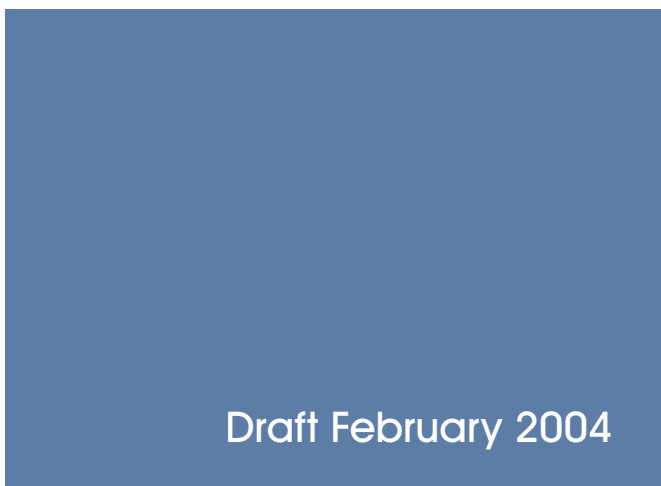
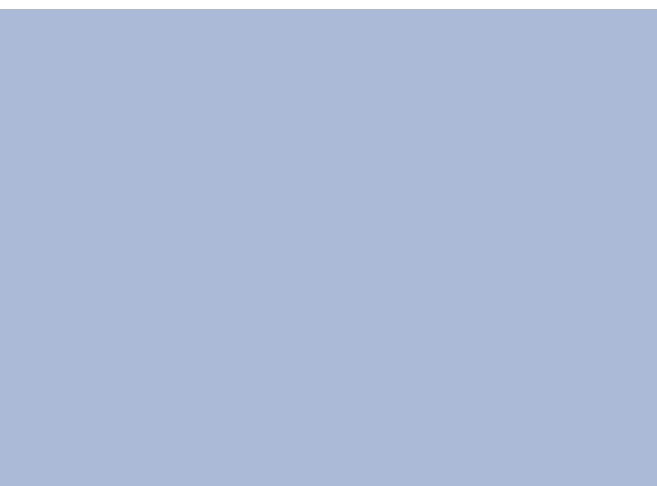
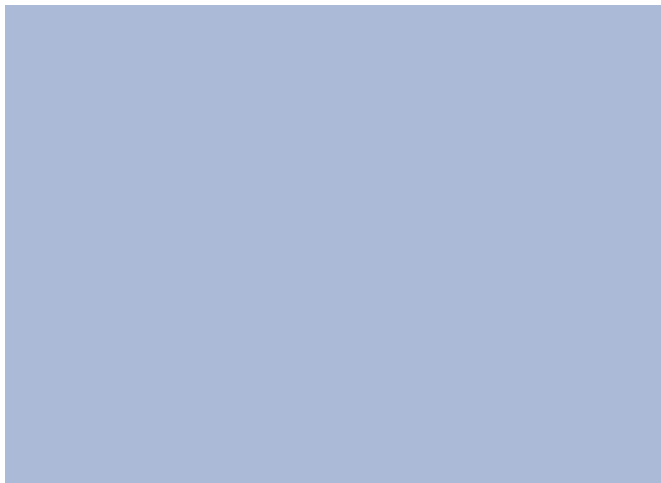




# South Sydney Pedestrian Access & Mobility Plan

(for Redfern, Surry Hills, Strawberry Hills, Paddington & Moore Park)



Draft February 2004

Arup**TransportPlanning**

South Sydney City  
Council

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**Pedestrian Access and  
Mobility Plan**

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Final Report

ARUP

**ArupTransportationPlanning**

South Sydney City Council

**Pedestrian Access and Mobility Plan**

Final Report

February 2004

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Job number



Job title Pedestrian Access and Mobility Plan Job number

Document title Final Report File reference

Document ref

Revision	Date	Filename	0004ReportJOL.doc		
Draft 1	16/06/03	Description	First draft		
			Prepared by	Checked by	Approved by
		Name	JOL/BBC	AMH	AMH
		Signature			
Draft 2	14/07/03	Filename	0005ReportJOL.doc		
		Description	Second Draft		
			Prepared by	Checked by	Approved by
		Name	JOL/BBC	AMH	AMH
		Signature			
Final	05/02/04	Filename	0006ReportJOL.doc		
		Description	Final Report		
			Prepared by	Checked by	Approved by
		Name	JOL/BBC	AMH	AMH
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document

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QA Rev 1/01 1 November 2001

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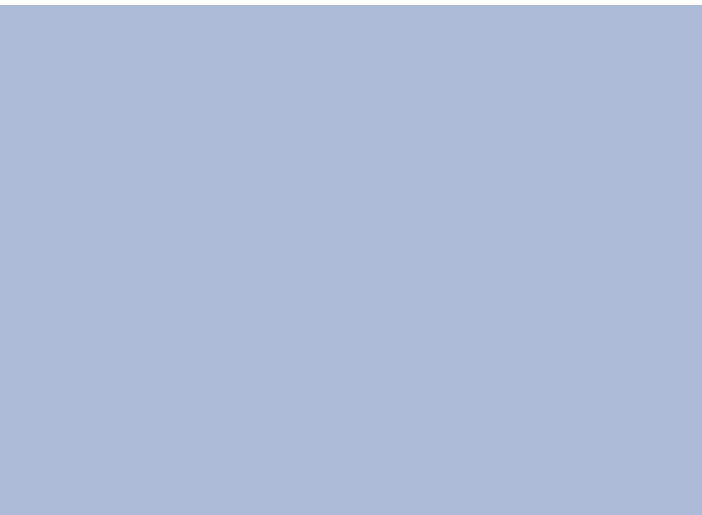
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- Background
- Aims
- Objectives
- Universal Access Principles
- Methodology
- Evaluation



## 1. INTRODUCTION

### 1.1 Background

South Sydney City Council engaged Arup Transport Planning (Arup) to undertake a Pedestrian Access and Mobility Plan (PAMP) for a high priority section of inner city area in South Sydney.

The PAMP approach involves joint funding from Council and the NSW Roads and Traffic Authority. The literature search completed for this study suggests that this PAMP approach in NSW is a world first.

Walking is an important travel mode, both for solely pedestrian-based journeys and also as a part of trips for which the main mode of travel is by bus, rail and car. Walking as a mode of transport has declined in western society in recent years (Arup, 1998). Recent research from the United States suggests that in 1997-98, on average, the US spent just 55 cents per person of their federal transportation funds on pedestrian projects, less than 1 percent of their total spending, yet their average spending on highways came to \$72 per person (STPP, 2000). This has significant environmental, economic and social effects. Increasing the proportion of journeys that are undertaken on foot can make a significant contribution to achieving a better quality of life and environment for all. Potentially there are significant benefits to be derived from encouraging more walking, particularly for shorter distance trips. These benefits include improved health, better environmental conditions, decreased traffic congestion and improved safety.

### 1.2 Aims

The main aim of the South Sydney City Council Pedestrian Access and Mobility Plan is to improve the pedestrian network's:

- coherence;
- directness;
- safety;
- comfort;
- attractiveness; and
- equity of access.

### 1.3 Objectives

The main objectives of the PAMP identified in the South Sydney City Council Brief are:

- to facilitate improvements in the level of pedestrian access and priority, particularly in areas of high pedestrian concentrations;
- to reduce pedestrian access severance and enhance safe and convenient crossing opportunities on major roads;
- identify and resolve pedestrian crash clusters;
- to facilitate improvements in the level of personal mobility and safety for pedestrians with disabilities and older persons through the provision of pedestrian infrastructure and facilities which cater to the needs of all pedestrians;
- to provide links with other transport services to achieve an integrated land use and transport network of facilities that comply with best technical standards;

- to ensure that pedestrian facilities are employed in a consistent and appropriate manner throughout NSW;
- Link existing vulnerable road user plans in a coordinated manner (e.g.: Bike Planes, Safer Routes to Schools Plan, Footpath Maintenance Programs, and associated issues to accessible public transport etc.)
- to ensure that pedestrian facilities remain appropriate and relevant to the surrounding land use and pedestrian user groups;
- to accommodate special event needs of pedestrians; and
- to address Council's obligations under the Commonwealth Disability Discrimination Act 1996.

#### **1.4 Universal Access Principles**

Universal Access Principles highlight the rights of all citizens in relation to all transport needs, including non-vehicle transport. These are presented in Figure 1.

