~~1 Cycle~~
2 Analysis.

Central Area Access Study

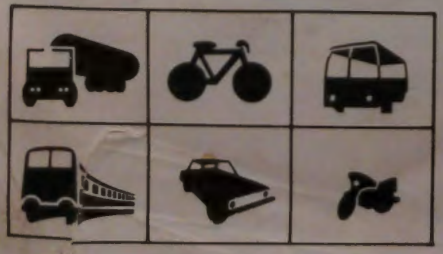
CAAS

1326

Issue Paper No. 9

BICYCLE NETWORK PLANNING

Prepared by : CENTRAL AREA TASK FORCE, Ministry for Planning and Environment in conjunction with the Ministry of Transport.



Ministry of Transport
Priorities and Planning Division

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MINISTRY OF TRANSPORT

CENTRAL AREA ACCESS STUDY

ISSUE PAPER 9

BICYCLE NETWORK PLANNING

"A Strategic Bicycle Network for the Inner Area of Melbourne"

Prepared by: R. Smith, Central Area Task Force,
Ministry for Planning and Environment
in conjunction with the Ministry of
Transport.

March 1984

FOR DISCUSSION PURPOSES

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MAP

EXECUTIVE SUMMARY

This report sets out a possible bicycle network for the year 2000, through the Central Business District and the inner suburbs of Melbourne. It has been released for public comment, as a step towards obtaining general agreement on the routes to be included in such a network.

The study has been carried out by the Ministry for Planning and Environment, in consultation with local Councils, the Ministry of Transport, and many other government and community groups. It builds on the "Melbourne Bike Plan Stage 2", prepared by the State Bicycle Committee.

A map showing the proposed routes, and the various works needed, is located inside the back cover. Appendix 1 gives details of the individual projects, and should be read in conjunction with the map.

Advantages of adopting a generally agreed network approach to bike route planning include:

continuity - routes will connect across municipal boundaries;

cost savings - developments can incorporate bike paths from the start, thus avoiding expensive removal of 'barriers' at a later stage; and

employment opportunities - bike route construction is labour intensive, and suitable for skills training in unemployed people.

The proposals have been costed at $25.5 million, or about $1.5 million a year for the next 17 years. This expenditure would of course be spread among many different organisations. Some of the projects are already being constructed, partly with Commonwealth and State Community Employment Program funding. The plan includes the construction of 21 bridges and some 200 km of off-road bike paths, together with many on-road improvements such as traffic signals at key intersections.

The author would like to thank the many Council officers and community groups who have lent their support to this project. An invitation is extended to all interested parties to participate in the review of this draft concept plan to help produce one that has general agreement. It would be appreciated if written comments were sent to the Ministry of Transport, P O Box 4910, Melbourne, Victoria 3001 by 30th June 1984.

ACKNOWLEDGEMENTS

This report was written by Russell Smith who was assisted through the study by the following persons:

Jeremy Wood, Ministry for Planning & Environment & Member of the SBC
Don Glasson, Loder & Bayly, Principal Consultant to the Study
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Peter Seamer, St Kilda City Council
Peter Moore, Recreation Officer, Richmond
Andrew Park, Altona City Council
The South Bank Project Team, Ministry for Planning and Environment
Kris Kudlicki, Flinders Street Station Redevelopment Project
Chris Leonard, V/Line
Greening of Richmond Committee

NB: SBC is the State Bicycle Committee

FOREWORD

This document has been prepared by the Central Area Task Force of the Ministry for Planning and Environment. However, as bicycle planning relates to transport it has been agreed that the process of obtaining comments on the proposals and of developing any implementation actions should be done in conjunction with the Ministry of Transport's Central Area Access Study and the State Bicycle Committee.

The Central Area Access Study was set up by the Ministry of Transport as one of the studies to provide input to the Ministry's Transport Strategy due to be released in 1984.

(i) Identify Central Area transport problems, in particular those relating to the Central Business District;

(ii) Develop options to minimise these problems and complement activity and development objectives;

(iii) Evaluate the options; and

(iv) Develop a program for implementation of solutions.

The paper is consistent with some of the Government's broad transport objectives for the Central Area especially those concerned with improving access by non-motorized means.

1. BACKGROUND

Until now, there has been no long-term strategy plan for bicycle transport in Central Melbourne. Existing documentation mainly looks at ways to make best use of our present road network.

Previous planning for cycling in the inner municipalities of Melbourne has culminated so far in the publication in 1981 of the "Melbourne Bike Plan Stage 2" by the State Bicycle Committee (SBC), a standing committee established within the Ministry of Transport.* That publication sets out a 10 year program for engineering works, education, enforcement, and encouragement (the four E's) in order to improve the behaviour of cyclists and motorists on roads that are shared. An important part of that publication is the "Melbourne Bike Map".

The "Melbourne Bike Map" is principally a publication to advise cyclists on the safety and quality of cycling along a selected network of roads throughout the Metropolitan area. It is part of a programmed plan for improved cycling. Existing traffic lights, hazards, hills and tram lines are among the features shown on the map, which serves to:

- help cyclists select appropriate routes for their trips;
- direct them away from unsafe or high stress routes;
- act as a master reference plan for use in short term land use and transport planning;
- create greater community awareness of cycling; and
- encourage councils to implement measures for cyclists.

The purposes are commendable and the Map is designed for the practical use of cyclists. The Map properly emphasizes on-road cycling and the best routes to follow but the Melbourne Bike Plan provides only a short term strategy for on-road networks and bike paths in the future - some future bike paths indicated are dead-ended. The Melbourne Bike Plan is not a comprehensive reference for planners or developers especially in the Central Area in the long term.

The Bike Map could tend to lead planners and developers to believe that a bicycle route network is not desirable through the Port area, in the CBD, and in other inner areas. But this is not necessarily so. The Lower Yarra Concept Plan provided for an extended bicycle path from Princes Bridge to Queens Bridge, but it excluded provision for bicycles between Queens Bridge and King Street Bridge and further west through the Maritime area (probably because the Melbourne Bike Map did not show this future possibility and because of the engineering difficulties). Consequently, some government agencies have proceeded to develop riverside areas without provision for bicycles.

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* Stage 2 of the Melbourne Bike Plan covered the central area of Melbourne and this publication refers to the same area. Stage 1 of the Melbourne Bike Plan covered the bayside suburbs and was completed earlier. Stage 3 covering the eastern suburbs will be published shortly.

Previously, an attempt has been made to develop a "non-motorised plan" for Melbourne by the Department of Youth, Sport and Recreation but this work was discontinued.

2. PURPOSE OF THIS STUDY

The Central Area Task Force considers that it is not too late to start to solve the difficult problem of providing an inter-connected and purposeful network of routes (both on-road routes and separated bike paths) in Central Melbourne and the inner suburbs. If a "year 2000 bicycle transport network" could be developed for the Central Area of Melbourne, planners and developers would at least know where reservations and developments are needed in future. It was the purpose of this study to develop such a (draft) future strategic concept.

