traffic, their alignment and grade must permit good visibility for cars driven at the speeds for which the roads are designed, and junctions must be constructed to minimise interruption to traffic movement and permit traffic to enter and leave the road with safety. Although these requisites fall primarily into the province of the road designer, they must be kept in mind when planning road reservations.

Location of the Roads

The three factors which more than any others cause interference with the free flow of traffic on our metropolitan roads are road junctions, shopping centres and tramways. The last two are frequently associated because one of the purposes of tramways is to carry people to and from shopping centres. For this reason, wherever possible the arterial roads have been located to avoid shopping centres and other points of community activity.

The location of each arterial road route provided for in the planning scheme has been carefully studied from the standpoints of alignment, grade and visibility, and also with a view to minimising junctions consistent with the requirements for access.

Road Intersections

If interruption to road traffic is to be avoided at road intersections they must be built so that traffic can move continuously. When lights are used at the junction of two roads to control traffic, the carrying capacity of the road is greatly reduced. Where the cycle of operation gives equal times for movement in each direction, the capacity of each road is reduced to less than half because of the time taken for the traffic to accelerate from rest. If, therefore, the arterial road system is to be fully effective, intersections must be designed to eliminate lights as far as possible and to permit continuous movement of traffic in all directions. This means the use of specially designed intersections such as roundabouts or grade separation structures. All important intersections of the proposed arterial road system have been studied from this point of view and a suitable type of intersection outlined. This was necessary so that sufficient land could be reserved for the future construction of proper road intersections.

Some typical examples of the types of road intersections envisaged are shown in diagram 23. A possible solution for the very important St. Kilda junction is shown in diagram 29.

Control of Access

Direct entrance from private properties and local roads to roadways carrying fast-moving traffic introduces a major hazard. Because specially designed junctions are expensive and mean some slowing down of the traffic their frequent occurrence would not only be costly but would unnecessarily retard road movement. For these reasons it is desirable to restrict the number of points at which traffic can enter an arterial road, and wherever possible such roads should be planned and constructed as *Controlled Access Roads* to which entry of traffic is permitted only at selected points.

In an urban area this is not always possible, but the various arterial road routes provided for in the planning scheme have been located with this in mind. Map 27 shows those portions of the proposed arterial road system in which limited access will be possible. In the rest of the system it would be too costly to limit access and it is only practicable

to provide for roads of the requisite capacity but without restriction of access.

Road Cross Sections

Some conception of the probable design of future roads is necessary to fix the extent of reservations. To determine this, it is necessary to estimate the volumes of traffic which they will probably carry in the future. Detailed studies, based on the zoning provisions of the scheme, were therefore made for every arterial road route. The calculation of traffic volumes was based on studies of today's traffic and allowance made both for the anticipated increase in population and the probable greater number of motor vehicles in proportion to the population. Diagrams 24 and 25 give for the principal traffic movements in the metropolitan area a comparison between the volume of present-day traffic and that which is likely when the population reaches 2,500,000. For purposes of comparison, it is of interest to note that at the present time the traffic over Spencer Street Bridge is about 32,000 vehicles in 12 hours and over Princes Bridge about 25,000 vehicles.

Having estimated the volume of traffic for a particular road the necessary width can be determined. For present purposes it may be taken that one traffic lane of a controlled access road is capable of carrying 11,000 vehicles in a 12-hour period, allowing for average peak conditions, although this will vary to some extent with the class of traffic using the road. For roads in which access is not controlled, it can be taken that the capacity is reduced to about 7,000 vehicles in 12 hours for each lane.

Modern road practice favours a pavement width of 12 feet for each traffic lane, and additional lanes 10 feet wide for the change of speed of vehicles entering and leaving the roadway. Separation of opposing lines of traffic by median strips of from about 12 to 30 feet wide according to circumstances is also desirable. Where buildings abut on to an arterial road, service roads are necessary if access to the main traffic route is to be properly controlled.

All these requirements mean road reservations of considerable width. At an early stage in the work it was realised that these would not always be attainable at reasonable cost, so cross-sections for desirable and minimum requirements were prepared as a guide to fixing the width of reservations. Examples of these are shown in diagram 26, and the necessary widths of reservation for various conditions are given in Table 8.

FEATURES OF THE PROPOSED ARTERIAL ROAD SYSTEM

The proposed arterial road system is shown on map 27 which distinguishes those portions of the system in which limited access is possible and those in which reservations for this very desirable feature would be too costly to consider at this stage.

From a study of the planning scheme maps which accompany this report, it will be seen that, although a considerable