**Figure 1: Universal Access Principles**

Universal Access is the ability of all citizens to reach every destination served by the public road and transit system.

Every local road and intersection should be designed and regulated to preserve reasonably safe access to all lawfully behaving citizens as intended and expected users (i.e. all citizens are Design Users.)

Engineering designers and policy should aim for acceptable Level of Service metrics, such as delays, that are similar for all road users – motorists, pedestrians, cyclists and mobility-impaired persons.

Avoid road “improvements” which reduce the Level of Service below acceptable levels for pedestrians, cyclists and mobility-impaired persons.

Provide footpaths on at least one side of all streets so that wheelchair users have accessible routes outside of vehicle travel lanes.

Public facilities or policies that discriminate against the “car-less” violate the most basic rights described in law.

(Acknowledgments to S.B. Goodridge)

## 1.5 Methodology

### 1.5.1 Study Area

The PAMP study focused primarily on inner east areas within the South Sydney and Woollahra area, as shown in Figure 3. The area includes Redfern, Surry Hills, Strawberry Hills, Paddington and Moore Park. During the course of the study, the council boundary was changed on 8 May 2003. The area between Campbell Street and Oxford Street is not part of the City of Sydney Council Area. The discussions and recommendations relevant to this area has been retained in the text of the report, but not included in the cost estimation.

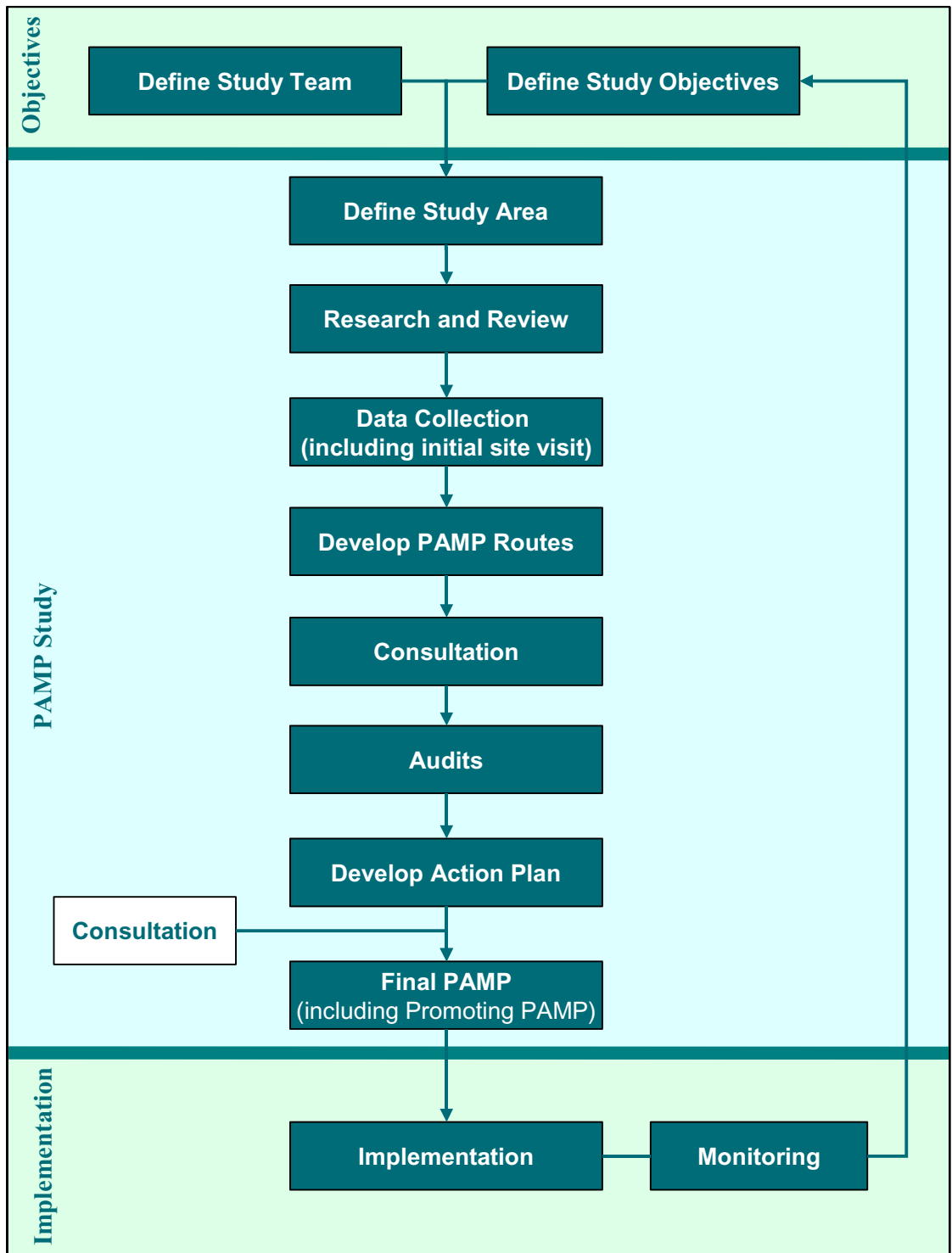
### 1.5.2 Outline of Study Methodology

The methodology for the study involved a number of components including the following:

- data review;
- questionnaire surveys;
- community consultation;
- PAMP routes development;
- pedestrian audit of routes;
- Action recommendations development; and
- consideration of Council policies and funding sources.

The process is illustrated in Figure 2. All components of the study have been discussed within this report. Further detail is provided in the working paper produced during the study.

**Figure 2: PAMP Methodology**



## 1.6 Evaluation

### 1.6.1 Introduction

Planning specifically for pedestrians is a relatively new activity in Sydney. Authorities such as Local Councils and the RTA have difficulty in addressing pedestrian problems and solutions without a clearly established framework for assessing problems, evaluating potential actions and developing priorities and implementation programs.

Transport authorities must compete for funding with other levels of government. Funding for pedestrians can usually be facilitated if the wider community benefits are identified.

Many expensive initiatives are applicable only to a small range of problems. The wider range of cheaper minor measures must also be accorded commensurate status.

A variety of objectives may exist for PAMPs, including:

- Economic objectives
  - travel time savings for pedestrians;
  - travel time savings for other road users;
  - accident cost reduction; and
  - economic sustainability.
- Social and political objectives
  - mobility of all members of the community;
  - redistribution of costs and benefits within community groups;
  - redistribution of costs between community groups;
  - effect on mode split;
  - decrease in fuel consumption;
  - equitable access to work, education and social opportunities; and
  - healthy lifestyle.
  - Personal physical safety
- Environmental objectives
  - reduction of atmospheric pollution/greenhouse gas emissions;
  - sustainability;
  - noise reduction; and
  - amenity.

Measurements of PAMP performance against these objectives is challenging because the objectives are qualitative, which makes measurement difficult, and rating of the importance of different (and in some cases, conflicting) objectives is a difficult task.

### 1.6.2 PAMP Actions

Possible actions for Council to be developed as part of the PAMP process are wide-ranging, and perhaps can be categorised in the same manner as planning for bicycles, the so-called 4E's approach:

- Encouragement;
- Enforcement;
- Engineering; and
- Education.

This PAMP study and the resulting Action Recommendations have focussed on the Engineering actions and recommendations. The Action Recommendations has been developed primarily through pedestrian audits undertaken on selected routes throughout the study area. The main considerations of the audit included:

- paths of travel;
- major intersections;
- pedestrian crossings;
- fixtures/furniture - seating, bus stops, rubbish bins;
- barriers to pedestrian movement;
- pedestrian/vehicle data; and
- general comments (land use, road user behaviour, road environment).