It is timely to undertake such an exercise given that a new Central Melbourne development strategy is being formulated and that transport objectives and plans of both State and local governments are being revised. A multi-modal view of transport needs to involve a vision of the role of bicycles. Currently, all levels of government are committed to providing additional employment programs for which cycleway construction is well suited (section 8.2 and 8.3 explain this further).

No inner area councils were known to be developing a future strategic plan at the commencement of this study. The study requires a consolidation and update of current municipal plans, so that an integrated future network would be worked out. The Central Area Task Force believes that this network concept is of interest to various State government agencies particularly as the State is responsible for regional planning and for ensuring continuity across municipal boundaries for the benefit of Melbourne at large.

The Melbourne Bike Plan aims to improve the current conditions and safety of cyclists. This exercise in future planning has built upon the Melbourne Bike Plan in areas to provide a map of a possible year 2000 network. For compatibility, this study uses definitions and route classifications from the Melbourne Bike Plan. The Melbourne Bike Map shows current stress ratings on roads and is for use principally by cyclists, with supporting short term works programs. This year 2000 concept aims to give a longer term view of the network for planners and developers.

The proposed Stage 2 Update of the Melbourne Bike Map is not attempting to develop a future network concept but will mainly update programs and maps of existing conditions. However, the Stage 2 update will draw on the results of this study (and any other forward planning concepts) in order to reflect selected off-road proposals.

3. OBJECTIVES

The general aim of the Central Area Task Force's work program is to contribute to the revitalisation of Melbourne.

This study's principal objective is to develop a long term future strategic bicycle network concept for the central area. It is intended that through the development and discussion of a strategic bicycle network, opportunities to provide for safer and more efficient movement of cyclists and pedestrians shall be realised throughout the Central Area network of roads and open spaces.

Other objectives include:

- to develop a future (year 2000) network of preferred on-road and off-road bicycle routes;
- to develop a network that serves commuter, recreational and other travel needs;
- to provide planners and developers with an annotated concept map of future bicycle usage, to help save various links/paths from being blocked by new development; and
- to help municipalities integrate their planning for bicycles.

4. STUDY PARAMETERS

Year 2000

The year 2000 was chosen for the concept, to allow sufficient time for planning and development a new bicycle network, and to provide adequate separation from the existing road system.

Central Area

The "Central Area" of Melbourne has no definitive boundaries but in this study it includes:

- inner areas within half an hour's cycling time of the CBD - an approximate maximum time limit for many cycling trips;
- all municipalities adjoining the City of Melbourne;
- the full length of the Yarra downstream from the city;
- major areas of under-utilized Crown land e.g. Maribyrnong Valley; and
- areas of significance to the State e.g. St. Kilda Esplanade, which has tourist significance.

The concept map at the back of this report covers the same area as the Melbourne Bike Map.

Strategic Concept

The study did not set out to produce a detailed plan that could be implemented immediately. It is a concept, reflecting the way places should be linked by bicycle routes to form a network. The links are not meant to specify exact alignments. If the concept is accepted, detailed planning will be needed before cost, feasibility and exact alignments can be determined. Although the economic feasibility of the routes has not been established extensive "saddle surveys" have been undertaken and enquiries have been made to ensure that all links, bridges, etc. are realistic. The concept is referred to as strategic as it serves regional travel needs not just localized demands within municipalities: it identifies cross-town routes, and routes to and through the CBD.

5. METHODOLOGY

5.1 General Approach

For the development of the future concept, an important requirement was that it be consistent with existing bike routes, the SBC's Melbourne Bike Map, the Hierarchy of Roads, existing land uses and zoning, and any plans committed by inner city councils, the Melbourne & Metropolitan Board of Works, and other State agencies. Where the concept differs from any existing plans, justification is given.

Figure 1, illustrates the data collection and review steps (phase 1) which formed the basis for concept development (phase 2). Phases 3 and 4 in Figure 1 indicate the next steps needed for the draft concept to be finalised and implemented.

The selection and justification of routes relied upon considerations of future demand (see Section 6) and their compliance with three key principles:

- compatibility with the Hierarchy of Roads;
- appropriate "Stress ratings"; and
- continuity

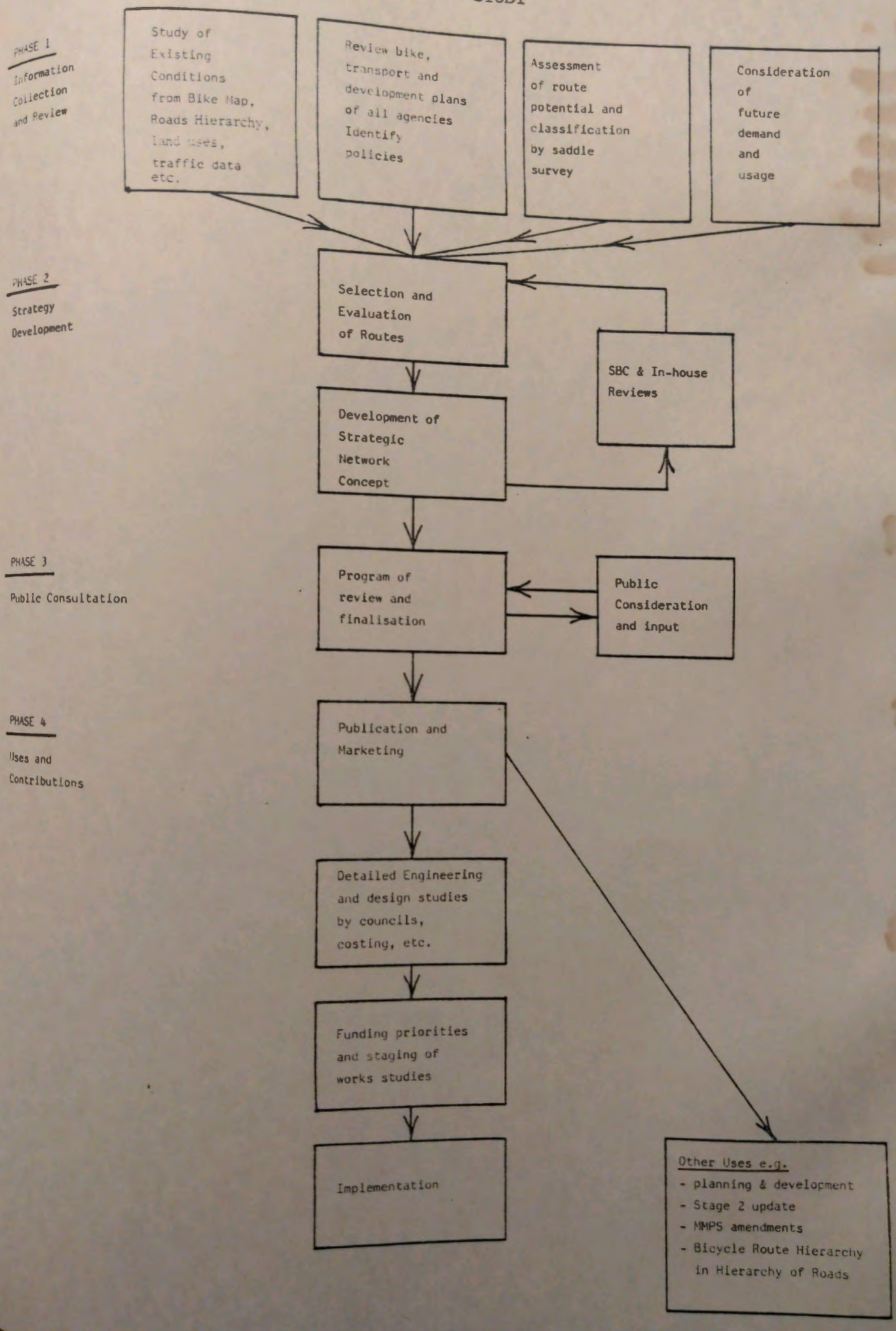
which are explained below.