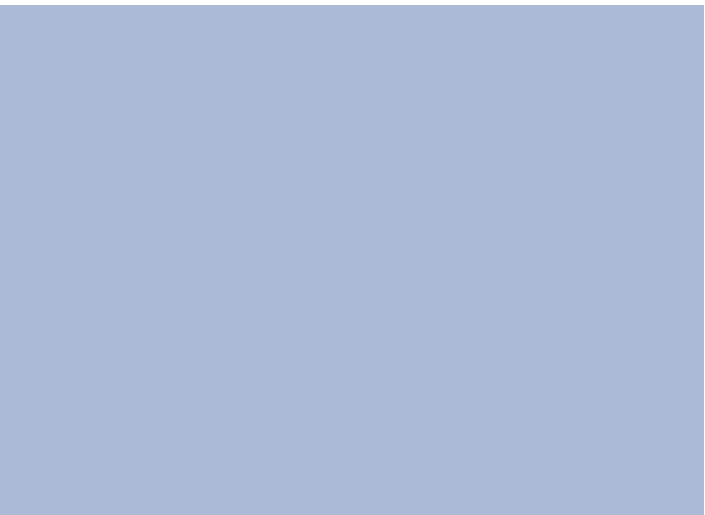
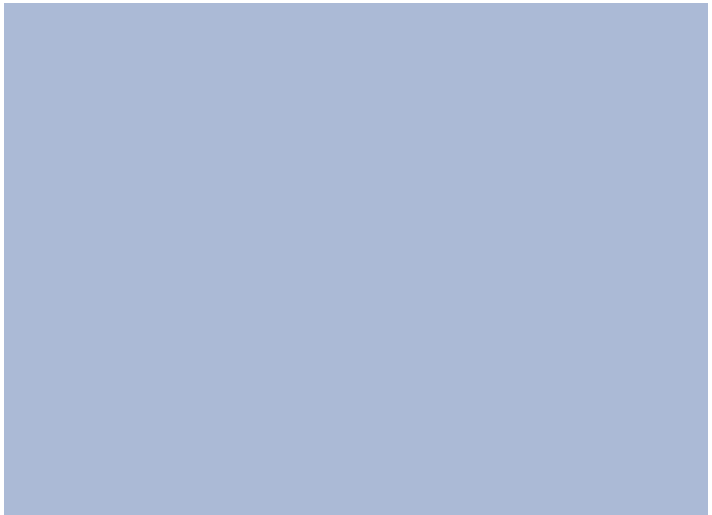
The Action Recommendations is presented as Appendix A to this report with the full audit spreadsheet as presented in Appendix D.

### **1.6.3 Implementation**

A method for problem ranking and solution assessment has been developed as part of the PAMP methodology. The method identifies problems, audits problems in the field, identifies potential solutions, ranks these and recommends a set of actions in the form of an Action Recommendations.

# Contents

- Questionnaire Surveys
- Media and Web Site Coverage
- Interview
- Council Consultation



## 2. COMMUNITY CONSULTATION

Throughout the study, community consultation was undertaken by a number of different means. Consultation was considered to be an essential part of the PAMP development to ensure public needs were considered and incorporated into the PAMP route development and Action Recommendations.

Findings from the consultation are summarised in the following section. Further detail of the consultation process can be found in the Community Consultation Working Paper, issued to Council in March 2003.

### 2.1 Questionnaire Surveys

Questionnaires were distributed throughout the study area and to the wider South Sydney community (Appendix F). They were sent to a selection of community organisations such as schools, churches, day care centres, ethnic groups, health centres, etc. The list of organisations contacted was generated from the South Sydney City Council community directories and approved by the responsible Council officer. Questionnaires were also supplied for the Council Age Coordinator for distribution to community's centres and local walking groups.

Fifteen completed questionnaires were returned.

In general, the questionnaires focussed upon the following issues:

- Travel patterns of South Sydney residents.
- Where are the major problem locations in relation to pedestrian safety, access and mobility in the study areas?
- What facilities (and where) could be upgraded/provided in the study areas to improve pedestrian safety, access and mobility?

A few key issues were identified through questionnaires and summarised below.

The main facilities' visitors were concerned about included:

- uneven footpath surfaces;
- poor kerb ramp design;
- lack of kerb ramps; and
- lack of pedestrian crossings.

These concerns were reflected in the facilities that residents felt needed improving, which included:

- increased pedestrian crossing opportunities;
- improvement of lighting and security; and
- pedestrian barriers on busy roads to stop illegal crossings.

When asked about the forms of transport visitors used to access each facility, 8 out of the 10 responses indicated walking as one of the main transport mode. This reflects the suggestion that walking is an important transport option for the study area.

### 2.2 Media and Web Site Coverage

A media advertisement and web site information page were prepared and issued to South Sydney City Council for release. These items sought input from the South Sydney

community in the preparation of the PAMP. The study received a total of 40 submissions during the consultation period. A summary of issues raised is presented in Appendix C.

The study received a comprehensive submission from the office of Clover Moore, Member for Bligh. It included pedestrian hazardous locations, new crossing opportunities and general comments about pedestrian facilities in the area. The study also received a detailed submission from Marrickville-South Sydney Bicycle Group (MASSBUG). It included comments on the importance of good pedestrian planning as part of the overall program to encourage the use of public transport and non-motorised transport. The submission also highlighted the importance of transparency in the process and the key issues for consideration as discussed in the RTS's "How to Prepare a PAMP" guideline. These inputs are also included in Appendix C and considered through the study.

## 2.3 Interview

### 2.3.1 Centennial Parklands

A meeting was held with Amanda Bock from Centennial Parklands on 28 January 2003 to discuss pedestrian issues in relation to access to and between Moore Park and Centennial Park through the PAMP study area. Discussion included key concerns regarding pedestrian access into the parks, the conflicts with vehicles along main traffic routes such as Anzac Parade and Oxford Street. Discussion also included the main findings of the Transport Access and Parking Plan for Centennial Parklands completed in 2002.

A particular key concern raised by the Parklands is the need for a new pedestrian crossing, probably mid block signals or grade separated crossing, across Anzac Parade at Gregory Avenue. Another concern is the lack of pedestrian crossing across Moore Park Road at Anzac Parade. Currently pedestrians are required to cross at the Greens Road signals. These and other locations for crossing opportunities are addressed in further details in Section 6.7.4

### 2.3.2 Paddington Society

A meeting was held with representative of the Paddington Society on 27 March 2003 to discuss pedestrian issues in the Paddington area. Issues discussed included crossing treatments, foot path provision and the general desire to create a more pedestrian friendly local environment through the area.

## 2.4 Council Consultation

Due to the extensive study area, Council Officers are usually aware of the ongoing issues in the community that may not be obvious from site inspections. Consultations were held with Council Officers including:

- Aged & Disability Services Manager,
- Aged Worker,
- Access Committee Representative, and
- Children Service Co-ordinator.

Consultation with Council Officers identified further local walking groups and community centres for consultation. Discussion also included the identification of key pedestrian activities for the aged and young population within the study area, general pedestrian issues such as crossing safety and security, and placement of street furniture in relations to all groups of pedestrians.

## **2.5 Public Exhibition**

South Sydney Council placed the Draft PAMP report on public exhibition for six weeks beginning 22 September 2003. Comments submitted were collated by Council and supplied to the consultant and included in this final report.

## Contents

- Population
- Geographic Features of the Study Area
- Road Hierarchy
- Public Transport



### **3. CHARACTERISTICS OF THE CITY OF SOUTH SYDNEY**

#### **3.1 Population**

In the 2001 Census prior to the boundary changes that came into effect on 8 May 2003. South Sydney City population stood at around 92,249 people before the boundary change, and 56,357 after the boundary change. The population is forecasted to be growing consistently within the area. There was a steady decline in children, young people and older people, with an increase in population aged between 20-54. In 2001 census, people aged 20-54 years old accounted for 68% of the South Sydney LGA population, while people aged 55 years and above only accounted for 18%. This trend is forecasted to continue as the property price steadily increases in inner city suburbs. The method of travel to work in the area is predominantly by private vehicles or individual form of transport (bicycle and walking). The comparison of 1991 and 1996 census data shows that the use of public transport within the LGA is in a decline.

#### **3.2 Geographic Features of the Study Area**

The study area includes Redfern, Surry Hills, Strawberry Hills, Paddington area west of Oxford Street and Moore Park of South Sydney, and Paddington area east of Oxford Street in Woollahra.

Some parts of the study area, like Surry Hills and Paddington north of Oxford Street, are quite hilly. This can pose difficulties for wheelchair access in the area.

The study area is predominantly a developed urban area with a mix of commercial and residential landuse. Potential pedestrian attractors/generators within the study area include Central, Redfern and Edgecliff railway stations; the Moore Park precinct including the Sydney Football Stadium, the Sydney Cricket Ground, Fox Studios, and the Hordern Pavilion; Centennial Parklands; and retailers and restaurants along Oxford Street.

#### **3.3 Road Hierarchy**

The primary State and Regional roads in the Study Area include:

- State Roads: Anzac Parade (route 70) and Regent Street, Gibbons Street (route 66), Oxford Street, Cleveland Street and South Dowling Street (Metroad 1).
- Regional Roads: Moore Park Road, Elizabeth Street, Albion Street, and Fizroy / Foveaux Streets.

State and regional roads often present problems in crossing opportunities for pedestrians due to high traffic volumes. State and regional roads are often the most direct route to retail and commercial centres and therefore are suitable for pedestrians.

Other key links in the local road network include Elizabeth Street, Crown Street, Bourke Street, Foveaux Road, Moore Park Road and Campbell Street.

#### **Traffic Volumes**

Traffic volume data (average annual daily traffic - AADT) on the road system was available from the RTA for 1999. High volumes of traffic were recorded on a number of state and regional roads identified in Table 1.

**Table 1 Traffic Volumes**

Road	1999 AADT <sup>(1)</sup>	2000 ADT <sup>(2)</sup>	2000 AWT <sup>(2)</sup>
Anzac Parade – South of Cleveland Street	59,814	66,279	68,538
Regent Street – South of Cleveland Street	53,834	NC	NC
Oxford Street – West of Ocean Street	62,914	NC	NC
Cleveland Street – West of Pitt Street	44,317	44,683	45,958
South Dowling Street – South of Taylor Street	17,868	20,877	21,259
Campbell Street – East of Crown Street	25,053	6,285	6,116
Moore Park Road – East of Greens Road	21,232	28,788	29,278
Elizabeth Street – North of Belvoir Street	20,886	NC	NC
Crown Street – South of Devonshire Street	18,356	16,176	16,064
Bourke Street – South of Devonshire Street	14,223	7,127	7,377
Moore Park Road – East of Driver Avenue	23,125	29,936	30,568
Oxford Street – West of Jersey Road	---	32,524	31,577

AADT = Annual Average Daily Traffic, ADT = Average Daily Traffic, AWT = Average Weekday Traffic

NC = not counted

(1) RTA published traffic volume data, before the opening of the Eastern Distributor

(2) RTA August 2000 “Before & After” counts

### 3.4 Public Transport

The study area is well connected to public transport. Central, Redfern and Edgecliff train stations within the study area provide convenient access to Surry Hills, Redfern and Paddington area.

Sydney Buses has an efficient bus network serving Eastern and inner city suburbs. A dedicated busway is provided along Anzac Parade. Bus services are also provided along Oxford Street, Elizabeth Street, Cleveland Street, Crown Street, Baptist Street Albion Street, Riley Street, Foveaux Street and Campbell Street (see Figure 4).

Full disabled access to the rail network, as defined by the State Rail Authority, is where the station has either a lift, level access or a compliant ramp (1:14) from street level to all platforms, and a portable platform to train ramp. Currently, Central Station is the only wheelchair-accessible station within the study area, with access from Eddy Avenue and Foveaux Street entrances.

Due to the gradual nature of improvements to bus fleets across Sydney there are currently a variety of buses operating within the study area. These can be summarised as follows:

- 1) Original Buses - these have a two-step entry and are the least accessible of the fleet;
- 2) Kneeling Buses - these have a two-step entry, however they can be lowered, or kneel, so that the bottom step can be made effectively level with the kerb. These buses also have bright yellow handrails, easier to read signs, better lighting, filtered air conditioning and elderly/frail priority seating. These buses therefore offer improved access for less mobile or visually impaired members of the community;
- 3) Scania Buses - These offer all the features of Kneeling Buses, but with a level entry rather than two steps, making them more easily accessible; and
- 4) Easy Access Buses - In terms of accessibility these buses offer all the features of a Scania Bus. In addition, they offer ramp access to allow for passengers in wheelchairs

and parents with prams. Within the bus, room is provided for people in wheelchairs, or alternatively babies in prams. These buses therefore provide access to the entire community.

It is recommended that South Sydney City Council lobby the State Transit to introduce more Easy Access buses into the area. Council should also give consideration to the requirements of Easy Access buses including:

- minimum kerb height of 150mm<sup>1</sup>;
- clearances and unobstructed spaces at bus stops to meet AS 1428 and AS 1428A;
- bus zones of at least 22.5m long for kerb side bus stop with capacity for one standard bus, as described in the State Transit Bus Stop Style Guide<sup>2</sup>.
- must be a full 27m long as stipulated in the National Road Rules;
- bus zones on departure side of signalled intersections or no standing zones on approach side of bus zones to increase opportunity of bus making straight in approach to bus stop; and
- low floor bus friendly road geometry eg careful choice of traffic calming devices and elimination of dish gutters.

All bus stops in South Sydney will require auditing to ensure that they meet these requirements for the successful use of Easy Access Buses.

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<sup>1</sup> The preferred kerb height of 150mm coordinates with the minimum requirements of 'kneeling' and hoist bus, and providing reasonable access to the step height of STA buses (step height of 12.5m bus ranges between 320mm and 380mm). 150mm is also the recommended maximum kerb height by the RTA. Higher kerb height can impact on the approach angle of buses due to the front overhang clearance. It also impacts on kerb ramp size and slope at crossings. Higher kerb of up to 300mm can be provided at specific high demand accessible bus stop (Appendix E). Such raised bus stops should be designed in consultation with authorities and transport provider to ensure that the ramp access system, provision for bus approach angle and the surrounding footpath complies with relevant design standards.

<sup>2</sup> The length of the bus zone is calculated from the length of the design bus (12.5m) + a associated pull in and pull out zone. Stops for a longer bus or stop for multiple buses would required a longer bus zone, eg a bus stop for single 14.5m bus would required a 26.5m bus zone. According to the Australian Road Rules, all non-public bus vehicles are not allow to stop within the bus zone. Therefore, the minimum bus stop and pull-in pull-out distance can be provided for with adequate "no stopping" zones before and after the bus stop.

# Contents

- Review of Previous Studies
- Data Review
- Pedestrian Accident Statistics



## 4. DATA COLLECTION AND REVIEW

### 4.1 Review of Previous Studies

This section places the PAMP study in its broader context. The studies listed below have been reviewed as they inter-relate with the PAMP, either because the PAMP study works towards meeting their aims and objectives or because they outline ideas and issues that are relevant to the development of this PAMP.

#### 4.1.1 Stage 6 Road Safety Audit - Oxford Street and Oatley Road, Paddington

The audit identified the major road safety issues at the Oxford Street and Oatley Road intersection. Main findings on pedestrian issues include:

- Majority of the traffic accidents at the site involve pedestrians and pedal cycles; and
- People disobey the crossing signals and cross at random locations.

The study recommended relocation of the western crossing a few metres eastward to improve the sight distance for driver turning left from Oatley Road. The recommendations also include installation of a pedestrian fence along the median east of the intersection to control the point of pedestrian crossing. However, subsequent to the study by T&UB, Council has indicated that the existing median is too narrow to accommodate pedestrian fencing.

#### 4.1.2 Pedestrian Safety Audits at Nine Hotel Sites at Surry Hills, Darlinghurst and Chippendale

The study identified issues related to alcohol-affected pedestrians in the study areas. The main pedestrian issues include:

- Poor footpath condition and absent of standard kerb ramp at crossing locations at Campbell/Crown Street intersection;
- Poor footpath condition along Foveaux Street;
- Hazardous pedestrian fence on the western side of Riley Street;
- Poor footpath along Fitzroy Street;
- Kerb ramp deficiency at crossing locations at Crown/Cleveland/Baptist Street, people jay-walking across the road; and
- Kerb ramp deficiency at crossing locations at Walker/Cleveland Street, people jay-walking across the road.

#### 4.1.3 South Sydney Issues Papers

The overall objective of the series of South Sydney Issues Papers was to aid the development of South Sydney Council's Social Plan. The Issues Papers draw the key information from the target groups and identify the issues that are of importance to all community groups. Moreover, it focuses upon the well-documented issues for which council has a capacity to have a positive impact and to provide Council with direction in setting the priorities.

Several relevant Issues Papers include:

**Families and Children** identified:

- the need to have safe, physically accessible, and affordable public or community transport; and

- the need to promote child friendly environment, like easy stroller access to shops, public transport and footpaths.

**Older Persons** identified that:

- People aged 65 years and over rely heavily on walking to access facilities;
- there is a need to improve the ability of older people to access services and facilities (like community bus), and to participate in the community; and
- there is a need to improve safety for older people as pedestrians and public transport users.

**People with disabilities** identified:

- the need to upgrade public transport facilities for wheelchair access;
- the poor standard of footpaths, cross walks and circulation areas in many areas presents a potential hazard to people with mobility impairment;
- the inability of many people with disabilities to access services, facilities and public areas in the South Sydney; and
- the need to provide appropriate and affordable transport to meet the needs of people with disabilities and their carers.