Care was taken to adopt prevailing council policies where possible. For example, the City of Melbourne recognises some problems with the shared cycle-pedestrian path along the Yarra. The City of Melbourne permits cycling in "parks" but not in "gardens" which are reserved for passive purposes.

Although no feasibility studies have been undertaken, the proposed network is tentatively considered feasible in engineering terms and able to be implemented without heavy capital expenditure for instance, traffic lights at intersections with major roads. Grade separated viaducts or bridges are in some cases proposed as a preferred solution. The network provides for conventional cyclist behaviour (e.g. the need to maintain height and avoid hills).

FIGURE 1

FLOW CHART OF STUDY



5.2 Principles Used

Routes (links) that make up the network concept have been selected through consideration of existing conditions, plans and commitments.

Alternative routes have been considered from a knowledge of the inner areas and experience of cycling along them, in order to fully appreciate vistas, hazards, opportunities, etc. Acknowledging that cyclists will continue to use all roads, the network represents a preferred grid to meet major anticipated needs.

First Principle - Compatability with Hierarchy of Roads

A future Hierarchy of Roads for year 2000 was generated from transport planning commitments. It covers freeways, primary arterials, secondary arterials, collectors and local roads. The top 2 levels - freeways and primary arterials - were used as an indicator of the most heavily trafficked roads, to be avoided on safety grounds by cyclists wherever an alternative was possible. Some arterials are convenient routes for experienced cyclists and where no alternative existed, it is proposed that appropriate works on these arterials be implemented to improve their safety for adult cyclists. In most cases, however, an alternative route to each arterial road was sought.

The degree to which main roads should be avoided by cyclists is dependent on the experience and risk-aversion of the cyclists as well as the dangers involved. Consequently, the concept of low and medium stress routes was used (as explained below). Low stress conditions cannot be achieved at reasonable cost on arterial and collector roads.

Second Principle - Appropriate Low, Medium and High Stress Routes

Development of the network strategy makes use of the low, medium and high "stress" classifications of routes. These are shown as good, medium and poor bike routes, respectively, in the Melbourne Bike Map. "Stress" is related to traffic speed and volume, lane width and other factors measuring cyclists' exposure to danger. The Melbourne Bike Map's high stress routes were eliminated and the low and medium stress networks were reviewed and generally expanded.

Low stress routes are suitable for "traffic-shy" cyclists (older than 9 years) where there is minimal potential conflict with other vehicles and pedestrians. These routes are ideal for recreational cycling but may be used for other journey purposes. They include on-road routes and off-road bike paths.

High stress routes, on the other hand, are suitable only for experienced cyclists due to potential dangers. "Experienced commuter" cyclists who are prepared to use high stress routes have the whole road network available to them, excluding freeways. All roads on which bicycles have legal right of usage as vehicles are open to the experienced cyclist. As long as there are alternative medium and low stress routes available to cyclists, then there is no immediate need for cycling provisions on the high stress routes, beyond normal maintenance. Thus high stress routes are not shown on the strategic network concept.

Medium stress routes are those on-road routes where a range of traffic management measures are available to reduce cyclists' exposure to traffic. These routes are useful for commuting to work, for shopping, and for other purposes and they are safer than high stress routes but they are intended for use by adult cyclists not children.

Third Principle - Continuity

Given the greater hazards to cyclists on medium or high stress routes, it was considered particularly important for low stress routes to form a continuous grid. Continuity theoretically minimizes the exposure of cyclists to stressful conditions whilst providing a city-wide (low stress) route network. Appropriate measures such as pedestrian signals are needed where these routes cross busy roads.

Several bicycle travel "desire lines" are interrupted by barriers such as rivers, freeways, railway property and large allotments. These barriers are illustrated in Figure 2. For the network of both low and medium stress routes to be useful for all cycling purposes, these barriers need to be bridged. Given the high cost of bridging, availability of an existing or proposed crossing point at a barrier may justify modifying the network to capitalise on that opportunity. As Figure 2 shows, 21 bridges are ultimately needed to overcome major barriers to bicycles. See also the list in Appendix 1.

6. FUTURE DEMAND FOR BICYCLE TRIPS

Recent research in Melbourne shows the significance of bicycle travel in relation to other modes. Note that the comparisons with other modes are illustrated over three diagrams with different vertical scales that measure exposure time i.e. time spent travelling on the road (See Figure 3).

Bicycles have been shown to account in 1978 for 1.7% of all trips compared to 3.8% by tram (see Figure 4) and are likely to reach 2% of trips by 1984.

The percentage of trips to work by bicycle in the metropolitan area declined from 9.5% in 1951 to 0.5% in 1971 but rose to 1.5% in 1983 (See Figure 5). The bicycle manufacturing and importing industries are expecting continued growth in sales.

There are few forecasts of bicycle travel demand. One recent estimate suggests by 1990 bicycle trips to work will grow to 2% in 1984 and to between 3% and 5% in 1990 (See Figure 5). This study takes a more conservative estimate that all trips by bike will reach between 3% and 5% by year 2000. Bicycle travel is likely to increase relative to other modes in view of several factors:

- increasing energy/fuel prices inhibiting motor travel;
- estimated continued high levels of unemployment;