#### **4.1.4 South Sydney Bike Plan**

Cycling can form a major component of travel opportunities in South Sydney, either as a mode of transport in its own right or in combination with other modes of transport such as trains, buses and of course walking. The opportunities identified in the Bike Plan often offer opportunities to enhance the pedestrian network as well, and hence were considered in this PAMP study. Consideration should be given when sizing new paths or bridges etc to provide sufficient width to accommodate cyclists as well as pedestrians.

#### **4.1.5 Draft Sport & Recreation Strategy for South Sydney**

More people are using footpath for recreational walking rather than purely functional walking between places. The strategy identified the needs to promote walking by providing safe and interconnecting footpaths. A PAMP study should be conducted to consider the need for integrated walking paths and recreational walking needs. The strategy also recommends investigation into opportunities for providing recreational walking tracks.

#### **4.1.6 South Sydney Public Domain Plan**

The Plan is a technical manual that presents guidelines for the streetscape improvements around South Sydney. It identifies desirable characteristics of different types of streets and specific locations for improvements such as street planting and footpath widening.

#### **4.1.7 NSW Healthy Ageing Framework, 1998-2003**

'Key Areas for Action' noted in the Framework include:

- the provision of 'accessible and supportive neighbourhoods and communities which make it possible for older people to live as independently as possible'; and
- 'promote the independence, well being and health of older people'.

The Framework identifies a number of activities that will be undertaken over the next five years including the upgrading of public transport facilities to improve accessibility for older people. In the 1996 Census people aged 65 years and over constituted 12.7% of the NSW population. The healthy ageing approach benefits all members of the community, not only 'older people', identified as being 60 years of age or older.

#### **4.1.8 NSW Government Disability Policy Framework**

Physical access has been identified as a priority area for the incorporation into Disability Action Plans. The NSW Government has adopted a number of principles relating to the provision of access including:

- ‘people with disabilities will have access to services provided to the general community’; and
- ‘in the provision of services to people with disabilities, focus will be on entire life needs of individuals in their own community’.

#### **4.1.9 Simply Active Everyday, Active Australia, 1998 - 2002**

The strategic goals of the plan that relate to the PAMP include:

- increasing safe and ongoing participation in physical activity, particularly among less active people;
- develop quality infrastructure, opportunities, programs and services to support participation; and
- realise the social, health, environmental and economic benefits of participation.

Less active people are specifically identified in the Plan as Aboriginal and Torres Strait Islander people, women, parents and carers of young children, older people, people from non-English speaking backgrounds, rural and remote people, young people, people with disabilities and socially disadvantaged people.

The Plan identifies that improving the environment may lead to more people undertaking physical activities such as walking. This includes maintenance of footpaths but also improving the level or at least the perception of the level of personal safety.

The Plan aims to develop and encourage the use of physical activity environmental audit tools and therefore increase the likelihood of people undertaking some form of physical activity. Another aim relevant to this study is the development of a major interagency program linked to the transport sectors to encourage environmental change approaches to the promotion of physical activity.

#### **4.1.10 Manual of Best Practice, Access for People with Mobility Disabilities**

This manual developed a best practice approach for the design of public spaces for access by the mobility impaired. Many of the issues identified in the Manual have been discussed in the physical access audit.

## **4.2 Data Review**

### **4.2.1 Existing Facilities**

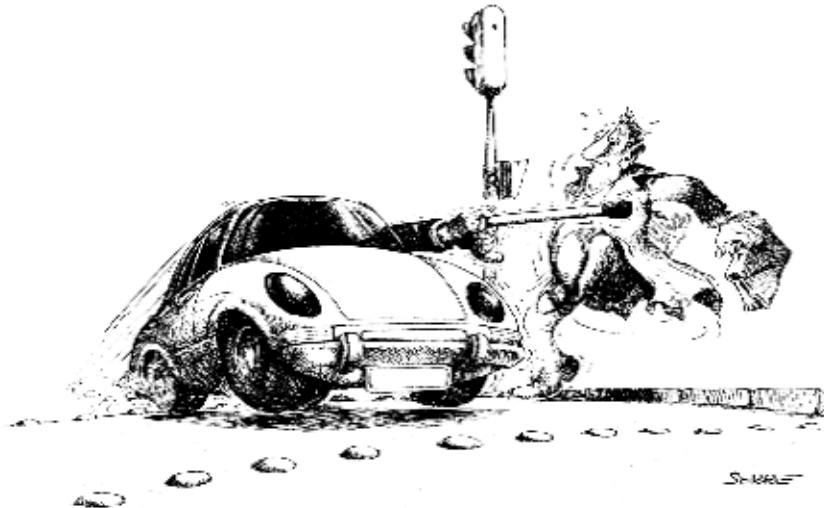
There are many existing pedestrian facilities located within the Study Area including:

- signalised intersections, some with audio and tactile facilities;
- pedestrian crossings;
- pedestrian refuges; and
- pedestrian overpasses.

The study areas face two key problems. Within the study area the age of infrastructure in general, and footpaths in particular, means that many are either in poor condition because of

their age and repeated repair over the years, or are of old-style designs with high barrier kerbs, no pram ramps and no tactile warning devices.

All traffic management devices should consider the use of areas by pedestrians. Local Area Traffic Management (LATM) devices, with careful design, can be beneficial to pedestrians. Local streets often provide attractive routes for pedestrians, particularly when running parallel to State or Regional roads.



#### 4.2.2 Trip Generators and Attractors

A number of trip or pedestrian generators and attractors are located within the study area as identified on Figure 4. Pedestrian generators and attractors include schools, child care and aged care centres, community centres, shopping centres and retail strips, recreation facilities (eg pools, sports facilities and parks), licensed clubs, places of worship and public transport facilities (railway stations and bus stops). The prioritisation of the pedestrian network is closely linked to the proximity to facilities as discussed in Section 5.

Major generators and attractors located within the study area include:

- Central, Redfern and Edgecliff train stations,
- Retail and restaurant uses along Oxford Street and Crown Street,
- Fox Studio,
- Sydney Football Stadium,
- Sydney Cricket Ground,
- Centennial Parklands,
- Sydney Boys and Girls High Schools, local primary schools, and
- Housing estates.

The location of trip generators and attractors were central to the PAMP network development and the prioritisation of the Action Recommendations.

#### 4.2.3 Proposed Developments

The study identified one major proposed development at the old St Margaret Hospital site that has a potential to become a significant pedestrian attractor/generator. The proposed development would include a new residential tower, a retail centre and some civic activities (eg. Library) and could increase pedestrian activities in the immediate area significantly. The proposed development is connected to the proposed pedestrian network. There have also been a variety of smaller developments that have recently taken place or been proposed within the

Study Area. Completion of these developments is likely to result in an increase in the appeal of the area, resulting in a likely increase in pedestrians and pedestrian activity in the area. Discussions with Council Officers indicate that future land use and population growth will be moderate.

#### 4.2.4 Opportunities

##### *Recreation Reserves*

Reserves and open space facilities throughout the study area provide some opportunities for walking paths, as well as passive and active recreational areas for walking. Larger parks present opportunities for pedestrian paths whilst smaller parks are useful in providing on-road routes with off-road access, improving the safety and aesthetic quality of the route. Open space facilities throughout the Study Area are shown on Figure 4. The major parks that can be found within the study areas include Prince Alfred Park, Redfern Park, Moore Park and Trumper Park.

##### *Road Crossing Opportunities*

Opportunities for pedestrians to cross major roads safely occur at signalised intersections, pedestrian crossings and central refuges. Crossing opportunities are particularly important on busy State and regional roads.



Through the community consultation process, as part of the PAMP development, concerns were raised regarding road crossing facilities at a number of locations throughout the study area. All sites raised during the consultation process have been included in the Working Paper; the key locations are discussed in detailed in Section 6.7.4.

In determining appropriate pedestrian crossing facilities, the recommendations of Section 3 - Treatments for Pedestrians Crossing Roads of Austroads Part 13, Pedestrians, 1995 should be taken into consideration.

#### 4.2.5 Constraints

##### *Railway Lines*

Walking is constrained throughout the study areas by the Central railway lines. The rail network runs from north to south at the western boundary of the study area. Bondi Junction train line in Paddington area is elevated by viaduct, which minimised disruption to pedestrian network. Pedestrian underpasses and overpasses are provided in a number of locations to provide continued pedestrian network.

### ***Major Roads***

Pedestrian activities within the study area is also significantly restricted by major traffic routes. There are routes with high traffic volumes and limited crossing opportunities such as the Eastern Distributor and South Dowling Street, Anzac Parade and Flinders Street, and Moore Park Road. There are also routes with high traffic volumes and high street side activities such as Oxford Street, Cleveland Street, and Crown Street.

### ***Pedestrian Hazard Spots***

Hazardous locations for pedestrians have been identified through community consultation and accident data. These are shown in Figure 7 and contained in Appendix C.

## **4.3 Pedestrian Accident Statistics**

### **4.3.1 Pedestrian Accident Distribution and Type**

The accident data was central to the PAMP network development and the prioritisation of the Action Recommendations.

RTA pedestrian accident data has been reviewed from 1997 to 2001 (inclusive) as shown in the tables below. The locations of the pedestrian accidents are shown in Figure 5. Over the period, 466 pedestrian accidents were recorded in the study areas. In total 3 of these accidents involved fatalities.

The distribution of these pedestrian accidents through the areas is detailed in Table 2:

**Table 2 Pedestrian Accidents (within the study areas), 1997-2001**

<b>Degree of Accident</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>Total</b>	<b>% Total</b>
1 Fatal	0	0	1	1	1	3	<1%
2 Injury	98	85	93	87	97	460	99%
3 Non-casualty	2	1	0	0	0	3	<1%
<b>Total</b>	<b>100</b>	<b>86</b>	<b>94</b>	<b>88</b>	<b>98</b>	<b>466</b>	<b>100%</b>

Most of the accidents involving pedestrians occurred near to the side of the road. The far side accidents are the second most common type of accident. Table 3 summarises the pedestrian accidents by the location of pedestrians.

**Table 3 Location of Pedestrians Involved in Accidents, 1997-2001**

RUM code	Location of Pedestrian	1997	1998	1999	2000	2001	Total	% Total
00	Near Side	46	45	45	38	42	216	46%
01	Emerging	8	5	6	4	2	25	5%
02	Far Side	32	20	30	25	34	141	30%
03	Playing, Working etc.	5	9	7	11	9	41	9%
04	Walking with Traffic	1	0	0	0	1	2	0%
05	Facing Traffic	2	0	0	0	0	2	0%
06	On Footpath/Median	3	0	2	0	5	10	2%
07	Exiting/Entering Driveway	0	1	0	6	0	7	2%
09 and others	Other	3	6	4	4	5	22	5%
	Total	100	86	94	88	98	466	100

#### 4.3.2 Accident Clusters

Pedestrian Accident Clustering in this study is specified by South Sydney Council as a length up to 50 metres long with three or more pedestrian accidents over five years, or an intersection with five or more pedestrian accidents over five years. Clusters of pedestrian accidents are shown in Figure 5 and are noted in the following locations:

- Botany Road/Raglan Street
- Regent Street/Redfern Street
- Redfern Street/Pitt Street
- Gibbons Street/Lawson Street
- Elizabeth Street/Phillip Street
- Cleveland Street/Elizabeth Street
- Cleveland Street/Wilton Street
- Cleveland Street/Crown Street/Baptist Street
- Cleveland Street/Bourke Street
- Oxford Street/Crowd Street
- Oxford Street/Palmer Street
- Oxford Street, Taylor Square
- Oxford Street/South Dowling Street
- Oxford Street, at staggered intersection of Oatley and Ormond Streets
- Oxford Street west of Taylor Square for around 60 metres
- Flinders Street/South Darling Street
- Flinders Street south of Oxford Street for around 160 metres.

### 4.3.3 Facility User Group Profiles and Vulnerable Pedestrian Accidents

The five years of accident data was also grouped into Facility User Group Profiles (FUGP), as shown in Table 4.

**Table 4 Accidents by Facility User Group Profiles**

FUGP Groups	Injury Accidents	Fatal Accidents	Total Accidents*
0 – 4 years	1	0	1
5 – 8 years	4	0	4
9 – 11 years	7	0	7
12 – 17 years	20	0	20
18 – 25 years	86	0	89
26 – 39 years	146	2	148
40 – 59 years	94	0	96
60 – 69 years	26	0	26
70 + years	33	1	34
Total*	417	3	425

\* The total is different to the total shown in Table 2 as the age of pedestrian was not available in some accident records.

The location of accidents involving children (15 years and below, representing children up to junior high school), and the elderly (60 years and above) are shown in Figure 6. There were a total of 20 pedestrian involving children aged 15 years and younger, and 60 pedestrians accidents involving elderly aged 60 years and over.

Of the 20 accidents involving young pedestrians in the Study Area, 11 were near side accidents (RUM 000), 1 was emerging (RUM 001) and 8 were far side accidents (RUM 002). Fifteen (15) of the accidents occurred in the Redfern area, particularly in the following areas:

- Cleveland Street between Elizabeth Street and Bourke Street
- Phillip Street between Elizabeth Street and Morehead Street.

Of the 60 accidents involving elderly pedestrians in the Study area, 37 were near side accidents (RUM 000), 1 was emerging (RUM 001), 13 were far side accidents (RUM 002) and 9 were other types of pedestrian accidents.

Thirty-four (34) of the accidents occurred in the Redfern area, particularly in the following areas:

- Elizabeth Street between Redfern Street and Phillip Street, along Redfern Park,
- Bourke Street at Cleveland Street and south of Cleveland Street,
- Redfern Street/Regent Street/Cope Street intersection,
- Raglan Street between Cope Street and Botany Road.

Apart from locations within the Redfern area, groups of accidents involving elderly pedestrians were also observed along Fitzroy Street and Oxford Street where there is a high concentration of other pedestrian accidents.

## Contents

- Pedestrian Route Network
- Facilities Standard
- General Routes
- Low Priority Routes
- High Priority Routes
- Special Routes



## 5. PEDESTRIAN NETWORK AND FACILITIES STANDARD

### 5.1 Pedestrian Route Network

The South Sydney PAMP Route Network is shown on Figure 9. The high and low priority routes were established by examining the following factors:

- the location of pedestrian accidents;
- hazardous locations identified through the community consultation process;
- key pedestrian routes identified through the community consultation process;
- the location of pedestrian generators and attractors; and
- path nature.

### 5.2 Facilities Standard

A general facilities standard guideline is developed for this study area in South Sydney based on information reviewed in the literature review, comments from the public consultation process and nature of the pedestrian demand and environment in the study area. General standards and recommendations are presented in this section while recommendations for high priority routes, low priority routes, and other routes are presented in Sections 5.3-5.5.

#### 5.2.1 Path Surface and Dimension

##### 5.2.1.1 Path Provision

Path surface and dimensions standards and guidelines are addressed in Austroads Part 13: Pedestrians, Austroads Part 14: Bicycles and in the Australian Standard 1428 series. According to Austroads, all roads (with the exception of an Access Place) should have some type of walking facility out of the vehicle path. A separate walkway is preferable, however a roadway shoulder can also provide safer pedestrian accommodation than walking in traffic lanes.

The building edge should be kept clear of any obstructions such as outdoor dining areas, retail activities, and other structures for the same reason. For location where such obstruction is necessary, the clear width of the remaining footpath should meet the minimum standard and the obstruction should be delineated from the footpath with structure that is solid along the ground.

##### 5.2.1.2 Path Surface

Surface treatment should be stable, firm even and relatively smooth but slip resistant. It is also important for many people that surfaces be flat. General comments in Austroads in some common paving materials are provided below in Table 5.

**Table 5 Surface Treatments**

Surface Treatment	Comment
Concrete and asphalt	<ul style="list-style-type: none"> <li>Generally the most functional appropriate.</li> <li>Preferred where a footpath is on a gradient, especially where it can become wet.</li> <li>Concrete and other light coloured surfaces are preferred in hot climate as they radiate less heat.</li> </ul>
Pavers and bricks	<ul style="list-style-type: none"> <li>Glazed surfaces can become slippery when wet, therefore pavers and bricks used on footways in external areas should not be glazed.</li> <li>The provision of a firm well-compacted base (preferably concrete) is essential when used for pedestrian paths.</li> <li>People with sight impairments frequently use difference in pavement colour as a means of guidance. They can find the variation of colour that occurs in surfaces composed of pavers confusing.</li> <li>Bluestone pitches are sometimes used as pavers in LATM treatments. They can often fail the flatness test and are difficult to negotiate for people in wheelchairs.</li> </ul>
Loose surface materials	<ul style="list-style-type: none"> <li>Avoid the use of exposed aggregate, gravel, soil, sand, grass and tanbark surfacing on pedestrian routes, other than recreational routes. Even though they can be less expensive, and more aesthetic, some people find them difficult to work on and they can impose severe difficulties for people in wheelchairs.</li> <li>Where these surfaces re used adequate crossfall should be provided to ensure that good drainage occurs.</li> </ul>

Source: Austroads part 13: Pedestrian, p24

### 5.2.1.3 Path Dimensions

Path dimensions are addressed in AS 1428 and Austroads Part 13 & 14. The clear requirements outlined in these documents are provided in Table 6.