FIG. 2

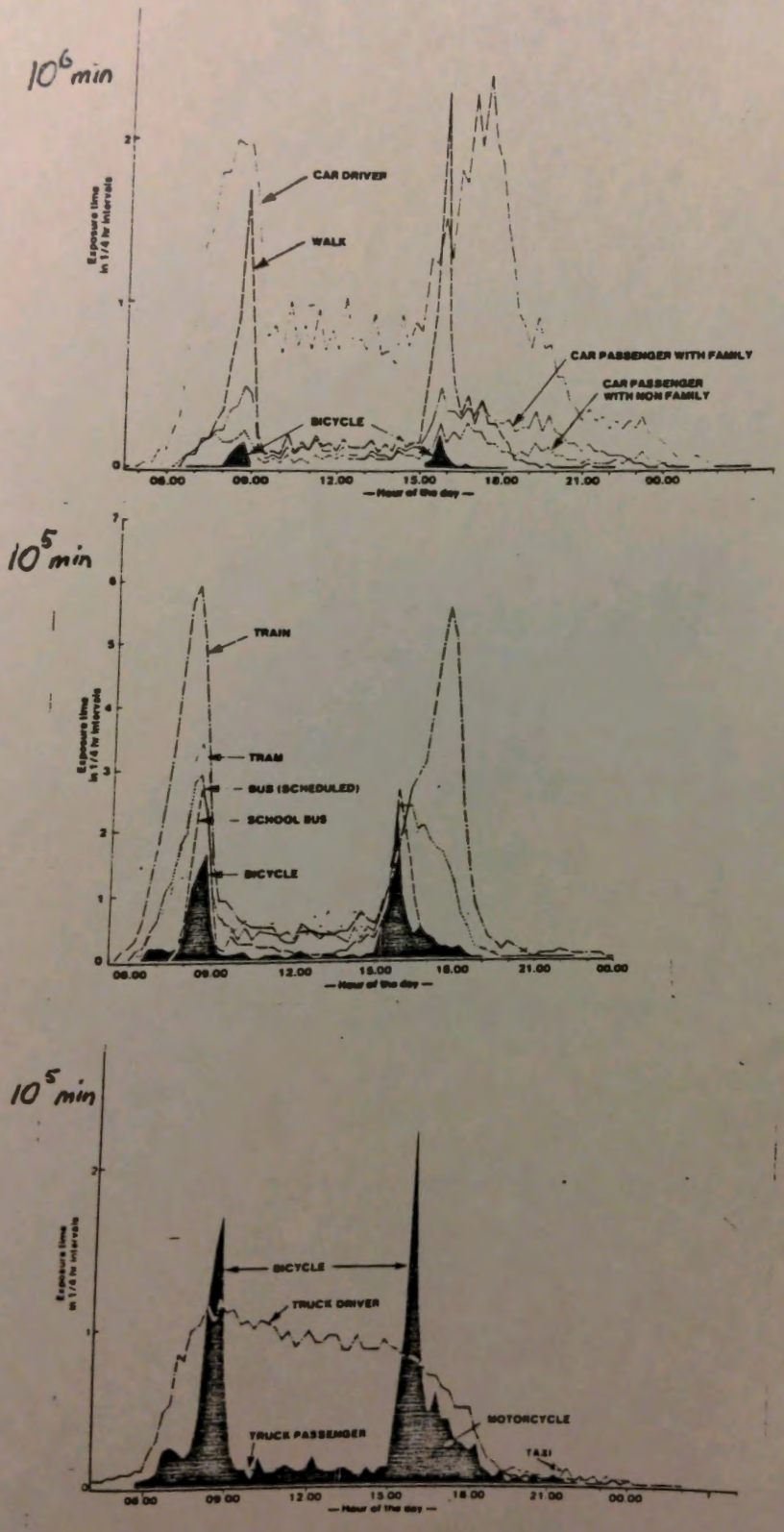
PHYSICAL CONSTRAINTS TO A BICYCLE NETWORK, & PROPOSED CROSSINGS

- RAILWAY LINE & YARDS
- RIVERS & BAYS
- RESERVES
- LARGE LAND HOLDINGS
- EXISTING ROAD BRIDGE
- PROPOSED BICYCLE/PEDESTRIAN BRIDGE (or Tunnel)
- PROPOSED BICYCLE CROSSING ON EXISTING FACILITY

2 16.2.8

FIGURE 3

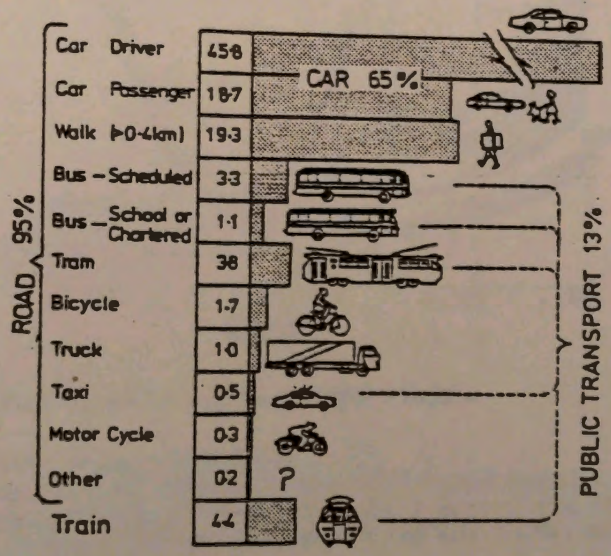
TOTAL WEEKDAY EXPOSURE TIME BY MODE, MELBOURNE 1978



Source: Wigan 1981

FIGURE 4

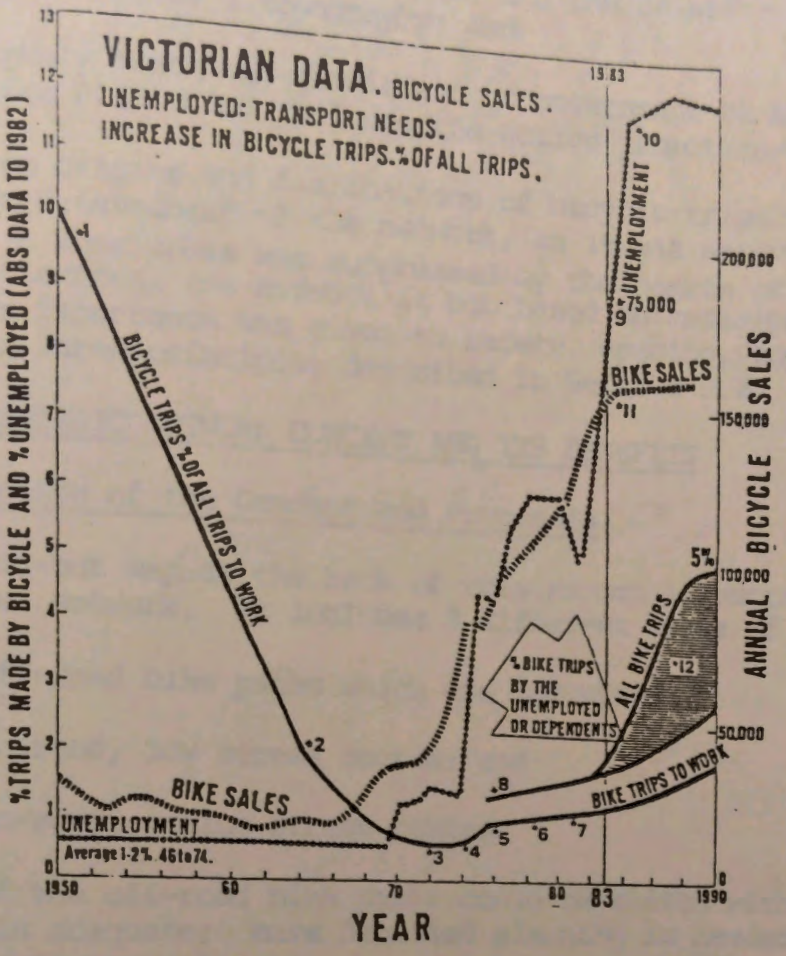
PERCENTAGE OF TRIPS BY MODE, MELBOURNE 1978