**Table 6 Width Requirements for Paths**

Type of Use	Required width
General minimum width	1.2m
Absolute minimum width	0.9m
High pedestrian volumes	2.4m or greater depending on demand
For wheelchairs to pass	1.8m
Absolute minimum	1.5m
For people with disabilities	1.0m to 1.8m
For shared (joint use with bicycles) where Cyclist passing in opposite directions are rare	2.0m
Two way cyclists are common, minimal pedestrians	2.5m
Two way cyclists and pedestrians are common	3.0m

Source: Austroads Part 13: Pedestrian, p18

In general a minimum footpath width of 1.2m is considered adequate. However, in high demand locations, such as transport nodes, commercial and main retail locations and entrances to schools, etc., a minimum width of 2.4 metres is recommended. It is understood that South Sydney Council will be adopting a minimum paved width of 1.8m as described in the "Streetscape Master Plan".

AS 1428 adopts a minimum height clearance of 2.0m above the trafficable surface with a preferred height clearance of at least 2.4m.

In addition to this, AS1428 also lists requirements for the design of sloped footpaths. The requirements for landings of at least 1.2m long and maximum lengths of sloped footpaths are dependent on the gradient of the slope. These are included in Table 7 below.

**Table 7 Design Requirements for Sloped Walkways**

	<b>Gradient (constant along whole length)</b>	<b>Maximum length between landing</b>
Slope	1 in 33	25m <sup>(1)</sup>
	1 in 20	15m <sup>(1)</sup>
	Between 1:33 and 1:20	Linear interpolation from above
Ramp	1 in 14 <sup>(2)</sup>	9m
	Between 1:20 and 1:14 <sup>(2)</sup>	Calculated by linear interpolation

(1) Maximum length can be increased by 30% if one side of a walkway is bounded by handrail as specified in AS 1428.1.

(2) Handrails as specified in AS 128.1 shall be provided on both sides of the ramp

Furthermore, crossfall on footpaths should be as flat as practicable, consistent with achieving an adequately drained surface. Excessive crossfall causes problems for some people. AS1428 specifies that any crossfall should not exceed 1:100. Steeper crossfalls may be provided if drainage problems are expected, but should not exceed 1:40. In South Sydney Council area, due to the local conditions, Council has indicated that a crossfall of 1:40 will be adopted as standard to address drainage issues and to prevent flows into premises.

#### 5.2.1.4 Tactile Ground Surface Indicators (TGSI)

According to AS 1428.4, TGSI can be used to “alert people who are blind or vision impaired to pending obstacles or hazards on, or changes in direction and location points of, the continuous accessible path of travel, where those hazards or changes could not reasonably be expected or anticipated using existing tactile and environmental cues. Tactile tiles or grooving (as outlined in AS 1428.4) should be provided at road crossings to indicate the edge of the roadway to pedestrians with sight impairments.

#### 5.2.2 Crossing Facilities

At all road crossings, kerb ramps should be provided for pedestrian to gain access to roadway with minimum impediment. They are also essential for people in wheelchairs and other pedestrians with mobility impairments. Kerb ramps should be aligned in the direction of travel. A diagram of appropriate kerb ramp design is provided in Appendix E.

Due to the topography and the established nature of the study area, it may not be possible to install the standard kerb ramp as shown in Appendix E. For example, compliance on the maximum ramp grade and ramp length requirement may be difficult along some steep street; and location of a kerb ramp may be compromised by existing services that would be difficult and costly to replace. In these circumstances, a best-fit solution may be the only reasonable solution. For non-standard kerb ramp design and placement, the following should be satisfied:

- The ramp path should be at least 1 metre wide,
- The ramp should land within the pedestrian crossing zone and not into vehicle paths. This is of particular concerns for kerb ramps at corners.
- There should be no lip or step.
- The link between the path of travel and the offset kerb ramp should be paved.

- There should be at least 1 metre clear width of footpath around the kerb ramp to allow most wheelchairs to pass without being affected by the grade changes in the kerb ramp.

Determining the appropriate crossing facility to install is mostly dependent on pedestrian and traffic volumes as well as the nature of the surrounding area. According to Austroads the provision of formal pedestrian crossing facilities should be considered when at least one of the following conditions exist:

- Whenever there is the need for increase visibility and designation of the crossing area, where pedestrian cross at numerous locations along a short section of road and a formal crossing would serve to channel pedestrian crossing activity to a single point;
- Where there is substantial conflict between motorist and pedestrian movements;
- Where the best location for pedestrians to cross may be unclear due to geometric or traffic operational conditions; and
- At locations recommended as part of the “Safe Routes to Schools” scheme.

Australian Standard 1742.10 specified installation guidelines in the form of numerical warrants for the establishment of a crossing. These warrants are included in Appendix E.

In addition to these numerical warrants, Austroads also provides a guide to the most appropriate crossing type for each road classification. This guide is included in Table 8.

**Table 8 Suitability of Crossing Type**

Facility	Road Classification			
	Primary Arterial (non-freeway)	Secondary/ Sub Arterial	Collector Road/Local Crossing Road	Local Street
Pedestrian operated signals	A	A	C	Pedestrian device should not be needed
Pelican	B	A	C	
Pedestrian operated school signals	A	A	B	
Pedestrian (zebra) crossing	C	B	B	
Children’s crossing	C	B	A	
Pedestrian refuges	B	B	A	
Footpath (kerb) extension	C	B	A	
Road narrowings indented parking, kerb extension, line marking	C	C	A	
A	Most likely to be appropriate treatment			
B	May be an appropriate treatment			
C	Inappropriate treatment			

Source: Austroads Part 13: Pedestrian, pp 28-29

It should be noted that neither numerical warrants, or the guidelines provided above should be taken as the sole criteria for determining the requirement for a particular facility. Austroads recommends that a careful engineering study be conducted, considering matters such as safety and capacity to fully determine the need for a crossing facility.

### 5.2.3 Other Facilities

#### *Bus Shelters*

Austroads recommends that all bus stops should be provided with adequate signage, lighting, and related treatments to clearly identify them. All shelters should be adequately lit, have

Australian Standard seating and be as draft proof as possible. All bus stops should also be accessible.

### ***Street Furniture***

According to AS 1428.2 all items of street furniture should be positioned away from the path of travel and should be of a colour which contrasts with its background. Where possible, furniture should not be position along the building line as it is used as a physical cue for people with sight impairments.

All seating should meet the standard measurements in Appendix E. In addition, AS 1428.2 states that in areas of high use by people with ambulatory disabilities, such as areas frequented by elderly peoples, seats should be provided no more than 60m apart alongside the path of travel.

### ***Directional Signage***

The issue of directional signage placement is addressed in Austroads part 13. For a standing person signs should be placed less than 10° above or below eye level; for a seated person signs within 15° of eye level are acceptable. Signs mounted between 900mm and 1.5m from the group level provide the most appropriate compromise between the requirements of seated and standing people. All signs should be placed within 30° horizontally of the direction of travel to allow them to be easily read whilst will maintaining a clear path of travel. Diagrams to assist in understanding these requirements as provided in Appendix E.

## **5.3 General Routes**

### **5.3.1 Definition**

The study area defined in this South Sydney Council study generally has a high level of pedestrian activities. With a significant proportion of medium to high-density housing typical of inner Sydney and access to a number of key transport nodes, there are significant local pedestrian activities throughout the study area. In addition, there are also special event pedestrian demands generated by the sports and entertainment facilities in the Moore Park precinct, student demand generated by the various schools, and tourist visitation generated by key entertainment streets. Therefore, this study recommends a minimum level of pedestrian facilities for those streets not included in high and low priority routes.

### **5.3.2 Path Surface and Dimension**

All roads in the study area should have paved footpath on both sides, with a minimum width of 1.2 metres where possible. The paths provided should meet the minimum dimension requirements stated in Section 5.2.1.