Source: Crampthorn 1981

FIGURE 5

TRENDS AND FORECASTS IN TRIPS MADE BY BICYCLE, MELBOURNE 1950 to 1990



SOURCES FOR DATA PLOTS SHOWN THUS ★

1. MMBW Transport Study 1974.
2. Melboure Home Interview Survey No. 3 Report Table 36.
3. Melbourne Home Interview Survey No. 3 Report Table 37.
4. ABS 1876 Census Data (Quoted by P. Moriarty) ARRB paper Vol 10. Part 5 1980
5. ABS 1976 Census Data.
6. Melbourne Home Interview Survey No. 3 Report Table 38.
7. ABS 1981 Census Data
8. Future Context for Transport — Overview Fig. 1.1
9. Prediction by Dr. Ironmonger — Melbourne University — Age. Dec. 82
10. Australian Industry Development Association Report Dec. 1982
11. Letter from General Accessories (Malvern Star)
12. Authors estimate.

Source: Pedal Power Autumn 1983

- the trend in production of more high-performance bicycles at low costs;

- comparisons of bicycle usage in other Australian cities (e.g. Adelaide and Canberra) and the relative suitability of Melbourne's topography; and

- likely continued commitment of government to the Melbourne Bike Plan which includes the active promotion of cycling.

Existing origins and destinations of bicycle trips were not made a major determinant of the network, as it was assumed that bicycle usage in some areas was suppressed by the dearth of facilities. To that extent, the network is not based on anticipated demand. Greater importance was given to safety, spacing, topography and the three principles described in Section 5.2.

7. THE STRATEGIC NETWORK CONCEPT AND ITS BENEFITS

7.1 Description of the Concept and Proposals

The fold-out map at the back of this report illustrates the proposed network. It includes 3 different types of links:

- off-road bike paths which are low stress;

- on-road, low stress routes; and

- on-road, medium stress routes.

Some of the off-road bike paths could be shared with pedestrians if width is adequate; more detailed planning is needed to verify where this is preferable.

Some of the network already exists. There are several bike paths along parts of rivers (e.g. the Yarra) and a number of streets where cycling conditions already meet the proposed year 2000 standard of either low or medium stress. No investment is needed where facilities already exist (solid symbols), apart from normal maintenance. The hollow symbols indicate proposals for public works in order to reduce the existing stress rating to that proposed in the network concept.

As mentioned in Section 5.2 continuity is considered fundamentally important particularly for low stress routes. The proposed network provides for continuous low stress routes (on and off road) across the Central Area in all directions. It is a network suited to radial, currumferential and cross town travel.

The choice of alternative links was not always straight-forward and the map produced in this report is the eighth draft: further drafts will be produced following the period of public comment. Some routes are controversial. Dandenong Road, Queens Road, and Victoria Street (North Melbourne) are primary arterials that have been avoided. They are obviously high stress routes (and are therefore suitable to very experienced cyclists) but the stress rating cannot easily be lowered because of the competition for limited road space.

Alma Road is proposed as the main low stress route parallel to Dandenong Road but that proposal would be costly to achieve. Queensberry Street is proposed as the alternative to Victoria Street but that would require a link through the Exhibition Gardens. To achieve the suggested stress ratings on city streets, measures such as lower speed limits and bicycle lane markings would be needed. As these types of measures are commonplace in many overseas cities, the network concept seems achievable over the 17 years to year 2000.

The Government and the Cities of Melbourne and South Melbourne have embarked on programs of beautification and improved access along parts of the Yarra River west of Princes Bridge. It is proposed as part of the network concept that a joint bicycle-pedestrian promenade be extended along both sides of the river as far as possible. The river banks provide a convenient linear access corridor along the river. Cross river links are suggested for Queens Bridge and Spencer Street Bridge and by two new bridge crossings between Flinders Street Station and Southgate and in the Maritime area. Cyclists crossing arterial roads (e.g. Clarendon Street) could be assisted by traffic signals as this currently works well at Chapel Street. In the longer term grade-separated crossings (above ground or submerged underpasses) may warrant investigation. Figure 6 shows the bicycle network proposal along the Yarra. To the east of Princess Bridge another river crossing is proposed as part of any redevelopment of Jolimont.

Appendix 1 contains a list of comments and explanations for particular links in the network that are represented on the map by numbers.