### **5.3.3 Crossing Facilities**

The installation of crossing facilities would be dependent on the ability of a location to meet the numerical warrants, taking into account the local features of the area.

### **5.3.4 Lighting**

Lighting meeting the requirements of AS 1158 is recommended for all pedestrian generators and attractors and around any hazard spots. Lighting should also be adequate at crossing points.

### **5.3.5 Other Facilities**

No specific other facilities are recommended for general routes. However in areas frequented by the elderly, AS 1428.2 seating is recommended at 60m to 100m apart (see Section 6.7.2).

## 5.4 Low Priority Routes

### 5.4.1 Definition

In general, low priority routes provide access to pedestrian attractors and generators. They also connect with the core high priority routes and extend the pedestrian network over the study area. Some examples are routes to local shopping areas, bus routes and local parks.

### 5.4.2 Path Surface and Dimension

All roads in the study area should have paved footpath on both sides, with width of 1.2 metres minimal and 2.4 metres adjacent to key pedestrian generators. The paths provided should meet the minimum dimension requirements stated in 5.2.1. Australian Standard kerb ramp should be provided at road crossings along the path of travel.

### 5.4.3 Crossing Facilities

The installation of crossing facilities would be dependent on the ability of a location to meet the numerical warrants, taking into account the local features of the area. At intersections with major traffic routes where crossing opportunities are limited, pedestrian crossings should be considered even if warrants are not met. A similar approach was adopted for installation of crossings over South Dowling Street and the Eastern Distributor for pedestrian connectivity.

### 5.4.4 Lighting

Lighting meeting the AS 1158 requirements is recommended for all pedestrian generators and attractors and around any hazard spots. Lighting should also be adequate at crossing points.

### 5.4.5 Other Facilities

It is recommended that bus shelters be provided along low priority routes at major stops where pedestrians are not already protected by other structures such as building awnings. As with the general route requirements, Australian Standard seating should also be provided in areas frequented by the elderly.

## 5.5 High Priority Routes

### 5.5.1 Definition

In general, high priority routes are routes that provide access to the most significant pedestrian attractors and generators, particularly those connecting to major public transport nodes. They also form the skeleton of the pedestrian network and provide the pedestrian trunk routes through the study area. These routes would often experience high pedestrian demand. Typical examples are routes accessing railway stations and major shopping areas.

### 5.5.2 Path Surface and Dimension

All roads in the study area should have paved footpaths on both sides, with a minimum width of 2.4 metres where possible. The paths provided should meet the minimum dimension requirements stated in Section 5.2.1.

All paths of travel along high priority routes should be fitted with Australian Standard kerb ramps. Tactile indicators (Section 5.2.1.4) should be provided at crossing points, steps, ramps and other obstacles. Additional requirements outlined in Section 5.2.1 such as type and positioning of grates should also be adhered to.

### 5.5.3 Crossing Facilities

The installation of crossing facilities would be dependent on the ability of a location to meet the numerical warrants, taking into account the local features of the area. At intersections with major traffic routes where crossing opportunities are limited, pedestrian crossings should be considered even if warrants are not met. A similar approach was adopted for installation of crossings over South Dowling Street and the Eastern Distributor for pedestrian connectivity.

### 5.5.4 Lighting

Lighting meeting the AS 1158 requirements is recommended for all pedestrian generators and attractors and around any hazard spots. Lighting should also be adequate at crossing points.

### 5.5.5 Other Facilities

Additional facilities recommended along high priority routes include bus shelters at key stops, seating at all bus stops, directional signage, bins and seating at 60m to 100m intervals. All additional facilities should meet the requirements outlined in Section 5.2.1. Facilities should not be placed along the building edge as this is used as guidance by persons with vision impairment.

The building edge should be kept clear of any obstructions such as outdoor dining areas, retail activities, and other structures for the same reason. For locations where such obstruction is necessary, the clear width of the remaining footpath should meet the minimum standard and the obstruction should be delineated from the footpath with a structure that is solid along the ground.

## 5.6 Special Routes

### 5.6.1 Central Station to Moore Park

A key pedestrian route identified in the study is the sign posted route along Foveaux Street between Central Station and the Moore Park precinct. Observations during the field audit confirmed that the gradient between Bellevue Street and Riley Street exceeds the maximum gradient specified in the Australian Standard<sup>3</sup> (1 in 14 for ramps). The average gradient along that section (170m) is around 1 in 10, with the steepest section between Corden Street and Little Riley Street at around 1 in 7.

Devonshire Street offers a more even climb from Elizabeth Street to Crown Street for pedestrian with mobility impairments. The steepest section is around 1 in 15 averaged between Holt Street and Waterloo Street. A possible route between Central and Moore Park along Devonshire Street is included in Figure 9. The northern footpath is preferred as large trees on the kerb side restrict the width of the southern footpath around Northcott Place.

The following issues should be considered in developing the Devonshire Street route as the accessible alternative to the Foveaux Street route:

- Provide Australian Standard kerb ramps and tactile paving at road crossing along the route.
- Investigate options for locating landings along the route or off the path of travel to provide rest areas for pedestrians. The possibilities for landing along the path are likely to be limited due to the steep terrain. However, there may be some options to incorporate off

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<sup>3</sup>Standards as described in AS 1428. The standard for ramp grades and design is not always directly applicable to public footpath as it generally follows the grade of the street. However, it is applied to this route as the Devonshire Street route is proposed as the accessible alternative to the Foveaux Street route between Central Station and Moore Park.

path landings into the street access into buildings or along particular wide section of the path.

- Investigate the installation of handrails where gradient exceeds 1 in 20.
- Investigate the placement of Australian Standard seating outside the path of travel at 60 to 100m intervals to provide rest opportunity during the climb.
- Provide signage at both the Foveaux Street and Devonshire Street entrances to Central Station to inform pedestrian of the route options. The Foveaux Street entrance is an accessible entrance and signage should be placed there to inform pedestrian of the alternate route along Devonshire Street.
- Direction signage is also recommended at the junction of:
  - Foveaux Street and Elizabeth Street,
  - Devonshire Street and Elizabeth Street,
  - Devonshire Street and Crown Street,
  - Foveaux Street and Crown Street, and
  - Foveaux Street and Fitzroy Street.

The estimated costs of the above work is presented in Appendix H.

### 5.6.2 Smartpaths Program

The study area experiences a large increase in visitors during special events and sporting events at the Moore Park precinct. To deal with the increase in pedestrian, the Council has developed a Smartpaths program and as part of this program, pedestrian routes have been identified and signposted. The existing signposted path included Central to Moore Park (as discussed in 5.6.1) and Oxford Street (Taylor Square) to Moore Park via Flinders Street.

There are opportunities to extend the program to other key pedestrian desire lines. This study identifies the following options:

- Continuation of Moore Park to Taylor Square by extending the path to Kings Cross via Darlinghurst Road.
- Redfern Station to Moore Park via Redfern Street and Cleveland Street.
- Bondi Junction to Moore Park via Oxford Street and Moore Park Road.

Parts of the above routes have already been identified as part of the pedestrian network (Figure 9). The suggested routes can be investigated further in future development of the Smartpaths program.

### 5.6.3 Footpath Seating

The location of the housing estates in the study area is shown in Figure 4. Residents in the estate have low car ownership and are more dependent on walking and public transport. Furthermore, there is a significant proportion of elderly residents. This study recommends that seating be provided on the streets surrounding the estate and along the path to the nearest local shops. The selection and placement of seats should meet the requirements outlined in Section 5.2.1. Suggested locations for seating are shown in Table 9 and Figure 8. The estimated cost of the work is included in Appendix H.

**Table 9 Footpath for Additional Seating**

<b>Location</b>	<b>Length</b>	<b>Sides</b>
Raglan Street between Botany Road and Pitt Street	400 m	Both
Pitt Street between Raglan Street and Phillip Street	140 m	West
Phillip Street between Cope street and Chalmers Street	440 m	South
Cope Street between Phillip Street and Raglan Street	120 m	East
Chalmers Street between Phillip Street and Redfern Street	330 m	East
Redfern Street between Chalmers Street and Young Street	450 m	South
Kettle Street between Redfern Park and Morehead Street	180 m	Both
Morehead Street between Redfern Street and Phillip Street	330 m	Both
Young Street between Redfern Street and Phillip Street	330 m	West
Phillip Street between Young Street and Moorehead Street	90 m	North
Devonshire Street between Chalmers Street and Crown Street	700 m	Both
Belvoir Street between Clisdell Street and Ward Park	150 m	north