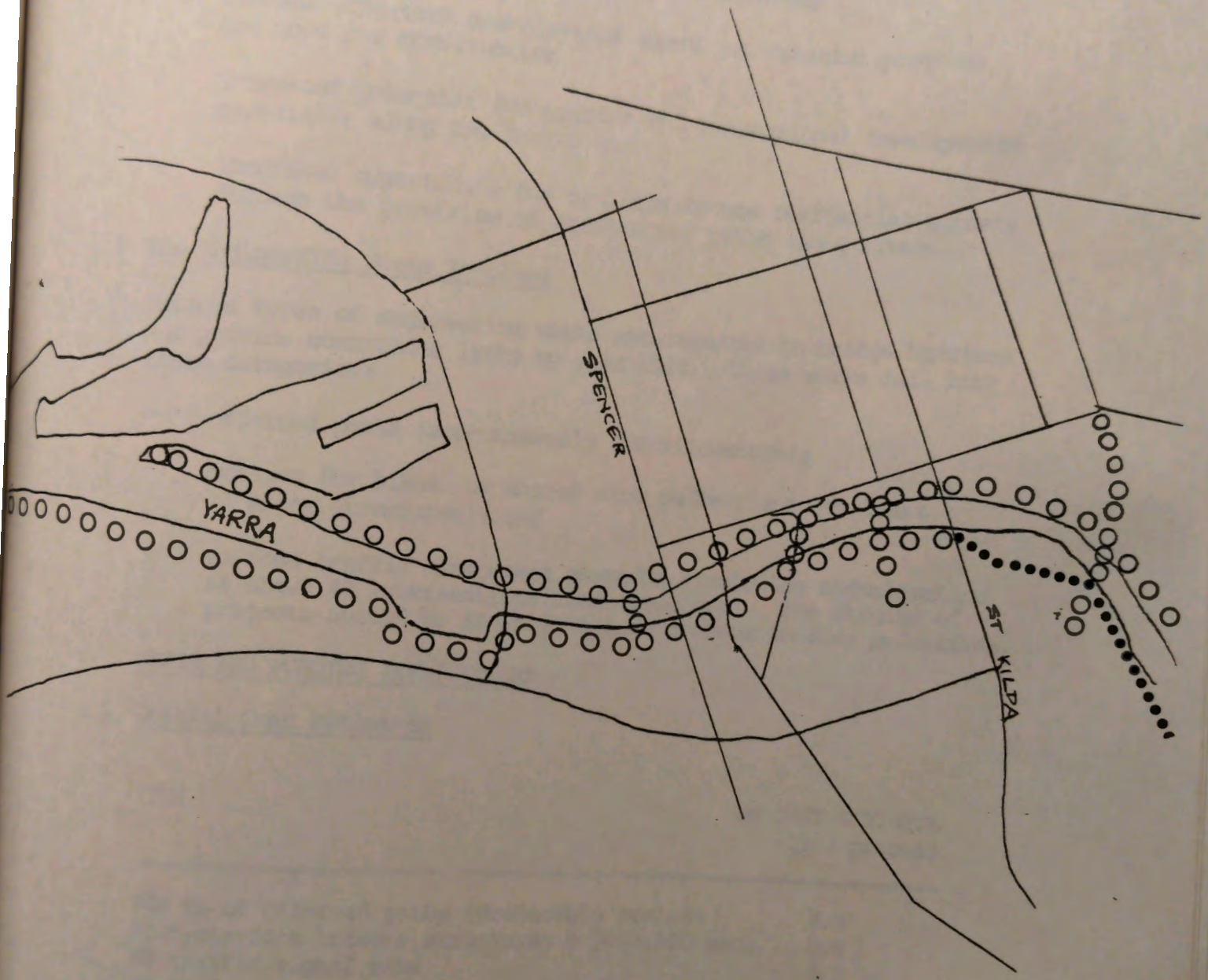
7.2 Expected Benefits of the Network

The potential benefits of developing an integrated bicycle network in the Central Area include the following:

- greater accessibility to and within the CBD and inner suburbs;
- enhanced image of Melbourne as a city for people;
- improved environmental conditions (capacity) of streets;
- improved road safety and reduced accidents;
- improved public transport system through improved cyclist access to trains and the promotion of dual mode (bike-train) travel;
- greater mobility for people especially for teenagers and others without cars or access to public transport;
- greater recreational opportunities on a safe network of routes;
- reduction in the use of fossil fuels;

FIGURE 6

EXTRACT OF PART OF THE BICYCLE NETWORK CONCEPT 2000
ALONG THE YARRA RIVER



TYPE OF ROUTE / SYMBOLS	Existing Route	Proposed Route
Bike paths, Off-road, Low stress	● ● ● ●	○ ○ ○ ○

- greater public awareness and use of parks, river valleys and Crown lands;
- improved community health and fitness through cycling;
- multiplier effects of the investment involved;
- reduced long-term unemployment where job creation programs are used for construction
- increased potential for tourist and recreational developments especially along the Yarra; and
- increased opportunity for cyclists to use residential streets through the provision of bridges and paths along rivers.

7.3 The Engineering Works Involved

Various types of engineering works are required to bridge barriers and provide continuous links by year 2000. These works fall into three categories:

- off-road paths (approximately 200 kilometres);
- bridges for bikes, or shared with pedestrians (at least 21 major structures); and
- on-road traffic management measures (including signalisation at about 40 intersections/road crossings). The staging of projects should be investigated to produce funding priorities.

8. COSTS AND FUNDING IMPLICATIONS

8.1 Initial Cost Estimates

ITEM	$m COST ESTIMATE (1983 prices)
200 km of off-road paths (preferably sealed)	8.0
21 cycle-foot bridges structures @ $400,000 each	8.4
40 traffic signal sets	2.0
on-road measures	7.1
TOTAL	25.5

NOTE: These cost estimates include some expenditure for continuation of the Melbourne Bike Plan.

The total cost of the order of $25.5m is not a direct outgoing for any single organisation. It would be incurred gradually over 17 years, say, at a uniform rate of $1.5m per annum, and it would be apportioned amongst Federal, State and Local Governments and possibly developers. Various benefits as cited in Section 7.2 would be derived by the community and each funding agency as witnessed from previous co-operative cycleway construction projects involving different government agencies.

8.2 Commitment and Funding

To realise this strategic network, funding of the order of $25.5m would be needed between now and year 2000, an average of $1.5m per annum for 17 years.

The concept needs to be generally accepted as a blueprint as soon as possible - preferably in 1984 - to avoid piecemeal construction of links in the network. Funding priorities need to be developed, and applications made for funds. Priorities also need to be reconsidered in relation to the engineering works proposed in the Melbourne Bike Plan.

Although the SBC wrote to all metropolitan councils in June 1983 to inform them that employment funds would be available for bicycle related projects and requesting them to prepare applications, only a few councils responded. In the past, the middle and outer metropolitan councils have been more active in seeking funds and implementing bicycle works than the Central Area councils. There is a strong equity argument for increased investment in the inner and inner-western suburbs. This situation prompted the Ministry for Planning and Environment to lodge a bulk application for Community Employment Program and Jobs on Local Roads funds on behalf of six Central Area councils and 2 State instrumentalities. The application was made in the form of the first year of a rolling program of $6m of works within three years. The application for approximately $2m in 1984 was successful and negotiations are underway with several councils to start work on these projects.

8.3 Project Suitability for Employment Training

The works needed are considered to be ideally suited to a range of unemployed groups as they could offer men and women technical and practical experience in planning, design and construction of minor engineering works. The off-road facilities and bridges are especially well suited to construction using labour under training. Also, the labour content is typically in excess of 50% of required costs. Bike path projects conducted under the Employment Initiatives Program have proven their worth to the community by providing openings for permanent employment as well as improving cycling opportunities. The third category of works, on-road traffic management measures, would require more consultative and administration effort and more technical expertise because of the greater amount of traffic conflict potential.

9. RECOMMENDED ACTIONS

- The proposal should now be made available for public comment. This, and subsequent phases of the study (as shown in Figure 1, Phases 3 and 4) will be carried out by the Ministry of Transport. Parties to be consulted are listed in Figure 7.

- At the same time, the network concept should be refined and developed. For instance, greater local knowledge will identify bicycle routes to local schools and shops which can be added to the network. A few differences with council bike plans also need to be resolved, mainly in Fitzroy, Collingwood and Melbourne.

- After finalisation of the network concept, detailed engineering and design studies need to be carried out. Table 1 lists those areas in which detailed engineering plans of on and off road cycling routes have been completed. This table also shows which municipalities have large job creation programs that could easily incorporate bike route construction and signing.

10. SOME ISSUES OF IMPLEMENTATION

10.1 Standards of Construction

Government approved standards for various types of bicycle paths have been prescribed by the Road Safety and Traffic Authority (now part of the Road Traffic Authority) in 1982. For example, the minimum width of a shared bicycle pedestrian path is 2.0 metres, or 1.5 metres where activity is very low. Desired widths are also specified together with clearances to obstacles/hazards, signing, etc.

Extensive experience of bike path construction in flood-prone areas of Canberra has led to the recent publication of detailed engineering design principles and material specifications (see National Capital Development Commission 1983). This is one of the most comprehensive handbooks available for design of off-road bike paths although some signs are different from those used in Melbourne.

10.2 Legal Liability for Injuries that Occur on Sub-Standard Bike Paths

There is increasing concern about councils which are applying for permits, funding or assistance to construct paths of a width that is suitable for either pedestrians or cyclists but not both; yet, it is obvious that the path in practice would be shared. The width is thus sub-standard. A narrow design may have been preferred for cost savings at the expense of safety.

FIGURE 7

AFFECTED PARTIES TO BE CONSULTED IN THE CONSULTATION PROCESS

COUNCILS

Melbourne City Council
South Melbourne City Council
Port Melbourne City Council
Brunswick City Council
Fitzroy City Council
Collingwood City Council
Richmond City Council
Prahran City Council
St. Kilda City Council
Essendon City Council
Footscray City Council
Kew City Council
Northcote City Council
Williamstown City Council

AGENCIES

Ministry for Planning and Environment
Metropolitan Transit Authority
Road Traffic Authority
Road Construction Authority
Melbourne and Metropolitan Board of Works
State Bicycle Committee
Education Department
State Transport Authority
Department of Youth, Sport and Recreation
Victoria Police
Australian Road Research Board
Ministry of Lands
Port of Melbourne Authority

COMMUNITY GROUPS

Royal Automobile Club of Victoria
Bicycle Institute of Victoria
Local Government Engineer's Association
Albert Park Trustees
Flemington Association
North Melbourne Association
Parkville Association
Carlton Association
Greening of Richmond Committee
Melway Publishing Pty Ltd

TABLE 1

COMMUNITIES FOR WHICH DETAILED CYCLING STUDIES HAVE BEEN COMPLETED

Community/Suburb	Council	Has a comprehensive and detailed on and off-road future bike plan been completed?	Does a job creation program exist that could be used for bike path construction?
Melbourne including CBD	MCC	No	Yes
North Melbourne, West Melbourne, Kensington	MCC	No	Yes
Parkville, Royal Park, Flemington	MCC	No	Yes
Carlton, East Melbourne	MCC	No	Yes
Williamstown	WCC	No	?
Footscray	FCC	Yes	Yes
Essendon	ECC	No	Yes
Brunswick	BCC	No	?
Fitzroy, Clifton Hill	FCC	Yes	?
Collingwood	CCC	Yes	?
Richmond	RCC	Yes	Yes
Toorak	PCC	No	?
South Melbourne, Albert Park, Middle Park	STH MCC	Yes*	?
St Kilda	StK CC	Yes	?
Port Melbourne	PORT MCC	No	?

* Off road bike path plan only.

Recently questions have arisen over the liability of councils and the State government for injuries resulting on paths that are below ROSTA standards of construction. Substandard paths could give rise to compensation claims in the event of accidents. Where individual design engineers are not protected by statute, they may face personal liability by anyone who feels he/she has suffered damage. Adherence to design standards for joint pedestrian and bicycle usage is preferable where paths will not in practice be used exclusively by one or the other.

Some plans have contained paths in which there are steps, forcing cyclists to dismount. Steps are undesirable given the difficulties of providing adequate signing/warnings to cyclists, pedestrians and others - especially after dark. The existing Yarra bike path contains some steep gradients instead of steps, and this approach appears worthy of consideration to minimise accident possibilities.

10.3 Law Pertaining to Usage

Bicycles are generally treated as vehicles under Victorian Road Law, i.e. when they are used within a road reservation. However, a recent amendment to the Road Traffic Regulations clarifies several matters. Entitled The Road Traffic (Bicycle Facilities) Regulations 1981 the amendment provides for the following:

(a) Shared Use of Footpaths

Cyclists can share the footpath with pedestrians only where signs permit this to happen. Such footpaths normally have only light pedestrian use, while the roadway is usually of high risk to cyclists - justifying the shared footpath option.

(b) Segregated Use of Footpaths

The amendment provides also for segregated use of footpaths where part of a footpath is designated for bicycle use and the remainder for pedestrians.

(c) Bicycle Paths

Bicycle Paths may be created on reservations (nature strips or median strips) by the erection of bicycle way signs. Pedestrians are not permitted to use a Bicycle Path.

(d) Approval for Bicycle Facilities

The signs used to create these facilities have been specified as Major Traffic Control Items requiring the approval of ROSTA (now RTA). Standard drawings for the signs are specified by ROSTA (1982).

(e) Wheeled Bikes and Traffic Signals

The regulations now make it clear that a person wheeling a bike is a pedestrian but allows for bicycles to be pushed along the left side of a carriageway. This provides for the possibility for cyclists to do a 'box' or 'hook' right hand turn similar to that used by vehicles in the central city at the intersection of tram lines.

(f) Bicycle Lanes on Carriageways

Bicycle lanes can now be created on a carriageway to protect cyclists from vehicles overtaking. In essence they are established by the erection of a 'bicycle way sign', at the start and an 'end bicycle way sign' at the end.

Different laws apply outside road reservations. Here, the principle concern is the use of Crown or other lands reserved as public open spaces, parks, or reserves. Legal opinions have indicated that the provision of paths and their use for bicycle riding by the public is not inconsistent with the purposes for which these lands were reserved; however, the legal use of bicycles in such places is limited to paths (and facilities) specifically provided for that purpose. In other words, lawful cycling in parks is confined to paths that are designated by signs.

Melbourne City Council has recently made a distinction between parks and gardens to the effect that cycling in gardens is not considered consistent with the passive purposes for which that land was reserved. This may restrict important linkages in the network of bicycle routes where there are no convenient alternatives.

10.4 Problems of Illegal Use of Motorbikes

Several municipal councils are facing problems of illegal trail-bike and motor-bike riding, but this should not deter them from developing a properly marked bicycle route system. Trail-bike problems have often been eliminated by the provision of special areas, deterents such as signs, and strict enforcement.

10.5 Local Area Traffic Management

There is scope for municipal councils to give greater consideration to bicycle routes when planning and constructing measures to reduce through traffic or heavy vehicles. Several measures, especially road closures, unnecessarily restrict access by bicycle.

10.6 The 4 E's

The government has previously recommended a comprehensive approach to implementation with co-ordinated engineering, education, enforcement and encouragement aspects (see SBC 1982 for details).

10.7 Aesthetics

Landscaping, tree planting, fencing and art work can be used to enhance the immediate environment and safety of cycleways. Note that the ROSTA (1982) standards include minimum clearances to obstacles and trees. The City of Knox has developed a series of linear parks along its bike paths to provide connexions between communities and recreational areas.

11. RECOMMENDED OTHER USES OF THIS STUDY

This study was intended principally for planning and development purposes and to contribute to the Melbourne Bike Plan Stage 2 Update. Other possible uses are as follows:

(a) Selected bicycle path reservations could be built into the Melbourne Metropolitan Planning Scheme where future rights of way need to be preserved.

(b) A metropolitan bicycle route hierarchy could be established in the Hierarchy of Roads for consideration by committees investigating arterial road planning.

(c) The strategic planning principles used in this study - compatibility with the Hierarchy of Roads, appropriate stress ratings, and continuity could be adopted by municipalities outside the Central Area to lead to a 2000 bicycle network concept for the whole of Metropolitan Melbourne.

(d) The study might be used as input to Planning Appeals Board hearings in which development applications may constitute obstacles to access by foot or bicycle.

12. REFERENCES

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APPENDIX 1

The notes below elaborate on proposals shown on the "Bicycle Network Concept 2000" Map. Priorities are to be determined.

No.	Proposal for Year 2000 or before
1	Bridge to form part of E/W route to Sunshine and N/S route to West Footscray.
2.	Bridge to link up with Niddrie and Keilor East.
3.	Existing cordite bridge that could have public access.
4.	Bridge to provide N/S route and to expand recreational opportunities.
5.	Bridge most important for E/W between Sunshine and North Melbourne.
6.	Bridge needed for N/S route.
7.	Rising route with stairs for pedestrians and switchbacks for bikes.
8.	Route under Westgate and over Stony Creek from Footscray to Williamstown.
9.	Shared bike-pedestrian route along the spit with viewing point at the end.
10.	Existing stock bridge requires maintenance.
11.	Redevelopment of the Rifle Range may provide an opportunity for this link.
12.	Access to the Breakwater pier would provide an excellent viewing point.
13.	Promenade proposed by Port of Melbourne Authority needs to link with 14, 15 and 18.
14.	Promenade proposed by Port of Melbourne Authority. The end of the foreshore route ultimately linking Frankston.
15.	Connexion between Westgate Park and the River.
16.	Bike path leading to southern safety lane on Westgate with connexion to Plummer Street as an alternative.
17.	Bike path from northern safety lane on Westgate to Cook Street.
18.	See 13.

No.	Proposal for Year 2000 or before
19.	Williamstown road has sufficient width for one-way bike paths down both sides with 1 metre grassed avenue between them and the traffic lanes.
20.	Bicycle access onto both piers.
21.	Access ramps for cyclists to and from Westgate Bridge. N.B. this route is for long distance tourists and adult commuters.
22.	Redesigned intersection allowing access from Williamstown Road.
23.	Promenade featuring Port of Melbourne attractions. The most western point of the Yarra promenade on the north bank ultimately connecting with other parts of the Yarra bike path without road crossings.
24.	Proposals consistent with St. Kilda Council's plans for a mall on the Esplanade with a connecting bike-pedestrian bridge to St. Kilda pier over the Lower Esplanade. Separate bike-pedestrian paths will connect with the Elwood Brighton bike path. See St. Kilda Bike Plan (1981).
25.	Development of Alma Road as an alternative route to Dandenong Road (to Caulfield Station).
26.	Bike-only paths in Falkner Park segregated from pedestrians and avoiding NE corner. Note new route to city parallel to Park Street using existing pedestrian crossing. Pedestrian crossing and short section of bike path required from Millswyn Street to Birdwood Avenue. Proposal differs from Melbourne Bike Plan.
27.	Pedestrian path across rail bridge from steps in Yarra Street and steps in Green Street (Richmond). Widen path and provide bicycle ramps on steps and ramped path from Yarra bike path. Safest N/S route from Alexandra Parade to St. Kilda. See also 30 and 42.
28.	Bridge to be incorporated in Jolimont redevelopment. Main N/S route for cyclists bypassing the city.
29.	Bike-only segregated paths following contours and clear of garden areas with high pedestrian use.
30.	Uses pedestrian underpass at East Richmond Station. Cyclists to dismount.

No.	Proposal for Year 2000 or before
31.	One way paths along both sides of Eastern Freeway.
32.	Proposals subject to a transport strategy for the CBD.
33.	Paths through Exhibition Gardens.
34.	Two major 'good cycle routes' running both E/W and N/S are required in the city. Elizabeth and Bourke Streets are preferred. The other two are not firm due to city planning reviews in hand.
35.	See text (second last paragraph in Section 7.1)
36.	Detailed bike plan needed for North and West Melbourne. See 44.
37.	For Drummond Street to be a major N/S low stress route, a series of island refuges for cyclists are needed at cross roads with some signalling and other traffic management/safety measures.
38.	Access to University of Melbourne and within the grounds by bicycle to be completed.
39.	Maintenance only required at Collins Bridge.
40.	Crossings needed over major barriers that prevent access to Royal Park including railway line, Tullamarine Freeway, Macarthur Parade, and Flemington Road. Proposals similar to Royal Park Masterplan.
41.	Bridge to connect residential areas west of Tullamarine Freeway providing connections through to North Carlton.
42.	Contra-flow bike lane in Lennox Street, as per Richmond Bike Plan.
43.	N/S route along Moonee Ponds Creek is a crucial connection between inner western suburbs and North Melbourne/Melbourne.
44.	North Melbourne's traffic management schemes could be revised so that they make greater consideration of cycling needs.
45.	Flat route from South Kensington Station and Dynon Road via Lennox and Lloyd Streets. Regular street maintenance necessary.
46.	Bridge from Ross Street to the Coulson Reserve to link with signallized crossing at junction of Fenwick Street and Heidleburgh Road. Bike path through Coulson Reserve beneath road. Overpass to connect with John Street and Ramsden Street crossing at Hoddle Street which need to be signalized. A staircase with bicycle ramp is needed for access from this bridge to Merri Creek bike path.

No.	Proposal for Year 2000 or before
47.	Two short bridges over Merri Creek provide several E/W and N/S route opportunities.
48.	Two short bridges and connecting paths open up E/W access.
49.	Two short bridges and connecting bike path provide two E/W routes as alternatives to Normanby Road.
50.	Bridges to link Union Street and Huldberg Street by safe E/W route as alternative to Ormond Road and Dean Street.
51.	Bridge from Buckley Street route to Moonee Ponds bike path.
52.	Two pedestrian crossings and paths across Princes Park.
53.	Bridges to provide E/W access.
54.	Existing high stress route needs upgrading to connect with Nepean Highway bike path.
55.	Bike path under Chapel Street to be integrated into Chia development.
56.	(Ornamental suspension) bridge over Yarra.
57.	Link to Merri Creek path. See 58.
58.	Bridge from Merri Creek path to Yarra Bend Park Road and to Yarra bike path in Fairfield Park. Major E/W routes.
59.	Route from Carlton to continue through Fleming Park.
60.	Bridge for N/S and E/W routes.
61.	Bridges over Yarra.
62.	-
63.	Potential link through private land between Brunswick Road and Park Street.